

Inter-Society Color Council *News*

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PRESIDENT'S COLUMN

SEARCH FOR LIASON TO SMITHSONIAN INSTITUTE

PA

My column will be short, but very important. I have a special request of the ISCC general membership. I would like to find a volunteer to serve as

an ISCC liaison to the American History Museum at the Smithsonian Institute for the purpose of establishing a location to preserve the personal affects of ISCC pioneers, such as Ralph Evans, Carl Foss, I. H. Godlove, Richard S. Hunter, Deane B. Judd, Kenneth L. Kelly, Norman Macbeth, Sr., Dorothy, Nickerson, and Edwin I. Stearns, to name just a few.

Many thanks are extended to Richard Harold, who laid the groundwork with the Smithsonian American History Museum. Now we need someone to volunteer to follow-up. This follow-up would involve finalizing such details as the establishment of an ISCC endowment to cover the cost of maintaining such personal affects. I have the name and phone number of the contact person at the Smithsonian. If you are interested in serving as liaison, please contact me immediately. It sounds like it could be a fun undertaking!

Thank you very much for considering this opportunity to preserve our color heritage!

Paula J. Alessi
President, ISCC

PURPLE PROSE

The letter "S" is red: sleep, symphony, and even snow are all red words. Blood is deep blue. Milk is dark green. Love is a meek, watery yellow.

This is the world according to a synaesthete — someone whose senses are cross-wired in curious ways. For some people with synaesthesia, letters, numbers, days, and months may each have distinct hues. When these people hear words, they think colors, and the colors associated with a given word change from person to person. Other synaesthetes perceive color when they listen to music or smell an odor — or feel shapes when they taste food.

A team of psychologists and neurologists led by Simon Baron-Cohen of the Institute of Psychiatry in London became interested in synaesthesia in 1987, after [receiving] a letter from an artist who claimed that every word in her vocabulary had a different color. The psychologists read out 100 words to the artist, Elizabeth Stewart-Jones, now in her 80s, and asked her to describe the colors she saw. Ten weeks later, without warning, they repeated the test. Her replies were identical. Subsequent tests have shown that normal people come up with the same color for the same word only 37% of the time in tests a week apart, while self-declared synaesthetes — the study has anecdotal evidence from 450 of them — are 92% accurate after 18 months.

By using radioactive molecules to track the blood, the neurologists have compared the blood flow in the brains of six synaesthetic women and six normal ones. The researchers read a list of words and meaningless sounds to their blindfolded subjects. In the synaesthetes, blood flowed to the part of the brain that handles vision. In the control group, it did not. That suggests color is indeed being sensed when the only stimulus is sound.

The results, which will soon be published in a journal called *Brain*, are provocative. They suggest that areas in

UNIVERSITY CORNER



The Rochester Institute of Technology Student Chapter of the ISCC is going strong.

We are designing a banner whose over-all design will be used for all student chapters, and will be individualized for each newly-formed chapter. We took a Fall Foliage tour of Letchworth State Park of New York on October 23, with a contest for finding the most chromatic leaf. We will be touring some of R.I.T.'s color-related facilities including perhaps the Eye and Ear Institute and the Image Permanence Lab. Other activities in the planning are tours of Rochester's Kodak and Xerox facilities, as well as bringing some speakers on campus.

RIT/ISCC Student Chapter has identified as one of its foremost goals assisting in the formation of student chapters at other universities. The coalition of such chapters leads to endless possibilities, such as student conferences, tours of other universities, and possibly a student chapter newsletter.

the brain normally cordoned off from each other are linked in synaesthetes. Have the normal barriers broken down, or were they never built up? John Harrison, one of the researchers, suspects the latter. He thinks synaesthesia is a childhood attribute most grow out of. The few who do not, though — often creative, left-handed and female — find living with the condition quite palatable. They claim to experience the life of white "o"s and yellow "U"s richly, enjoying the sort of unified sensory experiences other adults only get with drugs.

from The Economist
Sept. 4, 1993



We are currently putting together a packet of information which will describe the steps involved in forming a student chapter, possible academic and social activities, and suggestions for fundraisers. If you would like to receive such a packet for distribution at your college or university, please send your name, address, phone number, and e-mail address to:

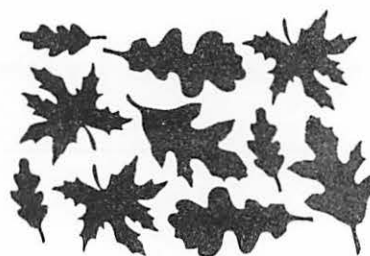
Audrey Lester
Secretary, ISCC Student Chapter
Rochester Institute of Technology
54 Lomb Memorial Drive
Rochester, N.Y. 14623

Or by e-mail:
aal4360@ultrb.isc.rit.edu

If you have any questions, please contact Robert Chung, ISCC Education Committee Chairman, One Lomb Memorial Drive, P.O. Box 9887, Rochester, N.Y. 14623, (716) 475-2722.

Karen Braun
President, ISCC Student Chapter

HAPPY HALLOWEEN AND HAPPY THANKSGIVING



WHEN DID PHOTOELECTRIC TRISTIMULUS COLORIMETRY BEGIN?

The question is often asked, "When did Photoelectric Tristimulus Colorimetry begin?" It is difficult to determine the exact month and year. One could use the month that Richard Hunter delivered a paper on the subject to the Optical Society of America. On the other hand, I recently came across the attached News Release when cleaning out an old file:

For release September 9, 1942
DEPARTMENT OF COMMERCE
Washington

Development of an "artificial eye for color measurement" was announced today by the National Bureau of Standards, Department of Commerce.

The new instrument is known as a photoelectric tristimulus colorimeter and under certain conditions and limitations will respond to color differences in much the same manner as the human eye.

The instrument and methods of use are described in Circular O-429 — Photoelectric Tristimulus Colorimetry With Three Filters. So far the three-filter method has been used chiefly in conjunction with the multipurpose reflectometer developed by Richard S. Hunter of the Bureau, author of the circular, to measure surface colors. Tristimulus measurements with this instrument have proved to be valuable in studies of the colors of paints, ceramic products, textiles, papers, pigments, inks and other materials that reflect light.

However, a number of the methods suggested are said to be equally useful for the study of volume colors by measurements of transmitted energy and for the study of illuminant colors by measurements of emitted energy.

The photoelectric tristimulus method employed with any instrument with which it can be used is direct and rapid and capable of very precise application to many problems. It can be substituted for some of the methods now in use which are more cumbersome and time-consuming.

Circular O-429 may be obtained from the Superintendent of Documents, Washington, D.C., at 10 cents a copy*.

Harry K. Hammond III

**Note: this document may no longer be available, and particularly not at that price!*

NEW MEMBERS

We are pleased to list the latest members to the ISCC. Welcome!

Mr. Rick Alfvén
RIT
27 Burr Oak Drive
Pittsford NY 14534-3537 USA

Mr. Nurhan Becidyan
United Mineral & Chemical Corp.
1100 Valley Brook Ave.
Lyndhurst NJ 07071 USA

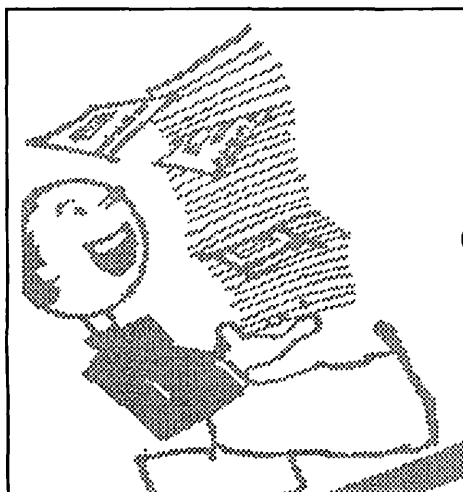
Mr. Curtis A. Bohn
Akzo Coatings Inc.
1518 Telegraph Rd.
West Chester PA 19380 USA

Mr. Jeff Gilbert
Colorgen Industrial Group
12 Federal Street
Newburyport MA 01950 USA

Mr. Bill M. Gresho
Delco Electronics
1800 E. Lincoln Rd
M/S R231
Kokomo IN 46904-9005 USA

Ms. Ann M. Herdmann
Mason Color Works, Inc.
250 East Second St.
PO Box 76
E. Liverpool OH 43920 USA

Mr. Keith Lee
Ihara Medics U.S., Inc.
Bldg K
25030 Ave. Tibbitts
Valencia CA 91355 USA



**THE ISCC
WELCOMES
CONTRIBUTIONS
FROM ALL
MEMBERS**

NEWS FROM MEMBER BODIES

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

Workshops on Fabric Preparation and Basics of Dyeing and Finishing



The American Association of Textile Chemists and Colorists (AATCC) will

sponsor back-to-back workshops on fabric preparation and the basics of dyeing and finishing on December 14-16, 1993 at the Radisson Executive Park in Charlotte, North Carolina.

Fabric preparation will be the focus of the first workshop which will be held December 14. Topics for discussion will include practical processes for singeing, desizing, scouring, bleaching, mercerizing, heat setting, and quality assurance. Guest speakers for this workshop include Edward J. Elliot of Ford, Elliot, and Trimble Inc., Charlotte, N.C., and Raymond E Silva, Jr. of Aurora Bleachery Inc., Aurora, Ill.

The second workshop will be conducted on December 15-16 and will concentrate on the fundamentals of dyeing and finishing. Topics to be discussed include Basics of Dyeing Technology, Dyeing of Cellulose and Other Natural Fibers, Dyeing of Nylon, Dyeing of Cationic Dyestuffs, Dyeing with Disperse Dyes, Finishing Processes, and much more.

Registrants may elect to attend the one-day workshop on fabric preparation, the two-day program on the basics of dyeing and finishing, or both. Registration fees will vary depending on the number of days in attendance and will include luncheons, breaks, and cost of all materials.

Overnight accommodations are available at the Radisson Executive Park, 5624 Westpark Dr., Charlotte, N.C. 28217, (714) 527-8000. Reservations should be made directly with the hotel and attendance at the AATCC workshop should be specified

to receive the group rate.

To register or to obtain additional information, contact Peggy J. Pickert, AATCC, P.O. Box 12215, Research Triangle Park, N.C. 27709-2215, Phone (919) 549-8141, Fax (919) 549-8933.

AATCC News Release

AMERICAN SOCIETY FOR TESTING AND MATERIALS

Report of ASTM Delegates to ISCC

ASTM All ASTM optical and appearance standards under the jurisdiction of the Appearance Committee (E-12) and the Paint Committee (D-1) are now published in Volume 06.01 of the *Annual Book of ASTM Standards*. The 1993 edition contains 55 appearance standards, as well as many standards involving tests for chemical, physical, and durability properties of paint and other nonmetallic materials. Each standard is assigned an alphanumeric identification consisting of a single letter to identify the committee category, such as D or E above, and a serial number assigned when the standard is originally approved for publication. All appearance standards of these two committees together with those of other materials committees are also contained in the publication "ASTM Standards on Color and Appearance Measurement," third edition (1991), 400 pages.

The *Annual Book of ASTM Standards* includes 15 sections, each representing a different discipline or group. Together they comprise 64 volumes. All volumes are published

annually at different times throughout the year. A separate index volume lists all standards by subject as well as by alphanumeric designation. When a standard is referenced only by letter and number of the alphanumeric designation, consulting the index will reveal the section and volume in which the standard appears.

One of the most important standards for ISCC members is E 284, Terminology of Appearance. It contains over 400 terms with their definitions in simple language. Other standards of particular interest to ISCC members are three on color-order systems, namely

D 1535-89, Test Method for Specifying Color by the Munsell System

E 1360-90, Practice for Specifying Color by Using the Optical Society of America Uniform Color Scales System

E 1541-93, Practice for Specifying and Matching Color Using the Colorcurve System

ASTM regulations require that each standard be reviewed at least every five years. A standard may be revised, or simply reapproved when no revision is necessary. The terminology standard is revised at least every year because of the rapid advancement of terminology in the appearance field.

All the standards mentioned above are contained in Volume 06.01 of the 1993 *Annual Book of ASTM Standards*. They can also be purchased separately. The prices of the volume or separate standards may seem high until they are compared to those of technical publications of other organizations.

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ASTM, continued

ASTM members are entitled to discounts on many publications and receive one free volume with their membership. Since the current ASTM membership fee is about one-half the price of a volume, the obvious recommendation is to become a member and take an active part in the work of ASTM.

*Harry K. Hammond III
Chairman, ASTM Delegates to ISCC*

SOCIETY FOR IMAGING SCIENCE & TECHNOLOGY

CALL FOR PAPERS
ICPS '94: INTERNATIONAL
CONGRESS OF
PHOTOGRAPHIC SCIENCE



**Society for
Imaging Science
and Technology**

(IS&T) announces the 1994 International Congress of Photographic Science (ICPS '94) which will be held jointly with the 47th Annual Conference. The Conference will be held from Sunday, May 15 through Friday, May 20, 1994, at the Stouffer Rochester Plaza Hotel in downtown Rochester, New York. The Conference Committee is planning a stimulating technical program, which will cover a broad range of traditional silver-halide and chemical imaging areas as well as topics dealing with hybrid and electronic imaging. The presentations, both oral and poster, will provide a logical and focused overview of modern image science, imaging media and processes, and imaging systems.

The conference reception will be held at the International Museum of Photography at the George Eastman House. Participants will have an opportunity to explore this extraordinary museum housing one of the world's greatest collections of

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FEDERATION OF SOCIETIES FOR COATINGS TECHNOLOGY

Fred Schwab Receives FSCT's
Heckel Award

FSCT The
Federation
of Societies
for Coatings

Technology is pleased to announce that Fred G. Schwab, Executive Director of Coatings Research Group, Inc., Cleveland, OH, is the recipient of the association's prestigious George Baugh Heckel Award for 1993.

Mr. Schwab, a 35-year member of the Cleveland Society for Coatings Technology and the FSCT, received the award at the Georgia World Congress Center, in Atlanta, GA on October 27.

The Heckel Award, FSCT's highest honor, recognizes Mr. Schwab's outstanding contributions to the Federation's interest and prestige. Established in 1951, the Award is in memory of the Federation's initial Chairman and Secretary.

Mr. Schwab's involvement in Federation affairs includes Chairmanship of the Annual Meeting's Program and Mattiello Committees, as well as serving as FSCT's By-Laws Committee Chairman since 1980. His service as a member of the FSCT Board of Directors from 1978-92 included a three-year term on the Executive Committee. He has also served on the Investment, Corrosion, Professional Development, Memorial, Nominating, Practical Projects, and Paint Show Awards Committees.

A Past-President of the Cleveland Society, Mr. Schwab was elected an Honorary Member of the Society in 1991, and was recipient of the Society's Frank N. Selden Award and the Award of Merit.

FSCT News Release

ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA

IESNA Lighting Standards
Available on CD-ROM

IES The Illuminating Engineering Society of North America (IESNA) has announced the availability of their lighting standards on CD-ROM (compact disc - read only memory). This service will be offered through Information Handling Service. With this format, it is possible to locate, view, and print IESNA documents in seconds.

The service contains the full text of all standards published by IESNA: Lighting Handbook, Committee Reports, Energy Management Services, Measurement and Testing Guides, and Recommended Practices which cover

many aspects of lighting including various applications, terms and definitions, test procedures, energy management, and utilization.

Included in every subscription to IESNA standards on CD-ROM is the comprehensive Worldwide Standards Service Index. This easy-to-use tool searches for standards by document number, keyword, subject, or developing organization.

For additional information on this or other IESNA services, please contact Beth Bay, 120 Wall Street, 17th floor, New York, NY 10017. The IESNA is the recognized authority on illumination and a member body of the Inter-Society Color Council.

Danny Rich

IS&T, continued from page 5

imaging: photography, film, technology, and literature. Participants will also enjoy the hospitality of the Colonial Revival home of the founder of the Eastman Kodak Company. The conference will also feature a welcoming reception, the Honors and Awards dinner, an evening event at High Falls, and weekend tours to areas of local interest.

We invite original contributions related to imaging science and technology. Papers should be authoritative, complete in regard to advancing the state of knowledge in the

subject matter, and be accompanied by a well-prepared 20 minute presentation or an appropriate poster presentation. Papers of merit will be eligible for publication in one of the Society's technical journals. The conference language will be English.

Applications will be received up to December 1, 1993.

For more information and an "Author's Application" contact Robert W. Anderson, Publications Co-Chair, Xerox Corp., 800 Phillips Road, Webster, N.Y. 14580, Phone (716) 422-2487, Fax (716) 422-1035.

HUMAN FACTORS AND ERGONOMICS SOCIETY (HFES)

Fellows Elected



Three distinguished nominees were recently elected Fellows of the Human Factors and Ergonomics Society. They are:

- Philip L. Ackerman, professor, Department of Psychology, University of Minnesota, Minneapolis, Minnesota
- Alvah C. Bittner, Jr., senior research scientist, Battelle Human Affairs Research Center, Seattle, Washington
- Deborah A. Boehm-Davis, associate professor, Department of Psychology, George Mason University, Fairfax, Virginia.

These distinguished professionals join the Society's 216 other Fellows.

Fellow status in the Human Factors and Ergonomics Society requires a minimum of five years of membership, ten years of professional experience in the field, outstanding and demonstrable contributions to human factors, three years of direction or supervision of

significant human factors efforts, and at least one year's service to the Society.

HFES News Release

Awards Presented at 37th Annual Meeting

At a special awards ceremony and banquet during its 37th Annual Meeting, the Human Factors and Ergonomics Society recognized significant contributions to the field by members and nonmembers. Eight awards were presented.

The President's Distinguished Service Award is given in recognition of a person's outstanding contributions to the advancement of the human factors profession and the Human Factors and Ergonomics Society over his or her entire career. This year the award went to H. McIlvaine (Mac) Parsons, manager of the Center for Human Factors at the Human Resources Research Organization in Alexandria, Virginia.

For more than 43 years, Parsons has served the human factors profession in a variety of managerial and technical positions. In that time he has helped to develop a theoretical framework for human factors science based on operant behavior analysis, with emphasis on constructs of reinforcement and motivation. He has been a leader in the introduction of human factors principles and data to high-technology

applications, such as robotic systems and automation in the workplace.

Robert C. Williges, Beverly H. Williges, and Sung H. Han received the 1993 Jerome H. Ely Award for the best article published in the previous year's volume of *Human Factors*. The paper, entitled "Developing Quantitative Guidelines Using Integrated Data from Sequential Experiments" (Vol. 34, No. 4, Aug. 1992) was selected by a committee of HFES Fellows on the basis of subject matter relevance, methodological sophistication, clarity of presentation, and overall contribution to the field of human factors. In selecting this paper, the committee recognized the creative manner in which the authors used integrated empirical models to combine data across four experiments in order to evaluate the search process of locating information in a database using a telephone.

Robert C. Williges, an HFES Fellow, is a professor of industrial and systems engineering and director of the Human-Computer Interface Laboratory at Virginia Tech in Blacksburg, Virginia. Beverly H. Williges is a senior research scientist in industrial and systems engineering at Virginia Tech and is an HFES Fellow. Sung H. Han is on the technical staff of the Usability and Industrial Design Laboratory at IBM System Storage Products Division, Tucson, Arizona.

The 1993 Distinguished Foreign Colleague Award was given to Professor Mitsuo Nagamachi of Hiroshima University, Japan. Over the past 29 years, he has had a wide-ranging influence on human factors and related areas of psychology and industrial engineering, such as human factors and manufacturability, job redesign for older workers, macroergonomic applications to safety, fuzzy set theory, robotics, Kansei engineering, and participatory ergonomics.

The Society presented Walter W. Wierwille with the 1993 Paul M. Fitts Award, in recognition of his 22 years of outstanding contributions to the education and training of human factors specialists. Wierwille is Paul T.

Norton Professor at Virginia Tech, where he is responsible for developing and equipping a unique instructional and research laboratory for collecting and analyzing human factors information, in both automotive vehicles and aircraft.

Ivan Douglas Brown, assistant director of the Applied Psychology Unit of British Medical Research Council, received the 1993 A.R. Lauer Traffic Safety Award in recognition of his efforts to stimulate psychologists' interest in driver behavior and to convince traffic authorities of the importance of a driver-centered view of traffic problems. A Fellow of HFES and of the Ergonomics Society, Brown was the recipient of the HFES Distinguished Foreign Colleague Award in 1990.

The Alexander C. Williams, Jr., Award is given in recognition of outstanding contributions to the conception or design of a major operational system, the effectiveness of which depends on one or more experimentally supported human factors design principles.

This year's award went to Jerry R. Duncan of Deere & Company, Moline, Illinois, for his exemplary application of empirically derived human factors principles to the design of an innovative foot-control system used in many John Deere tractors and mowers. Duncan suggested the use of foot controls to change vehicle direction, the adoption of which by Deere & Company is a result of Duncan's research and the effectiveness demonstrated through experimentally supported human factors design principles.

Sandra G. Hart of NASA-AMES Research Center is the recipient of the 1993 Jack A. Kraft Award, which recognizes significant efforts to extend or diversify the application of human factors principles and methods to new areas of endeavor. Hart was directly responsible for important innovations in the area of workload measurement through the development of the TLX (task load index) scale, one of the two most successful methods of measuring

workload in practical situations to emerge in the last 10 years.

The Best *Bulletin* Article Award is presented each year to the author or authors of the outstanding technical article published in the preceding volume of the *Human Factors and Ergonomics Society Bulletin*, the Society's monthly newsletter. The 1993 award went to Clare-Marie Karat for her article entitled "Cost-Justifying Human

Factors Support on Software Development Projects" (Vol. 35, No. 11, Nov. 1992).

In her article, Karat, an Institute Fellow at IBM T.J. Watson Research Center, Yorktown Height, New York, discussed the economic benefits of including cost-justification of human factors support in all development projects.

HFES News Release

SOCIETY FOR INFORMATION DISPLAY (SID)

Call for Papers

INTERNATIONAL SYMPOSIUM, SEMINAR, AND EXHIBITION '94



The Society for Information Display will be hosting the International Symposium, Seminar, and Exhibition from June 12-17, 1994 in San Jose, California. SID encourages the submission of original papers on all aspects of research, engineering, application, evaluation, and utilization of displays. The following topics are relevant to SID's focus:

- Active-Matrix Liquid-Crystal Displays
- Product Engineering/Applications
- Applied Vision/Human Factors
- CRTs
- Display Manufacturing
- Display Measurement
- Display Systems
- Emissive Displays
- Hardcopy
- Image Processing

• Large-Area Displays

• Liquid-Crystal Technology

As part of the technical symposium covering the broad range of information display topics listed, SID '94 will feature topical sessions which focus specifically on selected issues or key developments. Paper submissions are welcome for any of the general symposium topics or for any of the many topical sessions.

Product Engineering/Application sessions will contain information on the practical aspects of display technology such as design, manufacturing, and testing of displays and display-related products. Papers are generally product or process oriented and deal with how something was engineered, how it works, what to use, how to use it, and what to avoid. Emphasis should be technical, not marketing. Application Sessions will be conducted in parallel with the Symposium sessions. A separate Product Engineering/Application Digest of Papers will be published. For information contact Kalluri Sarma, Honeywell, Inc., Phone (602) 436-6415, Fax (602) 436-2821.

Please submit your double-spaced 35-50 word abstract and technical summary on single sided 8.5 x 11 in. pages. Deadline for receipt of abstract is November 23, 1993.

For more information, contact Joyce E. Farrell, Conference Chair, Hewlett-Packard Labs, P.O. Box 10490, Palo Alto, California, Phone (415) 857-2807, Fax (415) 857-4320, E-mail: "farrell@hplabs.hp.com".

(SID continues, next page ➡)

SID Call for Papers

INTERNATIONAL DISPLAY RESEARCH CONFERENCE '94



SID and the Advisory Group on Electron Devices, in

cooperation with the IEEE Electron Devices Society, announce the 1994 International Display Research Conference (IDRC '94) and Display Materials Workshop. IDRC '94 will be held on October 10-13, 1994 at the Hyatt Regency Hotel in Monterey, California.

Research and fundamental development aspects of display technology and related human-interface issues will be emphasized. Leading contributors to display research are encouraged to attend for an intensive exchange of ideas through formal and informal discussions, stimulated by the natural beauty of the scenic Monterey Peninsula. In keeping with this emphasis and tradition, there will be no commercial exhibition of equipment.

Papers are solicited in all disciplines relevant to advancing the state of the art of electronic display materials, processes, circuits, devices, and human interfaces. Submissions are also encouraged on advanced display systems, ranging from high-definition and digital television through entertainment and virtual or enhanced reality. Increased emphasis will be placed on electronic-display materials through a special two-day material program, including a one-day Display Materials Workshop scheduled for October 10, prior to the start of the main conference. The Workshop will include invited and solicited papers only.

The deadline for submission of 35-word abstract and 2-5 page technical summary is May 2, 1994. For more information, contact General Chair Thomas Credelle, Apple Computer, (408) 862-7271 or Program Chair Frederic J. Kahn, Kahn International, (415)327-2043.

1992 ISCC/TAGA PROCEEDINGS

Volume 2



Don't miss the following papers that were presented at the Inter-Society Color Council (ISCC) and Technical Association of the Graphic Arts (TAGA)

Conference held in Williamsburg, Virginia on February 23-26, 1992.

The theme of the conference was "Comparison of Color Images Presented in Different Media." These papers are contained in a hardbound book titled, *The 1992 ISCC/TAGA Proceedings, Volume 2*.

- "Techniques for Reproducing Images in Different Media: Advantages and Disadvantages of Current Methods," Anthony Johnson
- "Colorimetrically Quantified Visual Tolerances for Pictorial Images," Mike Stokes, Mark D. Fairchild and Roy S. Berns
- "State-of-the-Art Hardcopy/Softcopy Image-Matching Techniques," Paula J. Alessi and Thomas E. Madden
- "Appearance Modelling," Robert W. G. Hunt

- "Chromatic Adaptation to Image Displays," Mark D. Fairchild
- "The Influence of Surface Properties on Image Interpretation," Robert P. Mason
- "Device Independent Color—Achievable? Desirable?," Panel Discussion: Warren L. Rhodes, Moderator
- "Color Transformations and Look-up Tables," Karl J. Heuberger
- "Color Data Interchange: Technology and Standards," Robert R. Buckley
- "Trade-Offs in VDU Monitor Calibration," Michael H. Brill
- "Measurement of the Transfer Function of Hardcopy Color Reproduction Systems: A Metric for Comparison," David L. Spooner
- "Study of Colorimetric Changes That Occur on Transparent Color Images Reproduced by Ink on Paper," R. S. Fisch
- "A Comparison of Algorithms for Mapping Color Between Media of Differing Luminance Ranges," J. A. Stephen Viggiano and Jeffrey Wang

The cost of the proceedings is \$70 (U.S. Dollars). To order your copy, please write to Technical Association of the Graphic Arts, P.O. Box 9887, Rochester, NY 14623-0887, or fax your request to (716) 475-2250, or call (716) 475-7470.

Robert Chung, RIT

O T H E R N E W S

ART & CRAFT MATERIALS INSTITUTE (ACMI)

ACMI Finds USPIRG Report on Labelling Inaccurate

The Art & Craft Materials Institute, Inc. (ACMI) has issued a press release

stating that the recent U.S. Public Interest Research Group (USPIRG) report, "Poison Palettes: The Lack of Compliance of Toxic Art Supplies with Federal Law", is inaccurate and misleading. ACMI is a non-profit association of art and craft material manufacturers, sponsoring a certification program to ensure art and craft materials are properly evaluated and labeled for health hazards

according to the Federal Labeling of Hazardous Art Materials Act (LHAMA). "The majority of traditional art and craft materials, including nine of those cited in the USPIRG report, have been certified through ACMI. Many others are being evaluated and labeled independently or through other certification programs, such as those of the Pencil Makers Association and Writing Instruments Manufacturers Association," says Deborah Fanning, Executive Vice-President of ACMI.

USPIRG made similar claims about art materials labels in its September 1991 report. CPSC inspectors visited all ACMI companies in the report and were satisfied that current labels were in accord with LHAMA. In the current survey, USPIRG determined whether a product was poorly labeled by obtaining Material Safety Data Sheets (MSDS) on products and supplementing them with information on chemicals obtained from EPA and state agencies. The process used to determine appropriate labeling is not that simple and requires a qualified toxicologist. The toxicologist must consider the ingredients in the product, as well as the quality of each ingredient, its bioavailability, whether it could be harmful to humans, and how ingredients interact with each other. Most products, after such an analysis, do not require chronic or acute hazard labeling because they are non-toxic. Others require either chronic hazard, acute hazard, or both types of warnings. Only someone qualified to perform such an evaluation, such as a knowledgeable toxicologist, can make an accurate labeling determination. ACMI's toxicological protocols are on file with CPSC. CPSC recognized in its October 1992 final rules the extensive safety margins contained in ACMI's evaluation process.

With more than 60,000 art products on the market, the USPIRG report focuses on 18, and of its conclusions at least half are erroneous. With several ACMI-certified products cited, chronic hazards on some MSDS referred to colors in the product line other than

MUNSELL COLOR SCIENCE LABORATORY (MCSL)

New Course Offered in Industrial Color Measurement

Rochester Institute of Technology's Munsell Color Science Laboratory will present a new course, "Principles of Industrial Color Measurement," May 10-12, 1994. The three-day course will focus on applications of colorimetry for industrial color control. Key topics include:

- Spectrophotometry
 - principles
 - geometry selection
 - methods of characterizing precision and accuracy
- CIE Colorimetry
 - derivation of colorimetry from XYZ through CIELAB and CIELUV
- Tolerancing
 - CMC and TC 1-29 equations
 - derivation of visual tolerances from historical pass/fail data
 - optimizing l:c ratios
- Terminology

Additional topics include

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the cited, correctly-labeled one. Two other products bore the correct acute hazard warning and did not require chronic labeling. While only products with hazard labeling require a telephone number on the package, the report cites non-toxic products for not having a phone number.

The report attacks CPSC for not strictly enforcing the law. In reality, CPSC has been strictly enforcing the law by holding art materials shipments at Customs for inspection to ensure that they comply to LHAMA; inspecting retail stores to see if products on shelves are properly labeled; and inspecting numerous manufacturers' facilities.

USPIRG urges Congress and states to pass laws banning the use of toxic art supplies in elementary schools. LHAMA already addresses this issue by enabling CPSC to prohibit the purchase of toxic art supplies for pre-Kindergarten through grade six. Additional legislation is unnecessary. USPIRG urges Congress and states to pass legislation banning the most hazardous chemicals and reducing the use and production of others through pollution prevention planning and reporting. Many hazardous ingredients have already been formulated out of art materials; others, such as lead, do not

yet have a substitute. Artists want to keep such ingredients until substitutes are found because of the qualities they give products, including durability and brilliance of color. Those products are distinctly and conspicuously labeled with the hazard, "Keep Out of Reach of Children." Manufacturers are actively engaged in seeking less hazardous ingredients.

While ACMI acknowledges the importance of proper acute and chronic hazard labeling of art and craft materials when necessary, the overwhelming majority of manufacturers are already complying and consumers can trust the information on the label. For more information on the safe use of art materials, contact Deborah Fanning or Laurie Doyle at ACMI, 100 Boylston Street, Suite 1050, Boston, MA 02116, (617)426-6400.

This press release is reprinted for the benefit of the ISCC membership. Several ISCC members, including past president Joy Turner Luke, have worked with ACMI and ASTM to establish compliance with LHAMA. The theme of the last annual meeting (April 1993) dealt with related issues, further emphasizing the relevancy of ISCC to the needs of today's color community.

Danny Rich

Industrial Color Measurement Course, continued

- Color Vision
- Color Order Systems
- Illuminant and Observer Metamerism
- Total Quality Management (TQM) principles related to color

This course will greatly benefit anyone involved in the coloration of materials such as coatings, textiles, and polymers. It will include a visual tolerance experiment, demonstrations of color measurement instrumentation and software, and an open laboratory evening session. The instructors are Dr. Roy S. Berns, director of the Munsell Color Science Laboratory and Richard S. Hunter Professor of Color Science, Appearance, and Technology, and Dr. Mark D. Fairchild, Assistant Professor of Color Science.

For further information, contact Colleen Desimone, Munsell Color Science Laboratory, Rochester Institute of Technology, Chester F. Carlson Center for Imaging Science, 54 Lomb Memorial Drive, Rochester, N.Y. 14623-5604; phone (716) 475-7189, fax (716) 475-5988.

*Munsell Color Science Laboratory
News Release*

USNC/CIE DIVISION 1 REPORT

USNC/CIE Technical Council Meeting
Salem, Massachusetts, October 2, 1993



In June 1993, a symposium was held at the Central Bureau in Vienna on Advanced Colorimetry. The symposium was set up to discuss in an open and friendly atmosphere some fundamental questions of colorimetry. The following invited papers were featured:

60 Years of CIE Colorimetry by Dr. Alan Robertson

Mathematics and Properties of CIE Colorimetry by Dr. Roy Berns

Possibilities of an Improved Colorimetry by Dr. William Thornton, Dr. Fred W. Billmeyer, Jr. and Mr. Hugh Fairman

Review of Experiments Leading to and Properties of the 1931 and 1964 Standard Observers by Dr. Alan Robertson

Results of Vision Research by Dr. Joel Pokorny

Perceptual Attributes of Color by Dr. Robert W. G. Hunt

Determination of Color-Matching Functions (Maxwell Method vs.

Maximum Saturation Method) by Dr. Hirohisa Yaguchi

Many contributed papers were featured following each topic introduced by the invited papers. Proceedings of the symposium can be obtained from the Central Bureau.

Three recommendations for improved colorimetry resulted from discussions held at the symposium. First, the derivation of the 1964 color-matching functions require some very specific and subtle operations and conditions so that Grassman's laws remain valid, including an adjustment for rod intrusion at long wavelengths and the use of high luminance levels at middle and short wavelengths to prohibit rod intrusion. The use of the 1964 colorimetric observer functions may not be appropriate to predict the results of visual matching experiments conducted under observing conditions in which the retinal illuminance of the stimulus is less than 1000 photopic trolands. There are times when such visual observations are unavoidable and a set of procedures should be outlined for taking into account the appropriate amount of rod intrusion.

(con't ➡)

NATURAL COLOR SYSTEM (NCS)

Colour Day Was a Success

The Swedish Colour Centre Foundation arranged the annual "Colour Day" on May 11, 1993, in Stockholm, with the theme of "Colour in Graphic Design." Its purpose was to bridge the communication gap between different parts in the graphic arts field where colour is a mutual interest. 120 people participated.

The introduction talk by Agenta Jörgensen Carlsöö, Managing Director, Nord & Syd, dealt with the importance of colour in communication and associated factors. Lars Broms, Managing Director, Scapa Publishing, discussed the great importance of a good working system for achieving sufficient color reproduction in production in the graphic arts field. Torbjörn Lindgren, Art Director, HLR & Co./BBDO, talked about the relationship between color and form to give the "right message. Curt Dahlén, graphic designer, discussed the use of color in programs for "corporate

identity."

Color systems used in computer graphics are often chosen for technical reasons and are not always user-friendly. Anders Nilsson, research and development, Colour Institute, dealt with this problem. Lars Sivik has been working with color meaning and color combinations for many years in his research at University of Gothenburg. Hans Christer Ericson, professor of graphic design, discussed the incorporation of everyday images into design work.

NCS Newsletter

Second, recent data indicates that the magnitude of the range of inter-observer variance documented in Publication No. 80 may be too small for 10° field matches and very much too small for 2° field matches. It is recommended that Publication No. 80 be reviewed, the magnitude of the Standard Deviate Observer values be reformulated, and a revision of Publication No. 80 be issued to provide a more realistic estimate of the range of observer differences.

Finally, TC 1-36 is close to completing its work on fundamental 2° color matching functions. It is recommended that a reporter be assigned the task of taking results of this committee and the newly recommended $y_m(\lambda)$ function to form a test colorimetric observer with luminance weighting in a similar manner to the current 1931 standard colorimetric observer. This report would be submitted for field trial for applications where the current 1931 colorimetric observer has been known to fail, such as in the evaluation of whites and narrow spectral lights such as LEDs.

The following indicates the progress of certain technical committees at the CIE Division 1 meeting on June 11 and 12 in Budapest.

Regarding TC 1-26 Individual Variation of Heterochromatic Brightness Matching, data on heterochromatic brightness matching in terms of individual variation has been collected by Chairman H. Yaguchi (JPN). Two empirical formulae and a theoretical model to describe individual differences have been proposed by TC members. A simple set of individual characteristics for brightness matching will be developed.

TC 1-13 *Color Appearance Analysis* (Chairman: M. R. Pointer, GBR), whose function is to derive methods of evaluating the color rendering properties of illuminants based on color appearance, disbanded following publication of its report on the Hunt and Nayatani color appearance models in the CIE Collection.

TC 1-27 *Specification of Color Appearance for Reflective Media and Self-Luminous Display Comparisons* (Chairman: P. J. Alessi, USA) has completed the CIE Guidelines for Coordinated Research on Evaluation of Color Appearance Models for Reflection Print and Self-Luminous Display Image Comparisons. The Guidelines will be published in the Winter 1994 issue of *Color Research and Application* with the hope that interested researchers will conduct experiments following the guidelines. This should provide the TC with data which will be used to analyze various color spaces and color appearance models for hardcopy/softcopy applications.

TC 1-28 *Parameters Affecting Color Difference Evaluation* (Chairman: K. Witt, GER) disbanded following publication of its results on the effect of viewing and sample parameters on the evaluation of color differences between object colors in CIE Publication No. 101 (1993) *Parametric Effects in Color Difference Evaluation*.

TC 1-29 *Industrial Color Difference Evaluation* (Chairman: D. H. Alman, USA) developed a provisional recommendation on color difference evaluation between object colors in daylight illumination which employs a weighted Euclidean distance in CIELAB ΔL^* , ΔC , ΔH coordinates. A report was approved among TC members and a provisional recommendation was published in *Color Research and Application* (Vol. 18, No. 2, Apr. 93) to solicit user testing and comments. There is some opposition to this work by those in the textile industry who are working with ISO to standardize the CMC color difference equations.

TC 1-32, *Prediction of Corresponding Colors* (Chairman: Y. Nayatani, JPN) has completed its technical report describing the chromatic adaptation transform previously proposed for study (CIE Journal 5-1, pp. 16-18, 1986) together with subsequent modifications. The report is undergoing Division ballot.

TC 1-33 *Color Rendering* (Chairman:

W. Walter, USA) is studying indices for the evaluation of color rendering properties of light sources based on a color appearance model. TC members are working on choice of test samples, elimination of negative values, hue, chroma and lightness weights, methods of averaging, and choice of reference illuminants.

TC 1-34 *Testing of Color Appearance Models* (M.D. Fairchild, USA) is investigating the performance of models based on their ability to predict the color appearance of surface colors in simple and complex scenes under various illumination conditions. The models to be included are Hunt, Nayatani et. al., CIELAB, CIELUV, LABHNU (Richter), and RLAB (Fairchild). Several sets of test data have been identified and others are being investigated. The types of analyses to be performed on the data have been defined. Guidelines for coordinated research on color appearance models have been outlined.

TC 1-38, *Compatibility of Tabular Data for Computational Purposes* (Chairman: C. McCamy, USA), a newly established TC, had their first meeting in Budapest to discuss a draft set of guidelines for tabulating CIE spectral data to provide compatibility of sets of data for computational purposes. Such factors as spectral range, spectral interval, bandpass function, truncations, interpolation, extrapolation and number of digits will be considered.

TC 1-14 *Lighting Effects on Vision* (Chairman: P. R. Boyce, USA) discussed a fourth draft of their report at their meeting held in conjunction with the annual conference of IESNA in August 1993. The report, usable by intelligent laymen, describes the effects of lighting conditions on visual capabilities and demonstrates how this knowledge can be used to determine appropriate lighting conditions for the performance of specific tasks. The third draft of the committee's report needed to be updated and extended to cover topics such as the effects of lighting on reaction time, accommodation, and eye movements.

USNC/CIE, continued

TC 1-16 *Lighting Needs for the Partially Sighted* (Chairman: W. G. Julian, AUS) is attempting to determine lighting needs for the partially sighted, not only at the individual level by causal or functional subdivision, but also as a group with the view to accommodating public buildings, nursing homes, schools, etc. Emphasis will be on quality, flexibility, and safety aspects of lighting rather than on quantitative ones, as needs and preferences vary. Peter Stone is editing the draft report with the help of the members of the British Low Vision Society.

TC 1-19 *Specification of Visibility for Real Tasks* (W. K. Adrian, CAN) held its first meeting in Budapest. They discussed a draft document on the comparison of visual performance

models. They will prepare a review of all methodologies for evaluating the visibility (threshold or suprathreshold) of real tasks.

A new TC proposal was formed as an outgrowth of the CIE '93 Symposium on Advances in Colorimetry. It is entitled *Rod Intrusion in Metameric Matches*. The terms of reference of this committee are to write a report giving a step-by-step procedure for calculating the effect of rod intrusion, and to calculate the effect for real metamers. It will be chaired by Dr. Roy Berns.

The next Division One meeting will be held in Tokyo, Japan in conjunction with the International Symposium sponsored by the Illuminating Engineering Institute of Japan from July 26-28, 1994.

*Excerpted from a report by
Paula J. Alessi*

COLOR RESEARCH AND APPLICATION

In This Issue, December 1993

Let's have a little quiz. Why aren't all the colored stripes on the French flag equal thickness? Why does smoke appear blue against a dark roof but brown above it? Why do fishes' and cats' eyes seem to shine in the dark? The answers to these and other questions can be found in the writings of I. H. Godlove. Among his many other activities, Dr. Godlove was editor of the Newsletter of the Inter-Society Color Council for 100 Issues from Jan. 1937 to Dec. 1954. He contributed many articles to the newsletter himself. At the suggestion of Mrs. Margaret Godlove and with her permission, Rolf Kuehni has selected several of over 100 vignettes written by I. H. Godlove for the *Talking About Color...* column this month.

Two of the authors contributing to this issue, Petrov and Xu, published articles in the August 1993 issue. Alexander Petrov examined the

concept of color constancy in the human visual system and related it to color matrices that could describe perceived colors [see "Surface Color and Color Constancy" Vol. 18 pp. 236-240]. In this issue in "On Obtaining Shape from Color Shading," Dr. Petrov extends the principles described in his first article to writing image irradiance equations for colored objects under colored illumination.

Relating color and the Grassmann-Cayley coordinates of shape, a shape-from-shading algorithm was developed and tested on color images of various real objects. This approach allows the broadening of the range of illuminant (angular or spectral) distributions of possible scenes that can be reconstructed using machine vision.

There have been reports of changes in one's color vision as one gets older. See, for example, Walter Granville's color forum [Vol. 15 pp. 59-62, 1990] discussing the comparison of vision with one "old" eye and one "young" eye between lens implant surgical procedures. However, there is more to the story of aging and color vision. Brooke E. Scheffrin and John S. Werner

studied "Age-related Changes in the Color Appearance of Broadband Surfaces." They compared judgments by two groups of observers, who were, on average, separated in age by 50 years. They found that older subjects judge samples to have the same hue but less chromatic content than younger subjects. The differences cannot be explained by senile miosis or lenticular senescence.

In another article in the field of color vision, Yasuhiro Kawabata examines the critical area of spatial integration for equiluminous chromatic stimuli and compares the area to that of luminance stimuli. He reports in "Spatial Integration Properties in Vision With Chromatic Stimuli" that the results of his research suggest that the chromatic coding systems could change their spatial integrating organization independently of the luminance system.

In the first of the reprinted classical articles in the August issue "On the Theory of Compound Colours, and the Relations of the Colours of the Spectrum" by J. C. Maxwell originally published over 130 years ago, we see one of the earliest references to metamers — those specimens that match under one set of conditions and do not match under another set. Curiosity about metamers, as well as much discussion in the literature, has continued ever since their discovery. In an article published forty years ago this year, Charles W. Jerome and Deane B. Judd noted the intersections of the reflectance curves of metameric pairs fall near 450, 530, and 610 nm. W. D. Wright suggested that the intersections of metamers are related to three maxima of visual-system sensitivity. Now in "Intersections of Spectral Power Distributions of Lights that Match," William A. Thornton supports W. D. Wright's suggestion that there is a connection between the wavelengths of the intersections of metamers and human visual sensitivities by showing experimental evidence of the invariant spectral locations of intersections of metamers under from one to four illuminants.

As stated earlier, a pair of metamers match under one set of conditions and don't match under another. In the actual industrial situation often the pair of samples doesn't exactly match under any condition, thus it is not technically a metameric pair. However, there are cases in which the pair is very close to a match under one set of conditions and much more different under another set of conditions; we shall say nearly a metameric pair. It has been suggested that these near-metamers be called paramers. A second article by William A. Thornton, "Intersections of Matching Spectra: Applications," discusses a method to correct for simple color difference in parameric pairs and presents a definition and procedure for specifying "degree of metamerism."

This month's Color Forum describes a procedure for finding the maximum possible number of distinguishable luminance levels between two given luminances with respect to observers in a certain adaptation state. He Xu explains in "Lightness and Reflectance of Munsell Grey Samples" that the existing Munsell gray samples with values 1 to 9 can hardly be regarded as equally-spaced in lightness. Dr. Xu hopes that the idea and procedure will stimulate color research.

Dr. Ellen Carter

Editor, Color Research & Application

C A L E N D A R

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

1993

COLOR IMAGING SYSTEMS, Nov. 7-11

Color Imaging Systems co-sponsored by the Society for Imaging Science and Technology and Society for Information Display, Registry Resort at Scottsdale, Phoenix, Arizona. Information: IS&T (703) 642-9090.

ASTM COMMITTEE D-20 ON PLASTICS, Nov. 15-18

Hyatt Regency DFW Hotel, Fort Worth, Texas. Information: Katharine Schaff, (215) 299-5529.

POWDER COATINGS, Nov. 15-17

Paint Research Association (PRA); Brussels. Information: Conference Secretary, PRA, 8 Waldegrave Rd., Teddington, Middlesex TW11 8LD, United Kingdom

FABRIC PREPARATION AND BASICS OF DYEING AND FINISHING, Dec. 14-16

American Association of Textile Chemists and Colorists, Radisson Executive Park, Charlotte, North Carolina. Information: Peggy J. Pickett (919) 549-8141, Fax (919) 549-8933.

1994

ASTM COMMITTEE D-1 ON PAINT, Jan. 23-26

Crown Sterling Suites, Fort Lauderdale South, Florida. Information: Scott Orthey, (215) 299-5507.

ASTM COMMITTEE E-12 ON APPEARANCE, Jan. 23-26

Crown Sterling Suites, Fort Lauderdale South, Florida. Information: Bode Buckley, (215) 299-5599.

WILLIAMSBURG CONFERENCE, Feb. 21-23

Inter-Society Color Council Williamsburg Conference on Fluorescence, Williamsburg, Virginia. Information: Richard Harold (703) 471-6870.

IS&T ELECTRONIC IMAGING: SCIENCE AND TECHNOLOGY, Feb. 6-10

Society for Imaging Science and Technology, San Jose Convention Center, San Jose, California. Information: SPIE (206) 676-3290, Fax (206) 647-1445.

37th ANNUAL SOUTHERN DECORATING PRODUCTS SHOW, Feb. 11-13

National Decorating Product Association (NDPA), Atlanta, Georgia. Information: Ruth Wilms, NDPA 1050 N. Lindbergh Blvd., St. Louis MO 63132

38th ANNUAL CANADIAN DECORATING PRODUCTS SHOW, Feb. 11-13

National Decorating Product Association (NDPA), Toronto, Ontario, Canada. Information: Ruth Wilms, NDPA 1050 n. Lindbergh Blvd., St. Louis MO 63132

VISUAL SCIENCE AND ITS APPLICATIONS, Feb. 11-15

OSA Topical Symposium on Visual Science and Its Applications, Santa Fe, New Mexico. Information: OSA (202) 223-0920.

8TH INTERNATIONAL SYMPOSIUM ON PHOTOFINISHING TECHNOLOGY, Feb. 13-16

IS&T and PMA, Atlanta Renaissance Hotel, Atlanta, Georgia. Information: IS&T (703) 642-9090, Fax (703) 642-9094

IMAGES IN COLOUR, Apr. 10-12

The Royal Photographic Society Imaging Science and Technology Group and The Colour Group (Great Britain) host AIC '94 Interim Meeting on Images in Colour. University of Cambridge, Cambridge, England. Information: Michael Pointer 44 81 424 4524, Fax 44 81 424 3750.

BARTLESON SYMPOSIUM, Apr. 11

Cambridge University, Cambridge, England. Included in Images in Colour.

ISCC - ANNUAL MEETING, Apr. 24-26, 1994

Inter-Society Color Council Annual Meeting & Joint Symposium with Detroit Colour Council, Troy Marriott, Detroit, Michigan. Information: Jim Kaiser

TAGA ANNUAL CONFERENCE, May 1-4

Technical Association of the Graphic Arts Annual Technical Conference, Baltimore, Maryland. Information: Karen Lawrence, (716) 475-7470.

CMG - CONFERENCE, May 8-10

Color Marketing Group International Color Directions Conference, Sheraton New York Hotel & Towers, New York, New York. Information: Katie Register (703) 528-7666.

PRINCIPLES OF INDUSTRIAL COLOR MEASUREMENT, May 10-12

Munsell Color Science Laboratory, Rochester Institute of Technology, Rochester, New York. Information: Colleen Desimone (716) 475-7189, Fax (716) 475-5988.

IS&T 47th ANNUAL CONFERENCE, May 15-20

International Committee on the Science of Photography, ICPS '94: The Physics and Chemistry of Imaging Systems, and IS&T's 47th Annual Conference, Stouffer Rochester Plaza Hotel, Rochester, N.Y. Information: IS&T (703) 642-9090, Fax (703) 642-9094

FATIPEC CONGRESS, May 15-19

Development of the Lacquer and Paint Industry, Budapest. Information: Fatipec Congress Secretariat, Hungarian Chemical Society (36-1) 201 6883, Fax (36-1) 156 1215.

SID '94, Jun. 12-17

Society for Information Display, International Symposium, Seminar, and Exhibition, San Jose Convention Center, San Jose, California. Information: Joyce Farrell, Conference Chair (415) 857-2807, Fax (415) 857-4320, E-mail "farrell@hplabs.hp.com".

ASTM COMMITTEE E-12 ON APPEARANCE, Jun. 19-23

Montreal, Canada. Information: Bode Buckley, (215) 299-5599.

ASTM COMMITTEE D-1 ON PAINT, Jun. 26-29

Marriott Crab Tree Valley, Raleigh, North Carolina. Information: Scott Orthey, (215) 299-5507.

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, Maimi, 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.

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, Miami, Florida. Information: Katie Register (703) 528-7666.

COLOR AND COLORIMETRY, Sep. 29-Oct. 1

International Color Symposium, Slovene Centre for Color, University of Maribor, Maribor, Slovenia. Information: (+3862) 25 461, Fax (+3862) 255 013.

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) 862-7271.

AATCC - CONFERENCE AND EXHIBITION, Oct. 11-14

American Association of Textile Chemists and Colorists, Convention Center, Charlotte, North Carolina. Information: AATCC (919) 549-8141.

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) 642-9090, Fax (703) 642-9094

ADVANCES IN PHOTOMETRY, Dec. 1-3

CIE Expert Symposium on Advances in Photometry, 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. 23-25

San Antonio, Texas. Information: Bode Buckley, (215) 299-5599.

ISCC WILLIAMSBURG CONFERENCE, Feb. 5-7

Inter-Society Color Council Williamsburg Conference, Williamsburg, Virginia. Information: Michael Brill (703) 734-4027.

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**CMG - CONFERENCE, May 14-16**

Color Marketing Group International Color Directions Conference, Dallas Texas. Information: Katie Register (703) 528-7666.

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"

1996**ISCC ANNUAL MEETING, Apr. 21-23****TAGA ANNUAL CONFERENCE, Apr 28-May 1**

Technical Association of the Graphic Arts Annual Technical Conference, Dallas, Texas. Information: Karen Lawrence, (716) 475-7470.

AATCC - CONFERENCE AND EXHIBITION, Oct. 8-11

American Association of Textile Chemists and Colorists, Oprtkabd Hotel, Nashville, Tennessee. Information: AATCC, (919) 549-8141.

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.

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) 549-8141.

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

Send photo material (black and white if possible) to:

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meeting reports



photos



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American Society of Interior Designers (ASID)	National Association of Printing Ink Manufacturers (NAPIM)
American Society for Photogrammetry and Remote Sensing (ASPRS)	Optical Society of America (OSA)
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Color Marketing Group (CMG)	Society of Plastics Engineers, Color & Appearance Division
Color Pigments Manufacturers Association (CPMA)	Society for Imaging Science and Technology (IS&T)
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Pantone Color Institute
Mr. Donald R. Hall, Color and Appearance Technology

Mr. Thomas J. Keane, BYK-Gardner
Dr. Art Springsteen, Labsphere