

Inter-Society Color Council *News*

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Alessi for the outstanding job that she did as president. I will continue to look to her for assistance and support, as I perform the duties of this office. I also want to thank the outgoing directors, Dr. Ellen Carter, Dr. Joann Taylor and Ms. Magenta Yglesias for their outstanding efforts in promoting the aims of the ISCC.

I challenge the incoming directors, Mr. Mike Hammel, Mr. Rich Riffel and Mr. Bill Vogel to give the level of commitment and support as those leaving. I am sure they will, and I look forward to working with them over the next several years.

The ISCC will be opening an office in the near future. We will have a part time staff person that will man the office and perform many needed functions for this organization.

The address will be: Inter-Society Color Council, Suite 301, 11491 Sunset Hills Rd., Reston Va., 22090. Our phone numbers will be: Voice (703) 318-0263, FAX 703 318-0514.

Please DO NOT USE these yet, as the office will not be open until near the end of June. We are in the process of selecting a staff person to fill the position and the office.

I will be calling on many of you to assist in helping the ISCC by working at a number of tasks. I am sure that I will have the usual good response from members in volunteering their time and efforts. Together we can continue the excellent heritage of the ISCC.

Roland Connelly
President

PRESIDENT'S COLUMN

RC

I just wanted to say a word of welcome to all of the members and to say how excited I am about the future of this organization. I am

just beginning my 2 year term as president and I hope to have a letter in each newsletter to help keep everyone informed about the business of the ISCC. I may miss one from time to time, as business needs may dictate, but I will endeavor to meet this schedule.

The council and I owe a great deal of thanks to Ms. Paula

TEN YEARS IN REVIEW

The Richard S. Hunter Professorship and the Munsell Color Science Laboratory (MCSL) were both established in the fall of 1983. Thus, this annual report coincides with their ten-year anniversaries. I came to RIT during February of 1984 and during my first two weeks I experienced a two-foot snow storm, a heated discussion with a color photography professor about the differences between metamerism and color constancy, and the inaugural conference of the Laboratory where I was "asked" (with a 5 minute warning by Franc Grum) to moderate one of the technical sessions. This report also coincides with my ten-year anniversary at RIT. The pace and diversity of my first two weeks is representative of my first ten years. Our diversity of students, RIT colleagues engaged in color of one type or another, industries and agencies supporting our programs, and research

seems unparalleled in our field. The opportunities that result from this diversity as we head into our second decade are tremendous. I would hope that if Richard Hunter, Dorothy Nickerson, Gunter Wyzecki, and Franc Grum were alive today, they would still be as excited about the Professorship and Laboratory as they were when RIT first made formal proposals to establish both endowments.

Looking back over the first decade, we experienced two complete developmental phases and entered our third phase. Our first phase was acquisitional. RIT's commitment was enthusiastic. Start-up funds were used to purchase an extensive computer system and support a graduate student, R. Mitchell Miller, whose responsibilities included systems administration and instrument repair and interfacing. A second faculty position was also established. Franc Grum, as the first Hunter Professor, used his considerable contacts and leverage to equip the Laboratory with spectrophotometers, colorimeters, vision tests, color order systems, standard reference materials, and texts and periodicals. The Hunters and former Trustees of the Munsell Foundation (most forming the first Laboratory Advisory Board) also made significant donations and helped obtain unrestricted grants to promote color science education. When I arrived in February, the Laboratory was well equipped. By 1986, industrial education was well established and a Master of Science in Color Science was promulgated by the New York State Board of Education. The generosity of the color community cannot be overstated; their unequivocal support got us up and running very quickly.

The second phase was a "show me" phase. The color community wanted to see what we would do with all the equipment and whether their trust was warranted. The success of our students in the workplace, the attendance and relevance of our industrial courses, the quality, utility, and fundability of our research, and our involvement in the color community are all metrics that

can be used to evaluate whether we have "made good" on the community's initial investment. It must be noted that the early graduate students, faculty, and staff, and all of our family members were exceedingly patient and equally committed. As this second phase began, Franc Grum was killed; only through everyone's hard work and loyalty were we able to move through this critical phase. This past year seemed like a reunion from this time period. At the SPIE/IS&T San Jose conference on device-independent color imaging, I experienced my first student, Eric Walowit, presenting a seminar on colorimetry and device characterization. Ricardo Motta chaired the conference. At meetings or on site at their companies, I have seen Mike Beering, Chris Pearson, Steven Bloomberg, Mitch Balonon-Rosen, Andy Juenger, Rich Riffel, and Mark Gorzynski. They are all contributing to our field.

Several years ago, the third phase began. In this phase, our main areas of research should be defined and funded, our graduate education well established, our industrial education should be meeting current needs, we should be taking a leadership role in the color community, and we should use RIT's tremendous color resources to their full advantage. Our status concerning all of these points are described within this report. I hope you will agree that we are well into this third phase.

What of the future? At a personal level, I am interested in spectral color reproduction and colorant formulation applied to imaging. Using multi-spectral input, spectral printing models, and Kubelka-Munk turbid-media theory, more accurate color reproduction should be possible than using noncolorimetric-trichromatic input and densitometric printing models. Two recent graduates with a large positive impact on the Laboratory, Mike Stokes and Amy North, were involved at the beginning stages where we exhausted regression and benchmarked its limitations. Current students, Tim Kohler, Debra Vent, James Shyu, Peter Burns, Jim Adams,

Hae-Kyung Shin, and Glenn Miller, are all contributing to our understanding of the opportunities and limitations of spectral approaches. Appearance models continue to hold my interest. When I interviewed at RIT, I presented a lecture on chromatic adaptation and color constancy based on my dissertation research. Developing a color-constant color-order system was quickly replaced with modeling electrophotography with Kubelka-Munk turbid media theory and the Neugebauer equations, the Laboratory's first research grant. Fortunately, Mark Fairchild has taken a leadership role in studying chromatic adaptation and color appearance. In our first decade, Mark has grown from a undergraduate in photographic science to a tenured professor with sufficient expertise to chair a CIE technical committee on color appearance! At RIT, we have leading programs in photography, printing, and graphic design. Our research results can be implemented and tested within a real-life context. The potential exists at RIT to make significant advances in digital-based color reproduction. Ultimately, I would like to improve the color reproduction of artwork and high-quality consumer catalogs, and use these techniques for image-based information storage and retrieval. Educationally, I would like to develop more efficient and interactive methods of teaching colorimetry and its application to the quality assurance of color materials and as a communication tool for digital imaging. Emerging multi-media may hold the key to significant educational advances.

What of the future of the Munsell Color Science Laboratory? I hope to maintain an environment where faculty, staff, students, and visiting scientists can learn and grow beyond their expectations and where they are never limited by a lack of facilities. I would also like to attract more students and scholars with interests in art, design, colorant formulation, and the quality assurance of materials.

In closing, I would like to thank the many individuals in the color community who have helped us along

the way during our first decade. I sincerely hope we've earned your trust and future support as we enter our second decade. I would also like to thank my staff, Lisa and Colleen, my colleague, Mark, and my family, Susan and Abby, all of our students, and Mrs. Elizabeth Hunter for their contributions to the Hunter Professorship and the Munsell Color Science Laboratory; they have been significant.

*Roy S. Berns, Richard S. Hunter
Professor and Director, MCSL*

THE 1994 ISCC POSTER PAPERS SESSION WAS A BIG HIT!!!

The poster papers session at the 1994 meeting in Detroit was a big success. There were ten innovative poster papers and demonstrations. This represented a large jump in the number of participants over recent years. The Poster Papers covered a wide range of topics in both the sciences and the arts. They were available to participants for the duration of the conference during break time, and provided the backdrop for many interesting discussions.

Magenta Yglesias presented the just released computerized version of Josef Albers' classic book, *The Interaction of Color*, by Yale University Press. This CD-ROM package contains the complete set of images found in Albers' rare extended version of the book, and conference participants were able to conduct interactive explorations.

Arthur Shapiro and James Jeness presented a poster paper keeping ISCC members abreast of color-related research of the Optical Society of America. This poster related recent OSA contributions regarding the CIE color matching functions, cone fundamentals, chromatic and luminance discrimination, color appearance, color constancy, and adaptation.

Anna Campbell Bliss illustrated

color problems encountered in a recent design project. A stained glass window installation was followed through several stages, from computer graphics to slides to photographs of the finished project. Each stage of the project presented different problems in the transportability of color.

James DeGroff demonstrated a spectral analyzer using light emitting diodes as a light source. This new device is available as a result of recent advances in LED technology.

The ISCC Poster Papers sessions has recently changed to allow oral presenters to augment their oral presentations. Six of the ten posters presented took advantage of this new opportunity.

The Rochester Institute of Technology presented two posters as adjuncts to the presentation of the education committee. Glenn Miller, Hae Kyung Shin, and M. James Shyu authored a poster celebrating the forming of the first ISCC student chapter, and gave information on the formation of other chapters.

Prof. Bob Chung presented a poster containing his "Top Ten" list of myths about color that are commonly accepted. Also, RIT's Audrey Lester presented results of an investigation of slide film thermochromism. This study found significant excursions in color accuracy of Kodak Ektrachrome 100 film in extreme temperature environments. Margaret Walch presented a poster displaying automotive color palettes forecasted for this decade. This augmented her talk, in which she described several generations of color trends and their influence on palettes which appeal to us today.

Harry Hammond and Norbert Johnson summarized activities of the ASTM Committee E-12 on appearance. The ASTM has recently added committees and revised previous work. This adjunct to their talk provided brochures and samples of their latest publications for attendees to look over.

Finally, Philip Bradfield demonstrated a new light booth which

he had talked about. In this light booth, the color temperature or the white illuminant is easily and quickly adjusted with a slide control.

Clearly, these stimulating presentations covered the wide range of interests in color in art, science, and industry. We applaud your contributions!

CONTRIBUTED PAPERS SESSION ANNOUNCED

Do you have interests in color which the ISCC should know of? Annual meetings have specific focuses and directions, and participants often have interests which fall outside the domain of already-formed Project Committees or Interest Groups.

In order to encourage outside interests to participate, the ISCC is offering a new vehicle. At its annual meetings, the ISCC will now feature a Contributed Papers Session. The range of topics is completely open.

Authors are asked, however, to examine the subjects of any other meeting sessions, and submit their paper there if its subject matter is appropriate. As with other contributions, the presentations must be non-commercial in nature.

Also, the poster papers sessions have been expanded to allow all oral presenters a chance to demonstrate or clarify the content of their talks in other sessions at the meeting. If you intend to give an oral presentation at an upcoming meeting, you may also wish to submit a poster paper to clarify your ideas or to demonstrate the visual phenomena you are interested in. We want to know what is happening in your area of color. Please see future Calls for Papers for more information.

*Ronald Oldchurch
Inter-Society Color Council
Chair, Contributed Papers
Committee*

CALL FOR CONTRIBUTED PAPERS

ISCC Annual Meeting, April
23-25 1995

There will be a *Contributed Papers* Session at the 1995 ISCC Annual Meeting in Greensboro, North Carolina. The intent of this session is to provide a vehicle which could be used by all ISCC members to share state-of-the-art color information in oral form. Whether you are an artist, scientist, industrialist, educator, student, or researcher, we want to hear what is new in your area of color.

The topics for this *Contributed Papers* Session are completely open. Authors are asked, however, to examine the subjects of any other meeting sessions, and submit their paper there if its subject matter is appropriate. Each contribution should represent original work of a non-commercial nature, of interest to the ISCC membership and suitable for oral presentation.

This *Contributed Papers* Session will provide you with an excellent opportunity to present the innovative color work that you may be doing on a daily basis to color-interested colleagues attending the meeting. If your topic is more appropriate for a Poster than an oral presentation, you are encouraged to submit it to the *Poster Papers* session at the same meeting, or to prepare a *Poster Paper* augmenting your oral presentation.

Please send entries, in the form of a title and abstract to:

Ron Oldchurch
Chair, *Contributed Papers*
1680 N Hwy 101 #11
Leucadia, CA 92024
Phone/Fax: 619-943-7029
The deadline for entries is
February 1, 1995.

CALL FOR POSTER PAPERS

ISCC Annual Meeting, April
23-25 1995

There will be a *Poster Papers* Session at the 1995 ISCC Annual Meeting in Greensboro, North Carolina. The intent is to provide a vehicle which could be used by all ISCC members to share state-of-the-art color information in written form. Whether you are an artist, scientist, industrialist, educator, student, or researcher, we want to hear what is new in your area of color.

The topics for this *Poster Papers* Session are completely open. Each poster contribution should represent original work of a non-commercial nature, which is suitable for presentation even if the author is not present.

This *Poster Papers* Session will provide you with an excellent opportunity to present the innovative color work that you may be doing on a daily basis to color-interested colleagues attending the meeting.

Please send entries, in the form of a title and abstract to:

Ron Oldchurch
Chair, *Contributed Papers*
1680 N Hwy 101 #11
Leucadia, CA 92024
Phone/Fax: 619-943-7029
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ISCC EDUCATION MEETING NOTES OF THE STUDENT CHAPTER ACTIVITIES

ISCC Annual Meeting

The Education Meeting began with a brief introduction by the RIT student chapter. Three of the officers, Meredith Payne, president-elect, Jason Gibson, treasurer, and Audrey Lester, secretary, gave an overview of the chapter's year-long activities and presented the banner. The banner was collectively designed with the guidance of the ISCC Board members. Its design may be easily modified for new chapters to include a different color and their university name. The University of Chicago is in the process of establishing the second student chapter.

Open Forum

Next the meeting was opened to the audience and representatives from other universities were asked to describe their plans to increase student participation in the ISCC. Jim Wade from Southwest informed Bob Chung that a new dean has just begun directing his department. While they need more funding, some support may be available.

Joel Pokorny, from the University of Chicago was pleased to inform us that two students have volunteered to start a student chapter. He hopes this group will establish a forum in which students are exposed to other aspects of color.

Helen Atts from the University of Georgia, Department of Textiles, stated a need to improve interest in establishment of a student chapter.

Bill Longley from Eastern Michigan University was concerned that his department needed more instructors. Until that shortage was filled, there would not be enough faculty support to begin a student chapter.

In order to encourage student enrollment in the chapters, Bob Chung proposed setting aside space in the ISCC newsletter and in *Color Research and Application* for employment information. The student chapters may also be able to use this space to highlight recent graduates' skills, thus giving them a large forum from which to launch a job search.

The Individual Member Group expressed a desire to get more student input. Perhaps a student representative would volunteer to become a voting member of the IMG.

Mike Hammel challenged industrial ISCC members with contacts at the university level to encourage formation of student chapters.

Lou Graham stressed the importance of the student chapters. Their activity will encourage a variety of areas within the college arena to talk with each other.

Roy Berns from RIT, discussed activities of the RIT Color Consortium. This is a group of faculty members who meet on a regular basis. Throughout the year these members set-up tours or talks (open to all university members) describing state-of-the-art technology or recent research. Topics discussed during the past year include: direct digital printing, art conservation, and digital photography/preparation of a magazine strictly from digital sources. He expressed a need to increase facilities and joint research projects.

Ralph Stanzola recommended a one day course at universities. It needs to be stressed that color is more than physics.

Demystify Color

The majority of the Education Meeting was a series of interactive demonstrations to share techniques that explain color concepts. As explained by Glenn Miller: "Teaching and learning color become a lot easier and fun if the visual sensation is engaged in the learning process."

A color handout explaining 10 myths was prepared by Bob Chung and Ann Marie Scamacca which aided the discussion. Using 3 projectors, a variety

of filters, color separation records, and spinning wheels, a wide array of visual color perceptions were explored. Franz Sigg donated several handmade instruments which were used to demonstrate color theory as well. Participants from the audience shared with Bob Chung other demonstrations they have used.

This section was very creative and entertaining. Suggestions from observers were very helpful too. Wade Thompson suggested the presentation could provide the basis for a text. However there were some concerns about copyright issues.

If you would like a copy of the handout for "Demystifying Color" you may contact:

Professor Bob Chung at RIT/SPMS, 69 Lomb Memorial Drive, Rochester, New York, 14623-5603.

ISCC INTEREST GROUP I: FUNDAMENTAL AND APPLIED COLOR RESEARCH

REPORT, May 16, 1994

ISCC Interest Group I: Fundamental and Applied Color Research held a contributed papers session on Monday, April 25, 1994 during the ISCC annual meeting in Troy, Michigan. The session was very well attended and provided presentations on a variety of interesting topics.

The first presentation was an Investigation of a "Reported Failure of Optical Reciprocity" by David L. Spooner of rhoMetric Associates in which some causes for reported failures of Helmholtz's concept of optical reversibility were explained. Typically such discrepancies are caused by other changes in the instrumentation when 45/0 measurements are compared with 0/45 measurements. Careful measurements usually reaffirm

Helmholtz's concept.

Next, Yan Liu, James Shigley, Emmanuel Fritsch, and Scott Hemphill of Gemological Institute of America presented research on "The Alexandrite Effect of Polarized and Unpolarized Light along the Three Crystallographic Axes of Synthetic Alexandrite". This work analyzed chromatic changes in the gemstone Alexandrite as a function of illumination color, polarization, and orientation of the crystal. It provided some interesting quantitative colorimetry that could be used to better plan the cutting of gemstones to produce desired color-appearance effects in finished jewelry.

Color CRT displays are often used not only for the presentation of color images, but for color vision experiments. Arthur G. Shapiro, Joel Pokorny, and Vivianne C. Smith of the University of Chicago presented an analysis of "Rod-Photoreceptor Activity and Color Television Monitors". They concluded that at medium and high luminance levels (above 35 cd/m²) rod activity is below threshold for all chromaticities displayed. However, at lower luminance levels, rod activity is present for chromaticities near the long-wavelength corner of the chromaticity diagram.

"Colorimetric Analyses of Thermochromism of Ektachrome 100 Plus Professional Transparencies Upon Projection" were presented by Audrey A. Lester and Mark D. Fairchild from Rochester Institute of Technology. This research illustrated how the colors in projected 35mm slides changed significantly when the slides were heated in a typical slide projector. Measurements were also reported that showed permanent degradation of slides (formation of yellow stain) caused by repeated projection.

In a second presentation from the University of Chicago, Qiu Jin, Joel Pokorny, and Vivianne C. Smith discussed "The Role of Spatial Frequency on Color Induction and Color Contrast". This work provided some fascinating psychophysical results quantifying the transition from assimilation to contrast with changes in spatial frequency of the stimuli and analysis of the data in terms of the

physiology of the human visual system.

The session ended with two talks presenting different points of view on the same topic.

First Bill Thornton discussed "Intersections of Matching Spectra, Related to Color Matching in Industry and to Visual Sensitivity", followed by Rolf Kuehni of Miles Incorporated who described "The Determinants of Metameric Crossovers".

Thornton described a debate on the meaning of crossover wavelengths of metameric stimuli that had been going on for approximately 20 years and presented some of the data that sparked the debate.

Kuehni followed with a mathematical examination of what causes the crossovers to tend to fall at certain wavelengths and the interpretation of the results. The ongoing debate revolves around the interpretation of the meaning of the data, not the data itself. While the 20-year debate might not have been resolved, the audience was able to hear both sides first hand and come to their own conclusions.

On another note:

Interest Group I is actively looking for ideas for next year's session. Another contributed papers session can be organized if desired. A suggestion was also made that it might be useful to have some tutorials on specific research techniques given during the interest group meeting. We are also looking for anyone interested in becoming chair or vice-chair of the group.

Anyone having suggestions for next year's meeting or wishing to become more involved in Interest Group I, please contact the current chair:

Mark D. Fairchild
Chair, ISCC Interest Group I,
Fundamental and Applied Color
Research
Munsell Color Science Laboratory
Rochester Institute of Technology
54 Lomb Memorial Drive
Rochester, NY 14623-5604

INTEREST GROUP II REPORT

The 1994 Annual Meeting for ISCC Interest Group II, Industrial Application Of Color, took place at the ISCC meeting in Troy Michigan on April 25. The topic for this years meeting was Color Standardization and it's effect on Quality Management Systems. Several color instrument vendors presented papers on different aspects relating to Color Standardization.

Papers presented included:

Mr. David Alston, Color & Appearance Technology, "New and Improved Tools for Color Quality Control"

Dr. Dan Rich, Datacolor International, "Do Windows Make the Statistics Better?"

Mr. Bill Tuting, Hunterlab, "Considerations for Color Measurement Regarding Repeatability, Reproducibility, and Inter-Instrument Agreement"

Ms. Elaine Becker, Minolta Instrument Systems, "Documenting Your Color Compliance Procedures"

Dr. Philip Bradfield, Tailored Lighting, "NIST-Traceable Calibration of Lighting Booths"

Mr. Russ Steimle, X-Rite, "Portable Proactive Solutions"

A common theme throughout the presentations was the need for users to understand and communicate their color standards information and measurement conditions to their customers and suppliers. A fair number of industrial color measurement problems can be traced to a failure to communicate this information in a formal manner using written procedures, specifications, and work instructions. While the instrument manufacturers can suggest methods to help with the task, the responsibility lies with the users to implement some form of documentation and specification.

At the conclusion of the papers, a question and answer session was held.

Several audience members inquired about how to determine which of the many color metrics should be used as tolerances and if there was a common technique to set these tolerances. Based on the questions, the overall topic of tolerance may be a candidate for the 1995 meeting theme.

It was also brought forward that Interest Group II is currently looking for a new Vice-Chair for 1995 as well as topics for the 1995 meeting. Anyone wishing to offer suggestions for 1995, or is interested in serving as Vice-Chair, should contact Rich Riffel at (908) 236-2311. Any assistance would be appreciated.

INTEREST GROUP III REPORT

1994 Annual Meeting

Special Interest Group III, Art, Design and Psychology presented an exciting and well received session at the April Annual ISCC Meeting in Troy. Margaret Walch, Director of the Color Association of the United States presented a lively lecture on the historic color palettes of automobiles. Ms. Walch's visual's tied together color choice in automobiles to where one is in life, i.e. station wagon to sports car—conservative to "on the wild side".

Mr. Bob Yares, of the Cranbrook Academy of Art, guided 40 attendees from our group on a fascinating tour of the buildings, studios and grounds of the Academy.

Dear Reader: Your Co-Chair, Magenta Yglesias and Wade Thompson will report in more detail on these two events in the next ISCC Newsletter. We also are requesting any and all reports on your activities in Art, Design and Psychology, large or small.

Let us hear from you so that our work can be included in our article!



Highlights of The 1994 Annual ISCC Meeting



As outgoing Director, Ellen Carter receives a Certificate of Appreciation from President Alessi for her three years of dedicated service to the Board.



President Alessi presents Lou Graham with a Certificate of Appreciation for his five years of service as Planning Committee Chair.



As outgoing Director, Joanne Taylor receives a Certificate of Appreciation from President Alessi for her three years of dedicated service to the Board.



President Alessi presents Hugh Fairman with a Certificate of Appreciation for his six years of service as Project Committee 44 Chair.



As outgoing Director, Magenta Yglesias receives a Certificate of Appreciation from President Alessi for her three years of dedicated service to the Board.



President Alessi presents Hugh Fairman with a framed certificate for his dedicated service as Nominating Committee Chair, Problems Committee Coordinator, mentor and all other voluntary jobs he performed over the last two years as Past President.

Highlights of The 1994 Annual ISCC Meeting



President Alessi proudly presents Calvin S. McCany with a framed certificate naming him as an ISCC Honorary Member.



Dr. Robert Boynton rises to give the citation for the 1994 ISCC Godlove Award.



Joyce Davenport gives the citation for the 1994 ISCC Nickerson Service Award.



President Alessi proudly presents Dr. Peter Kaiser the 1994 ISCC Godlove Award.



President Alessi proudly presents Therese Commerford with the 1994 ISCC Nickerson Service Award.



Incoming President Roland Connolly presents Paula Alessi with a framed certificate for her two years of dedicated service as President.

Highlights of The 1994 Annual ISCC Meeting



Outgoing President Alessi presents the gavel to Incoming President Roland Connelly, whose first official duty was to adjourn the meeting.



Romesh Kumar, our Arrangements Chair, is seated hard at work at the registration table. Romesh's efforts were one of the keys to success for this meeting.



Rochester Institute of Technology members of the first ISCC student chapter proudly display their orange and white student banner, which was designed with the help of Bob Chung, Magenta Yglesias and the RIT students themselves. Pictured here from left to right are: Meredith Payne, Audrey Lester, Jason Gibson, Hae Kyung Shin, Glenn Miller, Paula Alessi, Bob Chung, Magenta Yglesias, Jim Shyu, Rick Alfvén, and Karen Braun.



Jim Keiser, the 1994 Annual Meeting Program Chair, rises at the podium to address the luncheon participants. The successful meeting in terms of content and social events is testimony to Jim's many hours of long hard and dedicated work.

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NEWS FROM MEMBER BODIES

CAUS TIDBITS

The Design Experience in Dallas, Texas



Last fall, Design Experience opened at 1400 Turtle Creek Boulevard, near the old Decorative Design Center, in

Dallas Texas. Design Experience presents considerably varied resources: A three-screen theater, computer-aided scanning of products available and design books, referrals to interior designers and architects, and a sample store. For a small fee (\$25 for annual membership), consumers (as well as professionals) gain entry to the designers' world and can on their own, explore possibilities for the home. The facility's design by Neal Stewart Design Associates features playful exterior colors featuring art deco cream showcases stucco with a turquoise trim and an interior palette of contemporary softly muted grayed and browned neutrals.

Red Radios?

"Table radios were made in new colorful plastics so the 'consumer would put a radio in every room'. Between 1930-41, an estimated 71 million radios were sold in the US - most of them plastic. Emerson had called on Bel Geddes to design a radio cabinet with a patriotic theme reflecting the growing nationalism prior to the US entry into W.W.II. A design inspired by the flag was a sales sensation, selling 700 units in one store alone on its debut day."

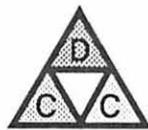
Cooper-Hewitt's "Packaging the New design and the American consumer 1925-1975" on view through August 14.

White at Winter Olympics

Over 200 million spectators saw white as a featured winter color at the Lillehammer Olympics in Norway during the month of February. Think about that! A gold mine of ideas for

colorist and designers. The white capes accented by hand-held, red-white-and blue Norwegian flags. The announcer's uniform - periwinkle blue accented by turquoise lining and gloves. The ethnic explosion of Norse 15th Century costumes. The Cossack red. The vertical stripes which distinguished the Mexican athletes. This great event points up the worldwide interest and swing to sports-oriented apparel and colors.

DETROIT COLOUR COUNCIL



The DCC's 16th annual symposium was held in conjunction with the ISCC's 63rd annual meeting. Over 300 people attended this highly successful conference. The Detroit Colour Council's segment of Tuesday April 26, was divided into two parts: Design and Technical. Noted speakers gave interesting talks that gave the audience a better understanding and insight into the important role color plays in the automotive industry. Professor Reznikoff, of Arizona State University, covered the impact of social economic patterns and special events on popular color usage in the automotive, clothing, and interiors industries. Bob Daily, duPont Automotive, discussed color trends, and how color goes from concept to customer. Trevor Creed, Chrysler Corporation, gave an entertaining, yet serious look at the complex and sometimes frustrating world of Color, Trim and Mastering. Tom Matano, Mazda R&D of North America, gave one car manufacturer's approach to dealing with bi-cultural issues, both from historical and present-day perspectives. The luncheon speaker, Nellie Toledo, of the Ford Motor Co., showed a highly entertaining video and talked about the need for more women in the Design stage of automobiles. She aptly

pointed out that there are differences between men and women and the fact that women have a lot of influence in the purchase of a new car.

The afternoon session covered technical topics, starting with Harold Fitzpatrick, of Fitzpatrick and Israels, Esq., who presented a review of issues faced by major classes of pigments. Allan Rodrigues, duPont Automotive, reviewed the status of ASTM E-12.03.02: Measurement of Metallic and Pearlescent Colors. Allan also pointed out the need for multiple measurements with averaging in order to obtain realistic readings. Professor Roy Berns, Rochester Institute of Technology, discussed the differences and similarities of CIE TC1-29 vs. CMC color difference formula. Dr. Berns was joined by industry users, James Fencil (Gibraltar Chemical Works) and Johnny Suthers (Eastman Chemical Co.) for a lively discussion on the industrial application of the two formulas.

James R. Keiser

IS&T/SID COLOR IMAGING CONFERENCE, 15-18 NOVEMBER, 1994



The 1994 Color Imaging Conference will be held November 15-18 at the Registry Resort in Scottsdale, Arizona. This will be the second in what is to become an annual conference, intended to be the premier conference for color imaging. It is sponsored by the Society for Imaging Science and Technology (IS&T) and

the Society for Information Display (SID). The Inter-Society Color Council is among the co-sponsors. As a multi-disciplinary conference, it attracts scientists, technologists and engineers working in the area of color science and systems and their application to images.

The theme of this year's conference is Color Science, Systems and Applications. The theme will be developed in a single-track technical program that will run from Wednesday the 16th through Friday the 18th. Wednesday's morning and afternoon sessions are Color Science: Color Vision and Appearance and Color Calibration: Instrumentation and Methodology. They will have a special emphasis on color imaging. Thursday's sessions will build on the color science results and focus on color systems, with a session on Color Engineering, another on the practical aspects of Building Color Systems, and an evening panel discussion. The sessions on Friday will be devoted to applications. Also planned is a poster session, with hard copy and electronic posters.

Among the invited speakers at the conference are Robert Hunt, William Schreiber, Jan Allebach, Fred Billmeyer, Gerald Murch, David Travis, Jay Rennilson and Rob Cook. The conference will also offer a series of eight tutorials given by experts on subjects ranging from color image processing to color management systems. The tutorials will be given on Tuesday the 15th.

For more information and details on registration, contact Pam Forness at the IS&T Office, 7003 Kilworth Lane, Springfield, Virginia 22151, Tel. 703-642-9090, Fax. 703-642-9094.

DAILY HUES

Colo(u)red Drink

Pantone

Nick and Nora Charles may have found it unorthodox when the smart set started ordering martinis made with vodka instead of gin, but they would be uncharacteristically baffled by the cocktail's most recent metamorphoses. The first twist was the Metropolitan, which replaced the vermouth with cranberry juice and substituted a splash of Rose's lime juice in lieu of lemon. Then came the Hennessy martini, which consists of a generous dose of the namesake's cognac with a squeeze of lemon and a twist. And now there's Martini on Seventh Avenue at 53rd Street, offering five innovative incarnations of the original. Fasten your seat belts, it could be a bumpy night!

Colo(u)red Love

It was the custom of French royalty for the young bride to hide a single red

carnation somewhere under her wedding dress for the bridegroom to discover after the ceremony, while in China, it was the tradition for the bride and groom to pledge everlasting love with two glasses of red wine tied together with a red cord.

Shades of Gray

Gray is the neutral territory that can make other warring colors work together in peace and harmony—a cooling and calming presence.

Because of its lack of color, gray does not compete with other hues. Since it is not a distraction, gray encourages curiosity, reflection and imagination.

From a Commercial for Levi's Dockers: Gray is what black could be if it would only lighten up!

And

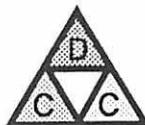
Silver is what gray could be if it would only have a little fun!

HURRY AND SIGN UP NOW FOR:

21st Annual Detroit Colour Council Golf Outing

Date: Tuesday June 28, 1994
 Place: The Links at Pinewood 8600 PGA Drive, Walled Lake, MI
 Time: Tee-Offs begin at 12:30PM
 Cost: \$100/Person - Included are: Golf, Cart, Lunch AND Dinner!

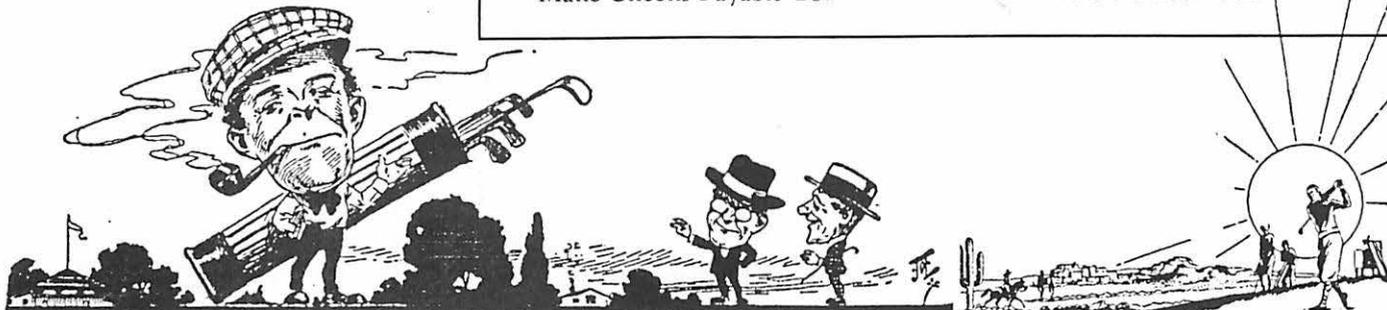
Please PHONE
 reservations by
 June 20, 1994
 (313) 255-2210
 Boehle Chemicals, Inc.



SEND outing fees to
 Jim Grady
 Ciba-Pigments
 7187 White Pine Drive
 Bloomfield Hills, MI 48301

Make Checks Payable To:

Detroit Colour Council



RETEC '94 CHICAGO

"Effects in Plastics" September
20-22, 1994



THE CAD and the Chicago Section of the SPE will be sponsoring a RETEC on September 20-22 at the Oak Brook Hills Hotel and

Resort, Oak Brook, Illinois. Oak Brook Hotel is located minutes from Downtown Chicago and is centrally located between O'Hare International and Midway Airport.

Papers will be presented on effect pigments, effect processing, techniques, measurement of effects, and effects design. Papers will be presented by industry leaders in color pigment, resin, color measurement and design. Abstracts for 24 papers have been received.

The preliminary program is as follows:

Tuesday the 20th will be the Golf, Wine and Cheese Reception, Exhibits will open, as will Hospitality Suites.

Wednesday the 21st will be the Technical Program and Exhibits.

Thursday the 22nd will be continued Technical Program and Exhibits.

CAD/Chicago section is currently looking for sponsorship for breaks and meals. Table top exhibits will be handled by Brian West.

Please contact Aram Terzian, EM Industries, 5 Skyline Drive, Hawthorne, NY 10532 (914) 592 4660

"Technical Tip"



Visual evaluations of chromatic yellow color differences can be very difficult and it is best done in bright sunlight or with a strong incandescent light source. It should also be understood that CIELAB and Hunter L,a,b differ significantly on how they calculate yellow color differences.

ROBERT A. CHARVAT ELECTED HONORED SERVICE MEMBER

May 1994

Robert A. Charvat of Englehard Corporation has been elected Honored Service Member of the Society of Plastics Engineers in recognition of his outstanding long term contributions to the Society. Mr. Charvat was one of 14 SPE Senior members to receive this honor at the Society's 52nd Annual Technical Conference (ANTEC), held at the San Francisco Hilton Hotel.

An SPE Member since 1957, Mr. Charvat began his Society involvement as a founding member of the SPE Color PAG (Professional Activity Group), presently the Color and Appearance Division, an ISCC memberbody. During his term as Councilor of CAD, he was instrumental in setting up the PAG and the Medical Division as well as the Student Chapter at Case Western Reserve University. He served as Chair of the 1974 Color RETEC (Regional Technical Conference) as as both Division RETEC and ANTEC Technical Program Chair.

Mr. Charvat is currently the CAD Education Chair, CAD board member, CAD seminar instructor, member of the SPE Divisions and Public Interest Committees. He has authored numbers of technical papers on coloring of plastics and associated technologies. Mr. Charvat has also been responsible for the color section in the "Modern Plastics Encyclopedia", and has contributed chapters to "Plastics Additives and Modifiers Handbook" and "Coloring of Plastics". He is presently organizing a new manual to update and replace the latter.

Mr. Charvat has received numerous awards, including the CAD's first Outstanding Achievement Award in 1985; he is a graduate of Cleveland State University. He and his wife Nancy, reside in Beachwood, Ohio, with their three children.

IS&T BESTOWS AWARDS TO 29 IMAGING RESEARCHERS

Professor Jordan Malinowski Made Honorary Member



Twenty-nine international imaging scientists and engineers, including the noted Bulgarian chemist and physicist Jordan Malinowski, were honored on May 17, 1994 with the industry's most prestigious awards by the Society of Imaging Science and Technology (IS&T) here at its 47th Annual Conference.

IS&T is the major international technical society dedicated to advancing the understanding application of imaging science and technology worldwide.

Dr. Malinowski, President of the Bulgarian Academy of Sciences, was made an Honorary Member of the Society, its highest award. Dr. Malinowski was Director of the Central Laboratory of Photographic Processes of the Bulgarian Academy of Sciences until 1992. He holds 16 patents and has authored 150 papers in the field of crystal growth, electro-deposition, solid state physics and photographic processes.

Dr. Malinowski has received Dimitrov's Prize for Science (1970), the Science Award of the Journal of Photographic Science and Engineering (U.S., 1973 and 1979), the Carus Medal and Prize of the German Academy of Natural Sciences (1980) and the Lieven Gevaert Medal of the IS&T (1988). He is an Honorary Fellow of the Royal Photographic Society (Great Britain), Fellow of the Society of Photographic Scientists and Engineers (U.S.), Honorary fellow of the Society of Photographic Science and Technology (Japan), Corresponding Member of the German Photographic Society, Member of the Advisory Board of the Journal of

Information Recording Materials, (FRG), and Member of the Union of Scientists in Bulgaria.

IS&T also bestowed four other major awards:

The Lieven-Gevaert Award, sponsored by Agfa-Gevaert for an outstanding contribution in the field of silver halide photography, was given to Harry E. Spencer for his outstanding research in chemical sensitization of silver halide photographic material. Spencer is Visiting Professor of Chemistry at Oberlin College, where he has taught general and physical chemistry since 1985 after retiring as Senior Research Associate at the Research laboratories of Eastman Kodak.

The Chester F. Carlson Award, sponsored by Xerox Corporation, Webster Research Center, for outstanding work in electrophotography, was bestowed on Hiroshi Tanaka for his contributions in the development of electrophotographic technology, in particular, the development of the all-in-one cartridge. Tanaka is Executive Vice President of Canon, Inc.

The Kosar Memorial Award, sponsored by the New York Chapter of the IS&T, for a significant contribution in the area of innovative imaging, was presented to David A. Morgan for his championship in the development of unconventional dry silver photographic materials. Morgan is a corporate Scientist in 3M's Graphic Research Laboratory.

The Raymond C. Bowman Award, sponsored by the New York Chapter, to an individual for fostering careers in imaging, went to Yasusuke Takahashi for his long standing contributions as an educator and organizer in the science, technology and applications of electrography, electrophotography and graphic arts. Takahashi is a professor at Tokai University.

Fellowship in the IS&T was awarded to Edgar B. Guttoff, formerly Senior Principal Engineer for Polaroid and now a consultant in coating, drying and statistical process control, for his long term contribution to the engineering aspects of photographic coatings; Anson Hosley, FRPS, formerly Research Director for the Case-Hoyt Corporation, for his technical innovations in applying photographic techniques to graphic arts reproduction and Shingo Oue, Managing Director and General Manager of the Optical Products Division of Fuji Photo Film Co., for his contributions to photographic image evaluation, sensitometry, the relation between sensitivity and resolution of photosensitive materials and non-conventional photographic system.

Also, Peter Walker, Laboratory Director for duPont Printing and Publishing and Electronic Materials at the Experimental station in Wilmington, DE for his contributions in many fields of imaging science and technology, including silver halide, polymer imaging and electronic imaging systems for printing, medical and electronics applications; and Masaaki Yokoyama, Professor, Osaka University, for his contributions concerning organic photoreceptors for electrophotography.

O T H E R N E W S

NOMINATIONS FOR THE 1995

DEANE B. JUDD AWARD

AIC The Association Internationale de la Couleur (AIC) has announced the opening of nominations for the 1995 Deane B. Judd - AIC Award. The award recognizes outstanding work of international importance in the field of color perception, color measurement, or color technology. The award is funded by Mrs. Deane B. Judd in honor of her late husband. The award takes the form of a gold medal awarded biennially to a suitable candidate at the quadrennial congress of the AIC, or at a mid-term AIC conference.

The award is made on the recommendation of the Awards Committee of the AIC which is appointed by the Executive Committee of the AIC. Nominations for suitable candidates are now being sought by the Awards Committee. If funds are available, the Executive Committee is empowered to assist the medalist with traveling expenses to the Congress to receive the award.

Previous recipients of the award have been:

- 1975 Dorothy Nickerson
- 1977 W. David Wright
- 1979 Gunter Wysecki
- 1981 Manfred Richter
- 1983 David L. MacAdam
- 1985 Leo M. Hurvich and
Dorothea Jameson
- 1987 Robert W. G. Hunt
- 1989 Tarow Indow
- 1991 Hans Vos and Pieter Walraven
- 1993 Yoshinobu Nayatani

Nominations with as much supporting information as can be obtained without disclosing the nomination to the candidate should be sent no later than July 1st, 1994 to:

Dr. Kees van Trigt
AIC Secretary-Treasurer
Saturnus 8
5591 PB, Heere
The Netherlands

RECENT ADVANCES IN ATMOSPHERIC RADIOMETRY

May 16-18, 1995
Westin Hotel, Ottawa, Canada

CORM The 1995 annual meeting and conference of the Council of Optical Radiation Measurements (CORM 95) will be held at the Westin Hotel in Ottawa, Canada on Tuesday, Wednesday and Thursday, May 16, 17 & 18, 1995. This conference will be the first held outside the United States and is

being organized in cooperation with the National Research, Canada (Conseil national de recherches, Canada NRC-CNRC). The preliminary agenda includes presentations by NRC-CNRC staff, a tour of the NRC-CNRC Montreal Road laboratories, invited and contributed papers.

For further information about attending and/or participating in this conference, please contact any of the conference coordinators listed below:

Dr. Ronald Daubach
c/o Osram Sylvania, Inc.
Test & Measurements
100 Endicott Street
Danvers, MA 01923
Tel: 508 750 2613
Fax: 508 750 2152

Justin J. Rennilson
Advanced Retro Technology, Inc.
27333 Via Orange Way, Suite
104 Spring Valley, CA 91978
Tel: 619 670 5105
Fax: 619 670 5107

Richard L. Austin
EG&G Instruments, Gamma Scientific,
8681 Aero Drive
San Diego, CA 921323
Tel: 619 279 8084
Fax: 619 576 9286

COLOR RESEARCH AND APPLICATION

In This Issue, August 1994

CR&A

In response
to recent
reports

challenging large field colorimetry, last summer the CIE held an expert symposium on Advanced Colorimetry to discuss some of the most intriguing questions about colorimetry that face CIE. While colorimetry has worked well in many situations, there are areas in which its failure is widely acknowledged [see as examples, Taylor and Murch, "The Effective Use of Color in Visual

Displays: Text and Graphics" Color Res. Appl. 11 Supplement, S3-S10, 1986 and W. A. Thornton, "Toward a More Accurate and Extensible Colorimetry" Color Res. Appl. 17, 79-122, 162-186, and 240-261, 1992]. One of the areas discussed at the symposium was the need for colorimetry to correlate to visual appearance. It is well known that foveal human color vision involves the stimulation of three classes of photoreceptors. However when the fields of view are larger than the roughly 2 degree foveal region, other factors come into play and Grassmann's laws of linearity are not strictly obeyed.

In "Rod Contribution to Large-Field Color Matching," Arthur G. Shapiro, Joel Pokorny, and Vivianne C. Smith report on research that investigates the role of rod photoreceptors in colorimetry. In their article they summarize the methods that had been used for removing the effect of rods when developing the 1964 CIE 10 degree Standard Observer, discuss the implications of rod intrusion for colorimetry and suggest procedures for preventing the adverse effects of rod activity in applied situations.

In this column last month, I reviewed the background of the Helmholtz-Kohlrausch effect and the development of the use of the term.

In this issue we have a new two-part article dealing with the Helmholtz-Kohlrausch effect in object colors, i.e., colors presented with a definite visible surround as opposed to aperture colors. As the reader will recall from the last issue, the Helmholtz-Kohlrausch effects deals with the increase of perceived lightness or brightness when the purity of a color stimulus is increased. In most of the literature relating to this phenomenon, the measure of the effect was determined by comparing the chromatic color to a reference achromatic sample set on an achromatic background. The reference achromatic sample was adjusted until the two samples were considered matching in lightness. Nayatani calls this method the representation method using variable achromatic colors (VAC). However, Dr. Nayatani

realized that there is a second way to approach the same Helmholtz-Kohlrausch effect. In the second method, the lightness of the chromatic sample is varied (holding the chromaticity coordinates constant) until the chromatic sample is deemed a match to the achromatic reference sample. Logically he designates this representational method VCC since it uses a variable chromatic color compared to a constant achromatic reference. In the first part of "The Existence of Two Kinds of Representations in the Helmholtz-Kohlrausch Effect" Yoshinobu Nayatani, Hiroachi Sobagaki, and Kenjiro Hashimoto confirm these two different approaches and present some of the reasons that it is not possible to transform between the two approaches mathematically. In "Part II The Estimation of the Models" the same authors present a model for predicting the Helmholtz-Kohlrausch effect using the VCC method and use that model to predict the effect for spectral colors.

In the April 1993 issue [vol. 18, 137-139, 1993] of this journal, David Alman chairman of CIE technical committee 1-29 on Industrial Color-Difference Evaluation presented a tentative set of equations which includes parametric factors that can be adjusted various experimental conditions or industrial situations. He then went on to call for field trials of the tentative equations in comparison to other existing models.

In this issue Klaus Witt provides the results of such a field trial in "Modified CIELAB Formula Tested for a Textile Pass/Fail Data Set."

The properties of surface reflections were first noted as important in colorimetry, because of their influence on instrumental color measurement. However, they are also important crucial to many applications. Surface reflections make the images that are portrayed with computer graphics more realistic. Reflectance models have been used for this application for quite a few years. More recently, reflectance models have been applied for image analysis and object recognition in the field of

machine vision. The final article in this issue is related to machine vision. In "Dichromatic Reflection Models for a Variety of Materials" Shoji Tominaga tests the adequacy of the standard model for reflection from inhomogeneous materials and extends that model to have an interface reflection component that depends on wavelength.

This month's Color Forum contains a discussion of the laws of color harmony and an examination of the concept of complementary colors.

Lars Sivik and Anders Hard use the Natural Color System (NCS) as a basis of a color combination model in "Some Reflections on Studying Colour Combinations." In this forum they challenge other researchers to tackle the complexity of the experiential world of color combinations with systematic studies.

Also in this issue is another selection from the Classical Articles in Color. Featured this month is Yves Le Grand's article "Les

Seuils Differentials de Couleurs dans la Theorie de Young" which was first published in Revue d'Optique in 1949. "Color Difference Thresholds in Young's Theory" is translated by Kenneth Knoblauch. Dr. Knoblauch teams with Dr. Robert Boynton to provide the introductory commentary. But one may ask, why was this paper chosen for the classical articles? It is in this paper that Le Grand was first to propose that for the special case of chromaticity differences at equal luminance, there might be only two dimensions of chromatic variation. This simple concept has far reaching consequences that are still being investigated today in CIE technical committee on an alternative system of photometry and colorimetry based on cone excitations and chaired by Françoise Vienot.

Ellen C. Carter

Color Research and Application

(703) 527-6003

CALENDAR

Please send information on Member Body and other organization meetings involving color with dates, places, and information source to:

Harry K. Hammond, III
BYK-Gardner, Inc.
2435 Linden Lane
Silver Spring, MD 20910
301-495-7150 FAX 301-585-4067

1994

ASTM COMMITTEE D-20 ON PLASTICS, Jul. 17-21
 Cincinnati, Ohio.

Information: Katharine Schaaf (215) 299-5529.

INTERNATIONAL SYMPOSIUM, Jul. 26-28
 Illuminating Engineering Institute of Japan, Tokyo, Japan

IESNA ANNUAL CONFERENCE, Aug. 7-11
 Illuminating Engineering Society of North America, 88th Annual Conference, Doral Resort & Country Club, Miami, Florida.
 Information: Valerie Landers (212) 705-7269.

INTERNATIONAL CONFERENCE ON COLOR EDUCATION, Aug. 17-19
 University of Industrial Arts, Helsinki (UIAH), Helsinki, Finland.
 Information: Harald Arnkil (+358 0) 799 827, 75631, Fax (+358 0) 7563 223.

FOURTH INTERNATIONAL CONFERENCE ON VISUAL SEARCH, Aug. 29-Sep. 1
 The Fourth International Conference on Visual Search, Koningshof, Eindhoven, Netherlands.
 Information: Prof. A.G. Gale, Applied Vision Research Unit, University of Derby, Chevin Avenue, Western Road, Mickleover, Derby, DE3 5GX.

1994 EUROPEAN CONFERENCE ON VISUAL PERCEPTION, Sep. 4-8
 Institute for Perception Research, Veldhoven, Netherlands,
 Information: H. de Ridder, P.O. Box 513, 5600 MB Eindhoven, The Netherlands.

JOHN DALTON CONFERENCE, Sep. 9-13
 An International Color Vision Meeting to commemorate the 200th anniversary of Dalton's first description of his own color vision defect, UMIST, Manchester.
 Information: Dr. C. Dickinson, UMIST, P.O. Box 88, Manchester

COLOR COMMUNICATION, Sep. 12-13
 Jointly organized by The Colour Measurement Committee of the Society of Dyers and Colourists, The National Physical Laboratory, Spectrophotometry and Colorimetry Club, and The Department of Textiles, UMIST, Manchester, UK.

IS&T PHOTOFINISHING TECHNOLOGY, Sep. 19-21
 IS&T Minilabs and Photokina, Cologne Germany.
 Information: IS&T (703) 642-9090, Fax (703) 642-9094

CMG - CONFERENCE, Sep. 25-27
 Color Marketing Group International Color Directions Conference, Sheraton Bal Harbour, Bal Harbour, Florida.
 Information: Katie Register (703) 329-8500, Fax (703) 329-0155.

COLOR AND COLORIMETRY, Sep. 29-Oct. 1
Fourth International Symposium of Colour and Colorimetry,
Slovene Centre for Color, University of Maribor, Maribor,
Slovenia.
Information: (+3862) 25 461, Fax (+3862) 255 013.

OSA - ANNUAL MEETING, Oct. 2-7
Optical Society of America Annual Meeting, Dallas, Texas.
Information: OSA Meetings Department (202) 416-1980.

**INTERNATIONAL DISPLAY
RESEARCH CONFERENCE, Oct. 10-13**
Society for Information Display, Advisory Group on Electron
Devices, and IEEE Electron Devices Society, Hyatt Regency
Hotel, Monterey, California.
Information: Thomas Credelle, General Chair (408) 8627271.

AATCC - CONFERENCE AND EXHIBITION, Oct. 11-14
International Conference and Exhibition, American
Association of Textile Chemists and Colorists, Convention
Center, Charlotte, North Carolina. Information: AATCC
(919) 549-8141.

USNC/CIE ANNUAL MEETING, Oct. 16-18
United States National Committee of CIE, San Diego,
California.
Information: Jonathin Hardis, NIST (301) 975-2373, Fax
(301) 8408551.

GATF/NSTF ANNUAL CONFERENCE, Oct. 16-19
Graphic Arts Technical Foundation, Saddlebrook Resort,
Tampa, Florida.
Information: (412) 621-6941, Fax (412) 621-3049.

**10th INTERNATIONAL CONGRESS ON
ADVANCES IN NON-IMPACT PRINTING
TECHNOLOGIES, Oct. 30- Nov. 4**
IS&T, Sheraton Hotel, New Orleans, LA.
Information: IS&T (703) 6429090, Fax (703) 642-9094.

ASTM COMMITTEE D-20 ON PLASTICS, Nov. 14-17
Phoenix, Arizona.
Information: Katharine Schaaf (215) 299-5529.

IS&T/SID COLOR CONFERENCE, Nov. 15-18
Soc., 2nd Color Imaging Conference: Color Science, Systems,
and Applications, The Registry, Scottsdale, Arizona.
Information: IS&T (703) 642-9094; SID (310) 305-1502.

ADVANCES IN PHOTOMETRY, Dec. 1-3
CIE Expert Symposium on Advances in Photometry, Lighting
Quality and Energy Conservation, CIE Central Bureau,
Vienna, Austria.
Information: CIE (+43-1) 714-3187, Fax (+43-1) 713-0838.

1995

ASTM COMMITTEE D-1 ON PAINT, Jan. 22-24
San Antonio, Texas.
Information: Scott Orthey (215) 299-5507.

**ASTM COMMITTEE E-12 ON
APPEARANCE, Jan. 26-27**
Phoenix, Arizona.
Information: Bode Buckley (215) 299-5599.

ISCC WILLIAMSBURG CONFERENCE, Feb. 12-15
Inter-Society Color Council Williamsburg Conference,
Williamsburg, Virginia. Information: Michael Brill (703) 734-
4027.

ASTM COMMITTEE D-20 ON PLASTICS, Mar. 12-16
Denver, Colorado. Information: Katharine Schaaf (215) 299-
5529.

TAGA ANNUAL CONFERENCE, Apr. 2-5
Technical Association of the Graphic Arts Annual Technical
Conference, Orlando, Florida. Information: Karen Lawrence
(716) 475-7470.

ISCC ANNUAL MEETING, Apr. 23-25
Color And Textiles, Inter-Society Color Council with
American Association of Textile Chemists and Colorists,
Holiday Inn Four Seasons, Greensboro, North Carolina.
Information: Ann Laidlaw (919) 274-1963.

CMG - CONFERENCE, May 14-16
Color Marketing Group International Color Directions
Conference, Fairmont Hotel, Dallas, Texas.
Information: Katie Register (703) 3298500, Fax (703) 329-
0155.

CORM 95, ANNUAL MEETING, May 15-17
Council for Optical Radiation Measurements, Ottawa,
Ontario, Canada.
Information: Norbert Johnson (612) 733-5939, Fax (612) 733-
6211.

**ASTM COMMITTEE E-12 ON
APPEARANCE, Jun. 19-21**
Denver, Colorado.
Information: Bode Buckley (215) 299-5599.

ASTM COMMITTEE D-20 ON PLASTICS, Jul. 9-13
Lake Como, Wisconsin.
Information: Katharine Schaaf (215) 2995529.

OSA - ANNUAL MEETING, Sep. 10-15
Optical Society of America Annual Meeting, Portland,
Oregon.
Information: OSA Meetings Department (202) 416-1980.

AATCC - CONFERENCE AND EXHIBITION, Oct. 8-11
American Association of Textile Chemists and Colorists,
Hyatt Regency, Atlanta, Georgia.
Information: AATCC (919) 549-8141.

CIE 23rd QUADRENNIAL MEETING, Nov. 1-3
Division Meetings, Nov. 6-8
International Commission on Illumination (CIE), Vigyan
Bhavan Conference Complex, New Delhi, India.
Information: Jonathin Hardis, Secretary USNC/CIE (301)
975-2373, Fax (301) 840-8551, E-mail "hardis@onyx.nist.gov"

CMG - CONFERENCE, Nov. 5-7
Color Marketing Group International Color Directions
Conference, Phoenix, Arizona. Information: Katie Register
(703) 329-8500, Fax (703) 329-0155.

ASTM COMMITTEE D-20 ON PLASTICS, Nov. 13-16
Norfolk, Virginia.
Information: Katharine Schaaf (215) 299-5529.

1996

ASTM COMMITTEE D-1 ON PAINT, Jan.
Fort Lauderdale, Florida.
Information: Scott Orthey (215) 299-5507.

ASTM COMMITTEE E-12 ON APPEARANCE, Jan.
Fort Lauderdale, Florida.
Information: Bode Buckley (215) 299-5599.

ASTM COMMITTEE D-20 ON PLASTICS, Mar. 18-21
Orlando, Florida.
Information: Katharine Schaaf (215) 299-5529.
ISCC ANNUAL MEETING, Apr. 21-23
Orlando, Florida.
Information: Ann Laidlaw (919) 274-1963.

TAGA ANNUAL CONFERENCE, Apr 28-May 1
Technical Association of the Graphic Arts Annual Technical
Conference, Dallas, Texas. Information: Karen Lawrence
(716) 4757470.

ASTM COMMITTEE E-12 ON APPEARANCE, Jun.
San Francisco, California.
Information: Bode Buckley (215) 299-5599.

AATCC - CONFERENCE AND EXHIBITION, Oct. 8-11
American Association of Textile Chemists and Colorists,
Oprtkabd Hotel, Nashville, Tennessee.
Information: AATCC (919) 549-8141.

ASTM COMMITTEE D-20 ON PLASTICS, Nov. 18-21
New Orleans, Louisiana.
Information: Katharine Schaaf (215) 2995529.
1997

TAGA ANNUAL CONFERENCE, May 4-7
Technical Association of the Graphic Arts Annual Technical
Conference, Montreal or Quebec City, Canada.
Information: Karen Lawrence, (716) 475-7470.

COLOUR '97, May 26-30
8th AIC Quadrennial Meeting, Colour '97, Executive Com-
mittee Meeting on May 25, Kyoto International Conference
Hall (KICH), Kyoto, Japan.

ISCC ANNUAL MEETING, Sep. 14-17
Inter-Society Color Council Annual Meeting with Color and
Appearance Division of Society of Plastics Engineers. New-
port, Rhode Island. Information: Ann Laidlaw (919) 274-
1963.

**AATCC - CONFERENCE AND
EXHIBITION, Sep. 28- Oct. 1**
American Association of Textile Chemists and Colorists,
Marriot Marquis, Atlanta, Georgia. Information: AATCC,
(919) 549-8141.

1998

TAGA ANNUAL CONFERENCE, May 3-6
Technical Association of the Graphic Arts Annual Technical
Conference, Chicago, Illinois.
Information: Karen Lawrence, (716) 475-7470.

AATCC - CONFERENCE AND EXHIBITION, Oct. 4-7
American Association of Textile Chemists and Colorists,
Philadelphia, Pennsylvania. Information: AATCC, (919) 549-
8141.

1999

TAGA ANNUAL CONFERENCE, May 2-5
Technical Association of the Graphic Arts Annual Technical
Conference, Philadelphia, Pennsylvania.
Information: Karen Lawrence, (716) 475-7470

AATCC - CONFERENCE AND EXHIBITION, Oct. 12-15
American Association of Textile Chemists and Colorists,
Convention Center, Charlotte, North Carolina.
Information: AATCC, (919) 5498141.



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NEWSLETTER EDITOR Michael A. Hammel
 ASSOCIATE EDITOR Karen M. Braun



meeting reports

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