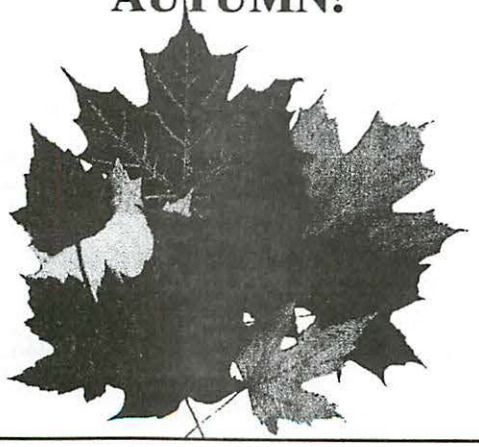
Inter-Society Color Council *News*

In This Issue

HAVE A COLORFUL AUTUMN!



Number 387 **September/ October** **2000**

2001 Williamsburg Conference "Color Basics For Industry" An Inter-Society Color Council Educational Course

The Inter-Society Color Council (ISCC) is sponsoring a two-day educational course designed for people who work with color or work in industries where color and appearance are important factors in their products. The course will be held at the Cleveland Airport Marriott in Cleveland, Ohio on Monday and Tuesday, **March 19 and 20, 2001**. Prior training in color science is not required for these two days of interactive instruction and learning, which will be presented in a unique format. Both the novice and those with years of experience come away with useful material that can be applied to their respective industries.

Day One will be spent on the basics of color, including how we see color, how we measure color and how we communicate color. Some of the topics will be visual evaluation, instrumentation, CIE system, color communication, color differences and how these all interact.

Day Two will consist of four one-half day sessions; each one of which will be presented twice, thus enabling participants to attend two different sessions. Each session will be industry specific in order to cover unique applications, problems and allow for interaction among participants and instructors. The sessions will be directed towards the following industries:

1. Textiles/Dyes,
2. Paints/Plastics,
3. Graphic Arts/Inks/Design, and
4. Digital Color Communication.

(continued on page two)

Course instructors come from a wide range of color and appearance backgrounds and are all well respected and knowledgeable in their fields. The list of instructors includes:

Mr. Kenneth Butts, Datacolor International
Mr. Roland L. Connelly, SheLyn Incorporated
Mr. Richard W. Harold, BYK-Gardner, USA
Dr. Nancy Howard, Philadelphia University
Ms. Ann Laidlaw, SheLyn Incorporated
Mr. John Setchell, Jr., Eastman Kodak Company
Mr. Ralph Stanziola, Industrial Color Technology

The tuition for the course is:

$435.00 for ISCC members and
$465.00 for non-members.

Early registration will last until February 19th with a discounted registration fee of $385 for ISCC members and $415 for non-members.

Lunch for both days, breaks and course materials are included in the tuition.

Please make your reservations at the Cleveland Airport Marriott by February 17th to receive the "ISCC" rate of $85.00/night. Call 800-228-9290 or fax 216-252-9404 for reservations and mention "ISCC".

(See enclosed registration form in this newsletter.) Requests for additional information should be directed to:

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Number 387 **September/October 2000**

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Please note: Next issue deadline for material submission is October 1st. All submissions must be in English.

Color Research & Application In This Issue, October 2000

To begin this issue, Yoshinobu Nayatani writes "On Attributes of Achromatic and Chromatic Object-Color Perceptions." Whiteness and blackness are rarely discussed in the field of colorimetry, and perhaps gray is discussed even less. In the NCS system, as one moves from one color, say blue, to its opposite color, yellow, we pass through a neutral. But do we consider as one moves from white to the opposing black that we also pass through something perceptibly different than either white or black - gray. We have lightness and brightness as achromatic attributes, and chroma and colorfulness for chromatic objects. Generally it is believed that lightness relates to chroma, and brightness to colorfulness. However, by raising the adapting illuminance, white samples become whiter and black samples become blacker. Dr. Nayatani shows that with minor modifications his color appearance model is able to explain all these complex characteristics of object color perception.

Next Guarav Sharma, in "Set Theoretic Estimation for Problems in Subtractive Color," reviews a vector-space framework for the description of color matching and color systems. Then he goes on to show the enlarged class of problems for which a robust set of theoretic estimation schemes are available and applies this to three practical problems: model-based scanner calibration, the design of color scanning filters at linear combinations of color-matching functions, and colorant formulation.

Two articles deal with uncertainties in visual perception and instrumental color measurement. First, M. Melgosa, M. J. Rivas, E. Hita, and F. Viénot ask the question, "Are We Able to Distinguish Color Attributes?" While it is fairly easy to see that there is a difference between two colored materials, it is more difficult to describe accurately the appropriate axis of the difference. In their research the authors used both knowledgeable and inexperienced observers to determine what Munsell attribute had changed or remained the same. They conclude that, although the three psychological attributes of color, in this case (hue, value, and chroma), are relatively easy to understand, discernment of these attributes in color sample pairs proves quite difficult.

Turning to instrumental measurements, J. L. Gardner derives analytical expressions for uncertainties and chromaticity coordinates resulting from both direct spectral measurements and from filtered tristimulus colorimeter measurements. The ISO Guide to the Expression of Uncertainty in Measurement has been adopted in the national metrology institutes providing traceable measurements. In "Uncertainty Estimation in Colour Measurement," the method of the ISO Guide is used to estimate uncertainties for color data. General conclusions on uncertainties are derived for broadband sources, and estimates are made of the correlation coefficients and uncertainties for narrow-band sources such as traffic signals and LED's.

In our Industrial Applications Section, two industries are featured: textiles and foods. When items such as clothing are made from cut pieces of fabric, then sewn together to form a single garment, there is a potential disaster waiting to happen. If the pieces which are cut from various positions on the roll, or from different rolls are sewn together, the variation in color may be obvious to the customer, resulting in an unsatisfactory garment. One method used to avoid this problem is by visually or instrumentally measuring the color of the pieces and grouping like pieces into categories in which the color is close enough to make a satisfactory match. This general technique is known as shade sorting, and it can eliminate such disasters as the one described above. One of the popular methods of shade sorting in the early 90s, known as the 555 technique, was based on a fixed-grid method, where a volume of color space was broken into smaller volumes within which the color variation would be acceptable. The textile pieces were sorted into the grid, and those from the same grid area were used together. In "Alternative Mathematical Approaches to Shade Sorting," J. R. Aspland, K. D. Balasaygun, J. P. Jarvis, and T. H. Whitaker use several mathematical techniques for clustering to develop an efficient shade-sorting algorithm.

In foods, too, color is critical. It is often used as an indicator of quality. However, other operations in the food production can affect the color of the item as well as the quality. Juana Fernández-López, José Angel Pérez-Alvarez, and Vicente Aranda-Catalá studied the "Effect of Mincing Degree on Colour Properties of Pork Meat."

The Communications and Comments includes a discussion of "How Does the Size of the Difference Affect Perceived Larger Color Differences?" given by Rolf Kuehni, and an erratum to an equation in "On Von Kries: A Reply to Brill," which was published in the first issue of this year. Mr. Kuehni's comments result from the reading and further analysis of an earlier article "A colour-difference formula for assessing large colour differences" by Guan and Luo, which was published in this journal last year [vol 24:344-355]. There are reviews of the books, *Color Reproduction* by Gary Field and *Color and Meaning: Art, Science, and Symbolism* by John Gage.

Ellen C. Carter, Editor

The Compositor apologizes.....

In the July/August 2000 issue of the ISCC News (#386, pp.) the third reference was inadvertently omitted from the article by Michael H. Brill

"Who First Said Color = Light + Object + Viewer?"

Following is the missing reference in full:

3. Aristotle, *On Sense and the Sensible*, Trans. J. E. Beare (Oxford: Clarendon Press, 1908), excerpt in David L. MacAdam, ed., *Sources of Color Science* (MIT Press, 1970), pp. 4-8.

Editorial Contact Information Change

Please note that Editor, Professor Gultekin Celikiz has a change in email address:
celikizg@aol.com
Please make a note of this change.

Scientists Explain Rare Fault In Vision.

Scientists have identified the defective gene that causes a debilitating total colorblindness among many inhabitants of a tiny Pacific island.

Neurologist Oliver Sacks described the condition in the 1997 book "The Island of the colorblind." The afflicted islanders see the world as if watching it on a black-and-white television.

The discovery of the defective gene ends a 30-year search. Researchers said it will not lead to a treatment immediately but might help find one eventually.

It could also lead to a test to tell islanders with normal vision whether they carry a flawed copy of the gene that would raise their children's risk of colorblindness. The disorder appears only in people who inherit a flawed copy from each parent.

The island, Pingelap, is part of the Federated States of Micronesia. Of the 3,000 Pingelapese, some of whom live on nearby islands, about one in 20 is totally colorblind. That compares with a worldwide rate of one in 50,000.

The flawed gene has been traced back to one man, who was among 20 survivors of a typhoon on Pingelap around 1775 who went on to re-establish the population.

The condition differs from the relatively common colorblindness in which people cannot distinguish certain colors. Affected people on the island cannot see colors at all. They lack the sharp vision most people use to read, and their eyes are overwhelmed by sunlight - a particularly severe problem in the tropics. In his book, Sacks noted that some affected islanders found work fishing by night.

The Associated Press

(Thanks to Nola P. Sturke for submitting this article to this publication.)

IS&T/SID Announce 8th Color Imaging Conference

The annual IS&T/SID Color Imaging Conference (CIC) is the world's premiere technical conference for people working in the area of color science and color engineering and for those who apply these disciplines to color products and color imaging technologies, such as digital photography, image processing, color display design, data visualization, and image processing. General Co-chairs James King (Adobe) and Jennifer Gille (Raytheon at NASA Ames) have announced the availability of the CIC8 preliminary program for this year's conference to be held at the SunBurst Resort in Scottsdale, AZ from November 7 to 10, 2000.

" Since this Conference has been so successful and has such a strong and loyal following, we have a difficult balancing act making sure that it constantly improves but not making so many changes that it is no longer the Conference attendees know and love. One change this year is the addition of the "how-to" tutorials." said the Conference General Co-chair James King from his office in San Jose, CA. "We bring together expertise from a great many disciplines - and to do color imaging successfully you need to tap that combined knowledge. The CIC provides a unique forum for the interdisciplinary communication needed for color scientists and engineers to accelerate the next wave of advances in this rapidly growing field," he said.

General Co-chair Jennifer Gille discussed the papers program. "CIC's single-track format allows participants to expand and deepen their knowledge of all aspects of color, while providing a common basis for both formal and informal discussion. This year's program covers topics from basic color science, to cross-media color reproduction, to device-specific applications for printers, displays, scanners, digital cameras. Papers span the spectrum from abstract models of devices and processes to concrete issues such as exploring ink spreading, mapping pigmentation in human skin, and digital restoration of faded color movies. Every professional in the field of color will find much of value in the information presented at CIC8."

The conference kicks off on Tuesday, November 7th with a series of two-hour tutorials in four tracks. "How-to" workshops are offered this year for the first time. Tutorials are:

Track 1 Tutorials:	Color Science
Track 2 Tutorials:	Color Management & Communications
Track 3 Tutorials:	Color Output
Track 4	How to Workshops - NEW THIS YEAR

Beginning on Wednesday, Nov. 8th, there are three days of invited and contributed presentations - again organized in a single track to encourage broad participation and opportunities for discussion in the group as well as in one-on-one conversation and informal communication.

Invited keynote talks will jump-start each day:

- Monday: Color Spaces, Jan Koenderink, Helmholtz Institut
- Tuesday: Shopping on the Web without Seeing Red, Robert W. G. Hunt, Color Consultant
- Wednesday: Chromatic Variation; A Fundamental Property of Images, Steve Shevell, University of Chicago

Program Co-Chairs Graham Finlayson (Univ. of East Anglia UK) and Eugenio Martinez-Uriegas (Canon) and their program committee have grouped the 36 oral presentations into these sessions:

- Color Theory
- Color Science
- Color Image Analysis
- Image Capture
- Gamut Mapping
- Human Color Vision
- Color Workflow
- Image Rendering
- Image Display
- Printing

Thursday afternoon is devoted to the poster session with 27 presentations scheduled.

This Color Imaging Conference, has become the leading event where color issues and applications

are discussed by people from around the world, typically drawing over 300 attendees from Europe, Asia and North America. The conference plan allows many opportunities for conversation and informal communication. In fact, networking opportunities abound with Tuesday evening's ice-breaker, Wednesday's conference reception, and Thursday's poster session followed by a humorous look at our industry's issues in the first ever audience participation event - The Color Game Show: Is That Your Final Color?

Immediately following CIC8, the CIE Color Experts meeting will be held on Saturday, Nov. 11. Discounted registration fees are offered for participants registering for both meetings.

For registration and hotel information, contact:

Society for Imaging Science & Technology
7003 Kilworth Lane
Springfield, VA, USA 22151.
Tel: 703-642-9090 fax: 703-642-9094;
e-mail info@imaging.org.

A detailed conference program, and on-line registration form is available on the IS&T website: http://www.imaging.org.

Pamela Forness, Program Mgr.

Jobs Wanted!

This Section is intended to help ISCC members in need of, and are looking for employment. Here is an opportunity to use the resources at hand. There is no charge for this service, however, the restrictions are as follows:

1. This service is for ISCC members' use only.
2. No more than 50 words may be used to describe yourself. (Not including name, address and/or telephone number, fax, email)
3. If you are using a P.O. Box, you must supply a complete address.
4. No Agency representing member(s) is allowed.
5. Neither the ISCC News nor the editor are responsible for any errors.
6. You must advise us in writing when you have obtained employment.

We hope this section will be of value to you, the ISCC member. If you have any suggestions/criticisms, please send them to the editor. Let's make this work!

Tek Celikiz, ISCC Editor

The 2001 ISCC Godlove Award

Nominations for the 2001 Godlove Award are being solicited through Nov 1, 2000.

The Godlove Award is the most prestigious award bestowed by the Inter-Society Color Council (ISCC) to honor long-term contributions in the field of color. The Godlove Award was established in 1955 in memory of Dr. I. H. Godlove. The award is presented biannually, in odd numbered years, with the next award scheduled for presentation at the 2001 ISCC Annual Meeting.

Candidates will be judged by their contribution to any field of interest related to color, whether or not it is represented by an ISCC Member-Body. The candidate's contribution may be direct, it may be in the active practical stimulation of the application of color, or it may be an outstanding dissemination of knowledge of color by writing or lecturing, based on original contributions. Candidates need not have been active in the affairs of the ISCC, but they must be either current or former ISCC members. All candidates must have at least five (5) years of experience in their particular field.

A Godlove Award Nomination Form is enclosed with this mailing of the ISCC Newsletter. The past and present membership of the ISCC boasts a number of individuals deserving of such recognition and this award requires your participation in the process. Please take time to consider and nominate a worthy candidate for this honor.

Feel free to copy the enclosed nomination form, if necessary. Requests for additional nomination forms may be directed to:

Joel Pokorny
Godlove Award Committee Chairman
Visual Sciences Center
939 East 57th Street
Chicago, IL 60637

The Color Association of the United States (CAUS)

Interiors 2002/2003

Differing points of view were expressed at the forecasting session to choose the Interior Colors for 2002/2003. Was the palette to be predominantly warm or cool? How profoundly would American interiors be influenced by such factors as fashion, nostalgia, or metallics? The differences in opinion were interesting to note in an upswing economy as good times usually foster color accord. Here is some of the discussion went:

Clodagh, Clodagh International Design: "We think that an interest in yellow, the color of optimism, brings us forward to a new millennium. The yellows we are looking for are mainly saturated ones. A natural straw color has a special appeal.

"A direction in metallics is named "Thanks, Frank"— an homage to Frank Gehry and to titanium. Five years ago metallics were used tentatively and viewed as being perhaps a little tarty; today metallics are accepted.

"Outdoor activities, especially hiking, will bring an interest in soft "fresh air" blues. In our designs, we are looking for lightness of feel and of actual materials. Mountain greens and teak browns, shades that get away from gray, can bring us good feelings. Teak has a universality about it, an implied nostalgia. Gathering in happiness, permanence and nostalgia are all influenced on our designs."

Diane Tesa Facteau, Shaw Industries, Inc.: "Solid color in carpeting will be at mid-value. We shall see fewer colors in combination for higher-priced carpets; instead more simplicity will be attractive. In places where soiling is an issue, more intense and more multicolored flooring will be used. Beige is everywhere now. Yellow-based color will probably continue to sell in carpeting. Background editorial colors in fashion magazines often influence future carpet directions, I find."

Jay Yang, Hines & Co.: "I have intentionally placed vivid colors at the sides, with fewer chromatic hues and less contrast in the center. The point about future design is a general trend toward simpler things. We are moving toward a more edited lifestyle. Earthy tones and nostalgia will be less evident as we lead less complicated lives. Cooler and less contrasting colors will find greater appeal in the future. (Stringer and more saturated colors will be in smaller objects.) Water and translucency are important elements in our lives; for this reason we will favor blues and greens."

Mary McFadden, Mary McFadden, Inc.: "The colors in shop windows are variations of pinks. Women are wearing the pink of the sixties. I have toned these hot pinks, reds and purple with a bronze surround. I have also taken wearable but somewhat drab shades and given them more life by setting them off with bronze."

Joann Eckstut, Ehrenkrantz Eckstut & Kuhn Architects PC: "Global warming is central. We need to use color from the earth to remind us that this is where we came from and of the importance of nature. Nature is always my source. Natural colors are muted, more intense and complex. This year I used stones for inspiration because in interior design many natural materials such as stones and slate are coming from the inside."

Sharon Clarke-Fodor, Koroseal/Vicrtex, Inc.: "In contrast wall covering for corporate spaces, hospitality and health care, creamy neutrals, especially with a high gloss, are the most important. Next in importance are soft, grayed medium greens. Grays are noticeably absent — grays appears only as metallic (Metallic treatments appear in all colors, of course, but is most strong in grays.) Reds are hardly there. Color, surface treatments and embossing are all a part of the creative part of wall coverings. In the future, deeper embossing or textured surfaces that appear deeper will be perceived as more exciting in contact wall coverings. The feature or accent wall is back."

Kenneth Charbonneau, Color Communications Inc.: "Brown is the most important neutral. The gray family is a substitute for black. Mica chips in the

automotive industry have given us special effects. Purples will be grayed off... veiled violets. Blue Canton and China export blue are well liked. Tissue blue with metallic touches... a kiss of pearlesence .. aqua blues and Caribbean turquoises are popular. Victorian greens or dragon-wing greens. Translucence and luminosity are lending special effects to all colors. The accent wall and wall with a finished surface are once again popular."

Sherri Donghia, Donghia Furniture/Textiles: "We design furniture, accessories, Venetian glass accessories, fabrics, wall covering, trim and carpets for residential and commercial interior worldwide. Our palette is presented in a collage to suggest a mix of textures and finishes that create innovative color use. The natural world of earth-inspired tones anchored with indigo and henna contrast and complement the industrial high technology world of plastics and composites in bold and aggressive shades of fuchsia and oranges. The resulting design tension is intriguing."

Marypaul Yates, Yates Weisgal Inc.: "Green has reached a point of maturity in the palette. Green has become yellow cast in the extreme, and every possible green is successful in the market. With the shift greens have influenced the naturals. In particular, gold is green-cast like a tarnished brass, rather than the recent gilded color.

"The pendulum is swinging back. Cooler greens, blues and purples look newer to my eye. Orange and hot pink look newest, whether in their brightest forms or reduced. They look beautiful with green — warm or cool. Perhaps this is the influence of Indian, hippie chic or perhaps just a reflection of a general optimism given our economic climate."

Barbara Schirmeister, Color/Design Consultant: "I am focused on the balance of cool and warm colors, which play off one another. In my palette there is an attention to each color family. I've eliminated heavy deep shades. My darks are lifted. The deeps and the mid-tones have a transparent quality. Blues and ethereal blue greens, and new greens represent the influence of water, which is symbolic of life itself."

Murray Douglas, Brunschwig & Fils.: "In our woven division — which ties all the fabric collections at Brunschwig & Fils together — we are paying extra attention to pastels, to warm and to clear color. Striés, textures and two-tones are gaining appeal. Damask is a time-honored was of achieving luminous effects, showing not a single flat color but two-tones. We have a more traditional approach to interiors, but we also are focused on special effects in a palette of warm hues."

Jack Lenor Larsen, Cowtan & Tout/Larsen, Inc. "There is so much green in the palette now — even pea green in a pale Japanese way — and a redness, even in the neutrals. The future is a time for real colors, not primary but very young and bright colors. These hues resemble 18th-century colors with two tones, pearlesence and iridescence effects. The paler tints will be as important as they were in the 1950s. The colors I now see most and like best are the ping greens, i.e. mostly pale shades of green neutralized with reds. Think of tatami matting and split peas as pink greens. Like khaki and celadon glazes, they may be yellower or bluer. Once you look for them they are quite ubiquitous. Even the cement and sandstone of cityscapes. Pink greens are also kind to most other colors — including skintones."

Nova Scotia Colors

There is a kind of naive architecture in Nova Scotia. It is defined by the rectangle and by symmetry. White wood siding as well as some of the brightest colors anywhere, one of the windows on each side of the door, as though drawn by a child, are prevalent. The proportion of the windows to the space around them and to the doors seems to prove that perfect symmetry is perfectly boring. Perhaps, this is why the Nova Scotians choose such appealing colors. The particularly bright tomato red used in Nova Scotia originally came from mixing clay with cod-liver oil to protect the wood against the salt of the waterfront. Bright red wood, dark green pine, charcoal seas and pale gray sky make up the Nova Scotian palette. On bright summer days when the sun shines, the waters take on a lush range of blue-green hues.

Cary Baron, Baron Associates, NYC

Roland L. Connelly Sr. to Receive AATCC Harold C. Chapin Award

In recognition for his outstanding service to the Association, AATCC has named Roland L. Connelly Sr. this year's recipient of The Harold C. Chapin Award. Connelly, a native of Spartanburg, S.C., is President and Co-Founder of SheLyn, Inc. in Greensboro, N.C. He received his BS with honors in textiles in 1968 and his MS in textile science in 1970 from Clemson University with course work in color science, instrumentation, and computerization of color in the textile industry.

He began his career in textiles by joining Burlington Industries' Corporate Research and Development Color Laboratories in 1970, as a chemist and color technologist prior to becoming manager of the R & D Color Labs. In that position, he was responsible for the design, development, and implementation of the laboratory, production, and quality control of color systems in all of Burlington's dyeing and finishing operations worldwide. He worked with marketing and design staffs on customer needs regarding color including lighting and viewing conditions, computer-aided textile design, and textile/apparel color linkage. He was also responsible for internal color courses including lectures, labs, and training.

Connelly founded SheLyn Inc. in 1987. With SheLyn, he is working with the application and development of new color technology for color-using industries. This includes all phases of color control including systems, software, hardware, and training.

Connelly holds four U.S. Patents, has published numerous papers and articles, and is a frequent lecturer.

AATCC Activities

A member of the AATCC since 1970, he has served with great distinction at the national, international, and local section levels. Connelly has served as chair and secretary of RA36 (Color Measurement), as chair of both the Technical and Executive Committees on Research, and as chair of the Employee Benefits and Individual Membership Committees.

He has been a member of various technical committees such as the Color Measurement Test Methods, Colorfastness to Light Test Methods, Terminology, and Assessment of Dye Strength and Shade Test Methods Committees. He has also been a member of the Technical Subjects, Publications, Global Interaction, International Test Methods, Buildings and Grounds, Corporate Membership, and Individual Membership Committees, as well as the Committee on Awards and Scholarships and the Committee on Conferences.

Connelly has been an organizer and presenter at the AATCC Color Measurement Workshops since their inception in 1977. He has also presented the Color Science Tutorial at several of AATCC's International Conference & Exhibitions. He currently serves as vice-president of the Midsouth Region.

On an International level, he has served as a delegate to the International Standards Organization (ISO) Technical Committee 38/Subcommittee 1 for textiles since 1977. He has served as Color Measurement spokesperson and expert for the United States since 1981, and head of the U.S. delegation for SC1 in 1998.

Other Activities

Connelly has been active in other professional organizations outside of AATCC as well. He has served as President of the Inter-Society Color Council (ISCC) and served on its Board of Directors, and as interest

group coordinator. He also chaired the ISCC's Williamsburg Conference. He has also been a member of the International Committee on Illumination, and American Society of Testing and Materials. Connelly was also a Founding Board Member of the Ronald McDonald House in Chapel Hill, N.C. He was a past member of the Board of Directors of the National Hemophilia Foundation, as well as a past-President of Hemophilia of North Carolina.

Personal Data

Connelly and his wife, Lynn Stricklin Connelly of Columbia, S.C., reside in Greensboro, N.C. They have a son, R. Lee Connelly Jr., 30, who manages the service center of the Lowe's Home Improvement in Greensboro, N.C. Another son, Christopher B. Connelly, is deceased. Connelly's hobbies include golf, water sports, woodworking, and reading.

Honors and Awards

Connelly received a U.S. Army Commendation Medal. He has also received a J.P. Stevens Scholarship, a Clemson University Teaching and Research Fellowship, the 1968 Northern Textile Association Award for Highest Excellence, and the 1968 Marvin R. Cross Honor Award.

The Chapin Award

The Chapin Award was established in 1958 in honor of the late Dr. Harold C. Chapin, professor of chemistry at Lowell Textile School, who served as national secretary of AATCC for nearly 25 years. Dr. Chapin was a contemporary of Dr. Louis Atwell Olney, founder and first president of AATCC, who was head of the chemistry department at Lowell Textile when AATCC was organized in 1921.Roland Connelly is the 42nd recipient of The Chapin Award.

From the ISCC Office:

Please note that when you receive a membership application form in your newsletter, it does not indicate that you need to reapply. The ISCC hopes that you will pass on the application to someone you feel would benefit from membership in our organization.

Cynthia J. Sturke

Gemological Institute of America (GIA)

Held in New York City, July 28, 2000, the GIA Career Fair attracted 700 job seekers, that included GIA students and graduates, as well as others looking for opportunities in the Jewelry Industry. There were 50 companies recruiting on site.

Mary Forte, executive vice-president of a jewelry corp., told those attending that of course you need expertise, but to succeed you must also have a passion for what you do. Marc Dorio, author of "The Complete Idiot's Guide to the Perfect Interview," conducted a workshop on resumes and interviewing skills.

Career Fair 2000 was made possible by generous support of sponsors. For more information contact Alexander Angelle, alex.angelle@gia.edu.
Tel. 760-603-4112 Fax: 760-603-4080.

Harry K. Hammond III

(Information obtained from GIA press release 9/21/2000)

The Detroit Colour Council

The Detroit Colour Council announces the 22nd annual panel conference; " Automotive Color Harmony." The conference will be held at the MSU Management Education Center, Troy, MI on October 3, 2000.

Whether we judge color match of parts and materials visually or by color measurement, we must decide on an appropriate tolerance to the color standard. The invited speakers describe proper practice for assuring a feasible tolerance which is suitable to the customer. A panel discussion then invites input from all attendees.

The invited speakers are: Dave Alston, Larry Depaoli, Brad Hartley, Bill Longley, Ellen Raymen and Ralph Stanziola.

Jim Keiser, DuPont
248-583-8345

Book Review
ASTM Standards on Color and Appearance Measurement

sixth edition (2000), American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, xxiii + 710 pages, softbound, $175 nonmembers, 10 percent ASTM member discount.

The *ASTM Standards on Color and Appearance Measurement* is a substantial compendium of 108 standards (most revised since Edition 5, and many newly incorporated). Its contents belong on the shelf of every practitioner in the visual appearance of materials, including display screens. Furthermore, because most of the standards have been recently revised, and others were deemed relevant enough to add, it might be worth getting the sixth edition even if one has an earlier edition.

For two taxonomic breakdowns of the standards, it is useful to read two reviews of earlier editions. Ellen Carter's review of the Third Edition [*Color Res. Appl.* **17**, 298 (1992)] explains the differences between "Standard Test Methods" (each a prescription to derive a specific metric for a material), "Standard Practices" (each deriving more than one number), and Standard Specifications (criteria against which the numbers are to be compared). On the other hand, Harry Hammond's review of the Fifth Edition [*Color Res. Appl.* **22**, 290-291 (1996)] emphasizes the differences among the originating committees within ASTM. Both these reviews are well worth reading, and perhaps the material in the reviews should be incorporated in the introduction of a later edition.

The fact that I am not a member of ASTM means I am not nearly so familiar with the standards as Carter or Hammond. On the other hand, the fact of my non-membership allows me to remark on some personal impressions from a distance.

First, an ASTM standard has no bylines and few references, because it represents a primary consensus document. To me the individual self-effacement is noble, but I find frustrating the lack of an audit trail to rationales or to more primary data. For example, I could find no reference for the color diagram in Figure 1 of D4383 (on pavement markers), which delimits the gamuts of nominal red, green, blue, yellow, and white chromaticities. This diagram also appears in at least two other standards. One might imagine that, since the standards are always being updated, their details are to be found in the brains of living, e-mailable people whose names are on file at the ASTM. In practice, the reasons for older methods are forgotten if they are not written down. Authors of old computer programs recognize the fragility of human memory in this regard.

Secondly, I have to express my profound respect for the authors of the ASTM standards, and for the companies that have funded their work. At great expense, these authors have persisted over many years to create a detailed and evolving set of rules for industry. Such staying power is difficult to find, as I am discovering from my involvement with other standards bodies. In particular Richard Harold (the Editor of the present compendium) is to be congratulated for the more than 10 years he devoted to evolving further the seminal ideas on appearance measurement that Richard Hunter brought to the ASTM.

Finally, it is appropriate to say some words about the coordination among standards bodies including the ASTM. The Introduction to the present volume makes very clear the prodigious efforts to coordinate the ASTM standards with those of the ISO, the SAE, TAPPI, and AATCC. Furthermore, I can attest to efforts in the VESA Display Metrology Committee to conform the evolving measurement nomenclature of screen reflection with the ASTM terminology in this book. An area for improvement is the present discrepancy between the ASTM model of colorimetric properties of a visual display unit (ASTM E 1682-96) and the International Electrotechnical Commission's model. The latter (but not the former) of these uses a polynomial model for cross-talk between additive primaries.

I lately have run into the attitude that standards-body activity is "easy" and "impossible to screw up." I have tried to remind the responsible parties that such activity is important and challenging in its own right, even if it is not glamorous or directly productive of revenue. To engage in successful standards activity,

you must weather disagreements tactfully through to consensus, make steady progress, maintain harmony with the parent standards body, be technically correct, communicate clearly, and (perhaps most importantly) anticipate and avoid lawsuits. The history of the ASTM attests to the abilities and dedication of all its contributors, and the present compendium is a good way to keep its wisdom at your fingertips. Also, buying the compendium is much cheaper than buying many of the standards individually.

Michael H. Brill

Book Review - A 2nd Opinion

ASTM Standards on Color and Appearance, Sixth Edition 2000, ASTM, 100 Bar Harbor Drive, West Conshohocken, PA 19428-2959, xxiii + 710 pages, soft bound, with CD-ROM, &175.

The sixth edition, compiled by Richard Harold, continues the series originally conceived by the late Richard Hunter. It includes all new, revised or reaffirmed standards since the publication of the fifth edition in 1996, 108 in all. Standards are listed first by the letter assigned to the committee having jurisdiction followed by an identification number assigned by ASTM, when the document is first approved for publication, followed by a dash and two-digits to indicate the year of publication or revision. When a standard is reaffirmed a four-digit number in parenthesis follows to indicate the year of reaffirmation. Most of the standards are under the jurisdiction of ASTM Committee E-12 on Color and Appearance, but to compilation editor, Richard Harold, with the approbation of E-12 has included appearance standards published by any ASTM Committee. Related standards published by other organizations that involve appearance evaluation are listed only by title.

The compilation contains a valuable, 12-page introduction that includes text material on 1) Uses of Measurements of Appearance and 2) Distinction Between the Attributes of Appearance. There follow seven tables that list standards by attributes and materials tested. This information is particularly useful to everyone seeking guidance in these areas.

The price of the compilation of color and appearance standards may seem high, but it is established by ASTM to cover staff assistance and publication costs. No ASTM Committee pays members to draft or revise standards. Take advantage of the opportunity this year to obtain a copy of the sixth edition of the printed volume together with a CD-ROM that contains all the printed material.

Harry K. Hammond III

Metamerism, Color Inconstancy, and Retail Lighting

(This is the first in a series of articles which will follow the development of new research being conducted by Prof. David Hinks of the College of Textiles at the University of North Carolina State University. This research is part of an ongoing study by the AATCC Subcommittee on Lighting Communications.

Summarized from a paper entitled "Assessment of the Effect of Lighting Variability on Color Difference" by Dr. David Hinks, Sara Draper, Qinglin Che, Monthon Nakpathom, Ahmed El-Shafei, and Roland Connelly)

No matter how precisely a manufacturer dyes his material, no matter how carefully an apparel maker selects the pieces that will make up each garment, one factor always remains outside of their control – the lighting in the store where the product will be purchased. Colorant formulation and quality control work, whether in the dyehouse or in the sewing room, is usually done using standard illuminants such as D65, A, or F2. However, retail space is rarely lit by such carefully defined light sources.

David Hinks and his students recently examined the lighting in several retail stores. The results from one such store were written up and presented at the AATCC's *Color Science Symposium* held in Greenville, SC in March, 2000. The study presented used a green metameric standard and trial that matched under D65. Radiometric measurements of the lighting environment were collected at ten different locations within the store. Spectral power

distributions for the in-store lighting were convertedto standard ASTM Table 6 illuminant data for each measurement location, and color difference data were calculated using DEcmc, a metamerism index (MI), and the color inconstancy index, CMCCON97.

This last index is a method for estimating the perceived color change for a single object, sometimes known as "flare," and reflects the degree to which an object changes in color along with changes in illumination. Remember, metamerism deals with the color difference between two objects which match under one illuminant but not another. It is actually possible for two objects to be low in metamerism while also being color inconstant. In this case, the color of both objects change when the illuminant is changed, but they both shift in the same direction of color space, thus continuing to match to each other.

This Color Inconstancy Index (CII) has only been recently developed. Since more research is needed to establish tolerances for the calculation of this value, it has been included as part of this study. This index could be of incalculable value in the future if such tolerances could be determined. Using the CII could lead to the development of new dye recipes which would take into account not only the metamerism for a standard compared to its batch, but also the color inconstancy of the batch. Developing more knowledge of the lighting variability in retail stores would assist with the development of these CII tolerances.

The data obtained from calculating the predicted color difference for the standard and trial pair at each of the ten locations revealed that a variety of lighting factors led to a color change. These include:

- Incorrect lamp installed.
- Mixing incandescent and fluorescent lighting.
- Lamp emission variability.
- Light pollution from doorways and windows.
- Strongly colored surfaces near the light source.

What this means for consumers is that the spectral power distribution of the light source in the store may differ considerably from the standard illuminant used in the original color specification. The color of a product in the store may be very different from what the creator of that product intended.

Space limitations prevent presenting all of the data included in the paper. However, some of the more interesting results should be mentioned. For example, DEcmc values for the green metameric pair used always exceeded 1.0 for every measurement location in the store. While the smallest DEcmc value was only 1.06, the largest was a whopping 4.1. The changing room scored a 3.31 DEcmc. Imagine the customer trying on a garment whose individual pieces matched under D65 but were over 3.3 DEcmc from the standard in the changing room. These color difference calculations do not take into account the effect of background color, which is probably significant. Still, these preliminary results indicate that the lighting issue is likely to be of great importance for both retailers and the manufacturers who supply them.

In addition to DEcmc, the metamerism index (MI) was also calculated for the samples at all of the measurement locations throughout the store for each of four standard illuminants. When the MI was calculated for the standard illuminant F2 at location five, the changing rooms, the result was over 5.5. MI calculated for the other standard illuminants were considerably lower with D65 the largest at 4.2, UltraLume3000 second at 2.5, and A third at 0.25. Therefore, with this pair of metamers, calculation of MI indices using the three commonly used standard illuminants would have underestimated the metamerism observable at certain points in this store, assuming that MI is accurate of actual human metameric perception.

Overall, this initial study demonstrates that retail lighting variability can have a large effect on the perceived color of objects. If the displayed products are color inconstant, then the color perceived may be considerably different from that intended by the designer. The development of color constant objects and improved control of lighting could be of significant benefit.

Reprinted from Color Byte™, SheLyn Inc., Color Technology and Applications, Volume 9.2 Summer 2000. Pleaes note: If you would like to read the complete article, it can be found in *Textile Chemist and Colorist and American Dyestuff Reporter, Vol. 32, #6, June 2000, pp. 16-20.*

CALENDAR

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

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fax:703-318-0514 **website:** *http://www.iscc.org*

2000

Sept. 12-20 **AATCC Intl Conference And Exhibition**, Benton Conv. Ctr, Winston-Salem, SC, Hilda McQueen, Tel: 919-549-3549; Fax: 919-549-8141, *mcqueenh@aatcc.org. Website: www/aatcc.org*

Sept 17-19 **CAD/SPE RETEC 2000** "Your ticket to Great Colorants and Additives" Washington, D.C. Sandra Davis--DuPont 302-999-2540 sandra.p.davis@usa.dupont.com

Oct. 1-4 **CGIP 2000,** Intl Conf. on Color in Graphics and Image Processing. St.Etienne, France. Info: Alain Tremeau *tremeau@vision.univ-st-etienne.fr* website: *www.univ-st-etienne.fr/~iupvis*

Oct. 3 **Detroit Colour Council,** Automotive Color Harmony - A panel discussion on setting appropriate color tolerances. MSU Management Education Center, Troy, MI. Call James R. Keiser, 248-583-8345 or Bill Longley 734-420-4920

Oct 14-17 **2000 PIA/GATF Graphic Arts Industry Summit** Hotel Del Coronado, Coronado, CA tel: 412-741-6860

Oct. 16-20 **International Coatings Expo (ICE 2000); FSCT Annual Meeting Technical Program**, Lakeside Ctr, McCormick Place, Chicago, IL, Info: FSCT, 492 Norristown Rd., Blue Bell, PA 19422; 610-940-0777; fax: 610-940-0292; *rodm@coatingstech.org.*

Oct. 22-27 **OSA Annual Meeting**, Providence, RI; Info: Meeting, 202-416-1907, *cust.serv@osa.org;* Exhibits, 202-416-1950, *exhibits@osa.org*

Oct. 29-31 **Color Marketing Group Fall International Conference 2000,** Boston, MA Tel: 703-329-8500

Nov. 1-3 **Human Factors and Ergonomics Society, Europe Chapter,** Maastrict, The Netherlands. Further information: http://utopia.knoware.nl/users/hfesec/meeting/ec_meet.htm. (It is not necessary to be a member of the HFES to participate.)

Nov. 6-7 **2000 AIC Meeting Seoul,** Color and Environment. Seoul, Korea, 82-2-365-514 fax: 82-2-365-0014

Nov. 7-10 **IS&T/SID 8th Color Imaging Conference** Color Science, Systems & Applications, SunBurst Resort Hotel, Scottsdale, AZ. 703-642-9090 Fax: 703-642-9094 *info@imaging.org; www.imaging.org*

Dec 3-5 **GATF Color Management Conference,** Embassy Suites, Paradise Valley, Phoenix, AZ tel: 412-741-6860

2001

Jan. 23-26 **ASTM Committee D-1**,Paint and Related Coatings, Materials and Applications, Info: T. Brooke, 610-832-9729; fax: 610-83-9666; *tbrooke@astm.org*

Jan 23-26	**ASTM Committee E-12,** Color and Appearance, Embassy Suites, Ft. Lauderdale, FL. Info: Bode Hennegan, 610-832-9740; fax: 610-832-1547; *bbuckley@astm.org*
Feb 25-28	**Continuous Improvement Network Annual Conference,** Drake Hotel, Chicago, IL tel: 412-741-6860
March 19-20	**Williamsburg Conference, ISCC Color Course,** Color Basics for Industry, Cleveland, OH, Airport Marriott. Info: Roland Connelly, SheLyn, Inc., *roland@shelyn.com,* Richard Harold, Color and Appearance Consulting, 703-709-5454 *rwharold@worldnet.att.net*
April 1-3	**Color Marketing Group Spring International Conference,** Orlando, FL 703-329-8500 *cmg@colormarketing.org*
April 23-27	**ASPRS Annual Conference,** St. Louis, MO, 301-493-0290; Fax: 301-493-0208 *www.asprs.org.*
May 6-9	**TAGA Annual Technical Conference,** San Diego, CA. Info: 716- 475-7470; fax: 716- 475-2250, *TAGAOfc@aol.com*; website: *http://www.taga.org*
May 10-12	**CIE Experts Symposium on Light Emitting Diodes,** Holiday Inn, Gaithersburg, MD contact: Y. Ohno, NIST, Ohno@nist.gov
May 13 -17	**CORM 2001**: 100 Years of Optical Radiation Standards for Commerce for the United States and in the Global Cmmunity - Shrinking Uncertainties for a Shrinking World to be held at NIST, Gaithersburg, MD. Contact: Danny Rich at SunChemical Ink (GPI), 201-933-4500 x1144 or RichD@sunchem.com
May 17-20	**2001 CIE Division 2 Annual Meetings,** NIST, Gaithersburg, MD, contact: Y. Ohno, NIST, Ohno@nist.gov
June 24-29	**ISCC/AIC Mtg,** Rochester, NY; Paula J.Alessi, 716-477-7673; Fax: 716-722-1116 *paula.alessi@kodak.com*
Sept 23-25	**CAD/SPE RETEC 2001** "Hot Color - - - -Cool Plastics", Marriott Resort Hotel, Marco Island, Florida Chairperson: Gary Beebe, A. Schulman, tel: 330-239-3059, gary_beebe@aschulman.com
Nov. 5-9	**IS&T/SID 8th Color Imaging Conf.,** Color Science, Systems & Applications, Scottsdale, AZ.

2002

February	**ISCC Williamsburg Conference,** Solutions for Industrial Color Problems, Chair: Ralph Stanziola *rascolor@juno.com*
June 9-13	**Fourth Oxford Conference on Spectrometry,** Davidson College, Davidson, N.C. Info: Art Springsteen *avian@kear.tds.net* Teresa Goodman *tmg@npl.co.uk*

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