Inter-Society Color Council *News*

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ISCC Member Body Plaque Awarded to Color Marketing Group (CMG)
Mr. Jim DeGroff (left) is shown presenting the ISCC Member Body Plaque to the President of Color Marketing Group, Mr. Merritt Seymore (right). The Plaque was presented at the CMG annual fall conference in San Antonio, Texas. This Plaque is available to all ISCC Member Body Organizations.

Number 329 **January/February 1991**

FINAL CALL FOR PAPERS 1991 ISCC ANNUAL MEETING

A FINAL CALL FOR PAPERS referring to a joint Interest Group I and II session at the 1991 ISCC Annual Meeting has been made. The title for this joint session will be "Color: What You See Is Not Always What You Get". Since the theme of the 1991 Annual Meeting centers around color design and marketing, papers should focus on how and why it may not always be possible for designers to achieve accurate color reproduction, especially when electronic devices or photographic processes are involved. Suggested topic areas are:

Metamerism (especially with regard to how photographic systems compare to the human visual system)

Color Reproduction Basics

Emerging Color Output Technologies

Color Perception

Titles and abstracts should be submitted immediately to:

Dr. Roy S. Berns
RIT Munsell Color Science Laboratory
P.O. Box 9887 Rochester, NY 14623-0887
Phone: 716-474-2230
FAX: 716-475-5988

ATTENTION

A FINAL CALL FOR POSTER PAPERS at the 1991 ISCC Annual Meeting has been made. The topics for contributions are completely open. The intent is to encourage all ISCC members to share their state-of-the-art color work in the form of written communication.

Titles and abstracts should be submitted immediately to:

Paula J. Alessi
Eastman Kodak Company
1700 Dewey Avenue
Rochester, New York 14650-1925
Phone: 716-477-7673
FAX 716-477-0127

MEETING REPORT

AIC Interim Symposium Instrumentation for Colour Measurement Berlin, September 3-5, 1990

Approximately 175 participants from 21 countries attended the Symposium which was organized by the immediate Past President of AIC, Prof. Dr. -Ing. Heinz Terstiege, the head of BAM Sub-Department 5.4, Colorimetry and Optical Properties of Materials.

The three-day Symposium was arranged so that each day began with a 45-minute invited lecture that set the theme for the day. This was followed by contributed papers. Time was provided in the afternoons for the more than a dozen exhibitors to demonstrate their instruments which were set up at the rear of the lecture hall.

The Symposium was opened with welcoming remarks by the President of the BAM, Prof. Dr. G. W. Becker, and by AIC President, Dr. Alan Robertson. Dr. Terstiege presented Dr. Robertson with a memento of the meeting—a brick from the Berlin Wall with the letters AIC painted on it in red, green and blue.

The first invited lecture, "Colorimetry for Standard Conditions (Including Fluorescence)" was given by Dr. Dietrich Gundlach of the BAM, Berlin. Spectrophotometers are often said to provide data superior to that from colorimetric (filter) instruments, but the comparison depends on the kind of samples and the type of data required. For fluorescent materials the two-monochromator method must be used. While filter colorimeters have long used as many as four detectors with appropriate filters, we now have many-element detector arrays that are used in conjunction with grating monochromators. CIE Illuminant C is no longer a primary standard illuminant for colorimetry because it is deficient in ultraviolet content which is needed to excite many fluorescent materials. On the other hand, there has been no completely satisfactory procedure for obtaining light duplicating D65, that can be built into an instrument.

At the BAM a combination of reflectors and filters is used to obtain three beams from the same lamp that are then combined to produce an acceptable spectrum. However, this procedure is not deemed suitable for industrial use. Gundlach also talked about the use of sphere instruments and the errors of measurement when only one port is used for sample and standard, especially with fluorescent colors. He spoke briefly →

NEW MEMBERS

We are pleased to list the latest members to the ISCC. Their names will appear in next year's Membership Directory. Welcome!

Mr. Louis A. Armanini
The Mearl Corp.
H.L. Mattin Labs
217 North Highland Ave
PO Box 960
Ossining NY 10562

Dr. Patrick T. Chong
Spartan Mills
PO Box 1658
Spartanburg SC 29304

Mr. Roland L. Guilmet
Application Techniques, Inc.
10 Lomar Park Drive
Pepperell MA 01463

Mr. Roy E. Hensel
Hensel Color Graphics
RD 4, Box 87
Cranbury NJ 08512

Dr. John W. Long
E.I.DuPont Imaging Systems
Chestnut Run #B-708
Wilmington DE 19880

Ms. Cheryl Rauh
Nevamar Corporation
8339 Telegraph Road
Odenton MD 21113

Mr. Timothy D. Rozgonyi
GATF
4615 Forbes Ave.
Pittsburgh PA 15213

Dr. Jason Shen
Continental Polymers, Inc.
2225 East Del Amo Blvd.
Compton CA 90220

Ms. Joyce W. Shore
Joyce Shore Interiors
3010 N.E. 57 Court
Fort Lauderdale FL 33308

Mr. Ron Stark
S/R Laboratories, Inc.
401 Falconrock Lane
Agoura CA 91301

Dr. Paul M. Tannenbaum
DuPont Company Exper. Station 357
218C Wilmington DE 19898

Mr. Stuart Yeo McCorquodale
Colour Display
Southworth Road Newton-Le-Willows
Merseyside WA120DH England

We wish to thank the following company for their support, as a new Member Body Organization:

The Human Factors Society
P.O. Box 1369
Santa Monica, California 90406

EDITOR'S COMMENT

As was noted in the last issue of the ISCC News, sadly, Mrs. Bonnie Swenholt has asked to be replaced as Editor of the ISCC Newsletter and Chair for the Publications Committee.

She has unselfishly given a large portion of her time to fulfill these responsibilities for a number of years.

I wish to take this opportunity to thank Bonnie for her efforts, on behalf of myself AND the ISCC.

Thank you, Bonnie!

Michael A. Hammel
Newsletter Editor

about dye lasers and the effect of xenon-flash lamp intensity on fluorescent colors. He indicated that one of the big problems of instrumental colorimetry is to illuminate and view the specimen reproducibly and with the correct geometry.

The first contributed paper, "Interchangeable Color Measurements from Different Instruments", was presented by Prof. Frederick T. Simon, Color Consultant, Clemson, South Carolina. He reported on procedures and calculations that could be used to obtain inter-instrument agreement in an industrial laboratory where color measuring instruments, often of different manufacture, are in use. Differences arise from wavelength calibration, white reference standard, zero calibration, and optical geometry. He has developed a set of 12 FTS plastic color standards for reflectance measurement evaluation.

"Data handling in Colorimetry-Computering" was presented by Arved Carl Hübler, Institut fur Technologie und Planung Druck (Printing), Berlin. He indicated that the system, shown in the instrument exhibit, used sophisticated data analysis and manipulation in conjunction with spectrophotometers.

Gunter Döring, BAM, Berlin, presented "Evaluation of Sphere Errors by Means of Matte and Glossy Sample Pairs of Same Pigments". He reviewed the principle of the integrating sphere and its use in practice.

Theoretically a measuring device with an integrating sphere should show no difference between a matte and a glossy sample of the same pigment when gloss is included. However in practice the multitude of apertures required for sample entrance and exit ports, cause the sphere to be far from ideal in its reflecting properties. His data on matte/glossy sample pairs measured on two different sphere-type instruments showed differences of 0.73 CIELAB units for one and 1.88 units for the other. Additional experiments will be needed to classify sphere design with amount of matt/glossy color difference.

Calvin McCamy, recently retired from Macbeth Division of Kollmorgen Corp, USA, discussed "Relating Colorimetry to Visual Observations", including lighting for viewing, standard illuminants, and instrument sources. Early Macbeth lighting booths used only incandescent lamps and Corning blue daylight glass. The ultimate criterion of daylight glass is not its spectral composition but how it renders the colors. Daylight and artificial daylight are important sources for evaluating color and color difference both visually and instrumentally. However, the light in most stores and offices today is produced with fluorescent lamps, cool white being the most used in USA. Thus visual evaluation of color must include lamps representative of those encountered in practice. With more and more use of fluorescent colors and especially fluorescent whitening agents it is imperative that sufficient ultraviolet radiation be available in viewing booths.

McCamy also alluded to current activity dealing with the accuracy of the computation of colorimetric information from spectral data that involves choice of integration interval and the spectral band pass of the spectrophotometer. More attention needs to be given to the methods of computing weights for colorimetric integration.

Dr. Johannes Fleischer, Optronik GmbH, Berlin, presented "Color Measurement in Production". Optronik makes a high-speed xenon-type flash unit, flash duration less than 100 microsecond, very useful for evaluating the color of an object moving at high speed. A versatile lens system permits the detector to be from 0.2 to 2.4 meters from the object. The instrument was demonstrated during the presentation of the paper.

Mr. Michael Petersilge, ICS-TEXIKON GmbH, Gevelsberg, Germany, talked about "On-Line Color Measurement". The measurement system is based on the "Eagle Eye" of Macbeth. The viewing distance can be 1.2 to 6.2 meters. The system utilizes a large illuminated area and a small measuring area, 55 mm at 1.2 metres. Changing distance from object to instrument has only a very small effect on CIELAB a* or b*; the major change being in L*.

The second day began with an invited lecture by Dr. Allan B. J. Rodrigues, E. I. DuPont de Nemours & Co., Troy, Michigan, USA, "Measurement of Metallic and Pearlescent Colors". For industrial color control, metallic and pearlescent colors must be characterized by measurement at a minimum number of angles, optimized to provide information on the overall goniophotometric color. Workers in the this field have found it useful to define a "Normalized Angle", or measurement angle away from specular. This is simply the sum of the illuminating and viewing angles.

Color of metallics has been found to be a function of this angle regardless of specific angles of illumination or view.

ISCC/CAUS MEETING MAY 5 -8

A conference stressing new and emerging Trends In Color And Fashion is being co-sponsored by the Inter-Society Color Council (ISCC) and the Color Association of the United States (CAUS). This conference will be held in New York City May 5-8, 1991 at the Doral Inn.

There will be general sessions on directions and the latest trends in Color Forecasting and Color Merchandising given by respected experts from the fields of Fashion, Decorating Products, Cosmetics, Transportation, Building Products, Publishing and Advertising. Some of the technical problems associated with color will be dealt with during ISCC sponsored meetings on Color Measurement, Color Imaging, Color Education and the Art and Psychology of Color. Calls for papers have been announced by the ISCC Interest Groups in each of the appropriate fields of color and programs are being organized to work in Color Problem Work Shops during the ISCC Annual Meeting, scheduled prior to the joint sessions.

For further information contact: Mr. Jim DeGroff, ISCC 201-236-2311 or Ms. Evelyn Stephens, ISCC 212-582-6884.

Many researchers have concluded that metallics can be characterized effectively by measurement at three normalized angles. DuPont's research recommends measurement at three normalized angles, one near specular (15 degrees), one far from specular (110 degrees), and one in between (45 degrees). This geometry has been used for routine color control at DuPont for the past eight years. Rodrigues went on to discuss the work of others and then to discuss choices of measurement angles in depth. Color measuring instruments are usually calibrated to read reflectance factor, that is reflectance relative to the perfect diffuser at that same geometry. Hence, metallic colors at near specular angles can read several hundred percent reflectance, causing problems in colorant formulation. L*,a*,b* values can still be computed but one cannot expect the same color tolerances to hold at grazing and near-specular angles as at 45 degrees. The grazing-angle tolerance can be twice and the near-specular tolerance four times that at 45 degrees.

Rodrigues reviewed instruments currently available for metallic and pearlescent measurements. He heads a task group of ASTM working on standardization of these measurements and nomenclature in this field.

While there is much confusion in this measurement area, fortunately there is good dialogue within ASTM and DIN as well as between them. Thus we can hope ultimately for national and international standardization.

Dr. Robert Besold, Eckart-Verke Furth, Bayern, contributed a paper on "Metallics and Pearlescent Pigments: Characterizing Parameters of Measurement". He reviewed the nomenclature, briefly describing terms such as "flake" and "color flop" (two-tone). He asked, "What is metallic effect?" He indicated that it can be described by words such as brilliance or sparkle, the flop or two-tone effect, and Distinctness Of Reflected Image (DORI). In answer to a question, Besold said that he does not use a sphere-type instrument in measuring metallics.

Dr. Peter Gabel and Franz Hofmeister, E. Merck Darmstadt, Werk Gernsheim, Germany, contributed a paper on "Appearance Measurements on Metallic and Interference Pigments". For their measurements they use a Johne+Reilhofer Color Measurement System ER 50. .

David Spooner, DuPont Imaging Dept., Wilmington, Delaware, USA, presented a paper on "The Colorimetry of Holograms". He noted that the index of refraction changes with lasers but that he has not seen laser speckle in the holograms made by St. Mackara.

Dr. Gorow Baba, Murakami Color Research Laboratory, Tokyo, Japan, reported on "Gonio-Spectrophotometric Analysis of Pearl-Mica Paint". Through gonio-spectrophotometric measurements of pearlescent samples he concluded that the spectral reflectance factor for any specific viewing direction is an additive mixture of base (diffuse) color, an interference component and a specular component. He suggested ways for characterizing flop.

Dr. Gerhard Rösler, Kollmorgen Instruments GmbH, Martinsried/ Munchen, Germany, presented "Multigeometry Color Measurement of Effect Surfaces". He reported on the instrument he has developed using source modulation, keeping the viewing angle constant. He used four lamps at different angles and one observer direction. For interference-type pigments (pearlescence) he showed multi-angle data on lightness, chroma and hue obtained with a Kollmorgen ER 50/E 51.

Dr. Hermann Gerlinger, Carl Zeiss, Oberkochen, Germany, presented "Color Measurement of Pearlescent Pigments for the Nineties". He reported that pure pearlescent pigment requires an angular resolution of 0.01 degrees for resolution of 0.1 in lightness. The Zeiss DMK instrument was designed to meet the need for small measuring angles, less than or equal to three degrees, with angle reproducibility of 0.01 degrees.

The invited lecture on third day was by Norbert Johnson, 3M Company, St. Paul, Minnesota, USA broadly covering "Colorimetry of Retroreflective Materials". The origin of the retroreflector was the observation of the eyes of a cat shining brightly in the light from an automobile headlamp. Glass cat's eyes were made and used as retroreflectors in the 1920s. About 1955, red stop signs were provided with retroreflective material. The use of clear glass beads with a colored base material does not provide good night-time color, but a transparent colored top layer provides good color identification day or night. The daytime color of retro materials is important. They may be illuminated by sunlight or just skylight. The illuminant for evaluating daytime color is usually CIE D65 but some signs are illuminated at night by incandescent or metal halide lamps. For nighttime color, the spectral coefficient of retroreflection can be used to compute the color, but the geometry has to be precisely defined and the illumination needs to be uniform. Telecolorimeters can be used. Johnson alluded to the fact that there still are many research needs, including the defining of the colorimetric boundaries for given color names, development of quality assurance specifications for the nighttime color of retroreflective materials, and international standardization of precise aperture and angle specifications to improve inter-instrument measurement agreement. He concluded this comprehensive lecture, pointing out that colorimetry of retroreflectors involves both spectral and geometric considerations that are unique to this class of materials.

Gunter Richey, Langenfeld, Germany, addressed "Problems in Measuring Prismatic Retroreflectors". There should be no problem when evaluating glass bead sheeting in its own plane. On the other hand, corner-cube arrays require decisions about the ranges of angles to be used in the test. In a plane view he showed two entrance angles, one for each headlamp of a vehicle. In an elevation view he showed that separate calculations are needed for cars and trucks because of the difference in distances between driver and headlamps.

Dr. Klaus Witt, BAM, Berlin, presented "The Measuring Geometry and Color Order Systems". He pointed out the need for standardization of geometry in measurement, showing that when measuring geometry is 8/d and the specular component is included, the

NEWS FROM MEMBER BODIES

THE FEDERATION OF SOCIETIES FOR COATINGS TECHNOLOGY (FSCT)

New Officers and Committee Chairmen

On October 31, 1990 FSCT installed their new officers at the Federation's Annual Meeting in Washington, D.C. Kurt F. Weitz became the 69th President of the Federation. William F. Holmes became President-Elect, and Colin D. Penny Secretary-Treasurer. The Executive Committee has two new members. Jan P. Van Zelm form ByK Chemie USA has been elected for a three-year term, and Joseph D. Guisto of Lenmar, Inc. was elected to fill the one year remaining on the unexpired term of Thomas E. Hill.

President Weitz has appointed chairmen of the 30 committees of the Federation. Obviously that is too many to mention here. However, Ralph Stanziola has been reappointed as chairman of the ISCC committee. Questions about the other committees or about the Federation can be addressed to him.

MANUSCRIPT ENTRIES INVITED FOR 1991 ROON AWARDS COMPETITION

Prospective authors are invited to submit manuscript entries in the 1991 Roon Awards competition. The Awards, sponsored by the Coatings Industry Education Fund, were established in 1957 by the late Leo Roon. They are presented each year to the winning authors at the Annual Meeting of the FSCT. A total of $4000 in cash prizes will be awarded for the top papers submitted for presentation at the 1991 →

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result is quite different from that of 45/0 geometry. He showed data for specimens having different gloss. Since matte samples deteriorate in use, chips of color order systems should be measured under 45/0 geometry.

Dr. Pat Trezona, Cambridge, Great Britain, presented "Software for a System of Photometry Including the Mesopic Region". There are response functions for the scotopic, mesopic and photopic regions, but there is a need for standards in the mesopic region.

Dr. Konrad Hoffmann, Frankfurt, Germany, retired, but working with Merck, presented "Stray Light in Spectrophotometers with Silicon Detectors". He showed stray light data for the Zeiss DMC 25 (5 nm bandwidth) and the B&L 505 (5 nm), derived using yellow cut off filters. Stray light in the violet portion of the spectrum is easily picked up by silicon detectors with their high red sensitivity.

Dr. R. Rattunde and Frank Rochow, LMT, Berlin, presented "Accuracy of Color Temperature in Tristimulus Colorimeters". Rattunde showed a slide from CIE Publication 15.2, Colorimetry, 2nd ed. 1986, showing that correlated color temperature is evaluated by using the 1960 UPS chromaticity diagram. He showed the differences between real and instrumentally measured values. He did not explain how he got the "real" values. They had measured the color temperature of 48 different light sources, including conventional fluorescent lamps and three-band lamps, and found the mean difference between real and measured values was +/- 5K.

Gerhard Pausch, BYK-Gardner GmbH, Geretsried, Germany, presented "Reliability of Color Measurement Using Automatic Calibration". Pausch commented that a piano player likes to have his piano tuned before each concert; so BYK-Gardner likes to calibrate its instruments before each measurement. To his knowledge the only instrument that calibrates itself using both white and black standards is the spectrophotometer TCM. A manual verification of instrument calibration by use of external standards may be desirable every few weeks.

Theodore Muller, Milton Roy Company, Oostende, Belgium, presented "Review of Diano Color Spectrophotometer Concepts". He showed a slide of the early Diano/Hardy Spectrophotometer I of advanced design. It was capable of illuminating a spot as small as 1 mm in diameter. A complicated feedback system had to be used to provide the desired stability. There followed instruments known as the Color Scan and then the Match Scan. The Milton Roy Color Graph uses a fiber bundle separated to provide 45 degree circumferential illumination. The Color Mate for d/8 geometry uses a 4-inch diameter sphere.

Dr. Danny Rich, ACS applied color systems, Princeton, New Jersey, USA, presented "Colorimetric Repeatability and Reproducibility of Chroma Sensor Spectrocolorimeters". He stated that repeatability is the most important instrument parameter today for quality control evaluation. Reproducibility is the second most important. Accuracy, in general, is not what it should be in commercial instruments. For the CS3 spectrophotometer he showed short term repeatability as a function of wavelength for BCRA tiles. He also showed data for medium term reproducibility of three weeks, then longer term reproducibility of 8 weeks. Separate data were shown for CS5 d/8, CS3 d/8 and CS3 45/0. Didymium filter measurements were made to evaluate wavelength error, usually found to be in the range 0.1 to 0.3 nm. He believes reproducibility is much better today than it was 10 years ago. Instruments are faster, more versatile and easier to use. Standardizing laboratories will need to train people in industry to get the best possible accuracy from their instruments.

Dr. Lother Jahreiss, Datacolor AG, Dietlikon, Switzerland, presented "Importance of Design Parameters and Errors in Abridged Polychromators". He made measurements of BCRA ceramic tiles and two fluorescent samples.

Social events included an elegant reception to open the meeting, a cruise on the River Havel ending with tours of castles in Potsdam, and a farewell dinner at the Hotel Berlin.

Harry K. Hammond III

Annual Meeting, to be held November 4-6 at the Metro Toronto Convention Centre, Toronto, Canada.

Papers submitted in the competition must: 1) describe original work not previously published or presented; 2) be directly related to the protective coatings industry; 3) be of such a caliber that they reflect a step forward in real scientific contribution to the coatings industry; and 4) be accompanied by clearance for publication. Papers to be considered for the competition are those by individuals associated with the organic coatings industry, including raw material suppliers and educators.

Those wishing to enter the competition must send a letter of intent, along with the title of the proposed paper and a brief abstract (by March 1) to the Chairman of the Roon Awards Committee of the Federation:

George R. Pilcher,
Akzo Coatings, Inc.
P. O. Box 147
Columbus, OH 43216.

SOCIETY FOR INFORMATION DISPLAY

The Eleventh Annual International Display Research Conference (IDRC) will be held in San Diego, California on October 15-17, 1991

This year the conference is being held in the United States in keeping with the recent triennial rotation among sites in Asia, Europe, and the United States; most recently Amsterdam, Kyoto and San Diego. The emphasis at these meetings is on research and development aspects of display technology and related human interface issues. Leading contributors to display research are encouraged to attend for an intensive exchange of ideas. In keeping with this emphasis and tradition, there will be no exhibition of commercial equipment and there will be no parallel sessions. There will, however, be one session devoted to poster papers. The INRC is sponsored by the IEEE Electron Devices Society, the Society for Information Display, and the Advisory Group on Electron Devices.

The sponsors and the program committee solicit papers which cover all of the disciplines related to advances in electronic display materials, processes, circuits, and devices. Consistent with a growing involvement of display research organizations in display ergonomics, submissions are also welcome in this area. The expanding research effort in high-definition display systems for a wide range of applications ranging from entertainment to "virtual reality" displays is another area where submissions are solicited.

Previously unpublished papers describing new results of interest to active workers in the display research field are requested. The area of new phenomena and concepts is one of the distinguishing features of the Display Research Conference—it is an ideal forum to present new concepts in display technology and discuss their impact.

The paper should be suitable for a 20-minute presentation, and authors must submit both a 35-word abstract and a 2-5-page summary. Since papers will be selected on the basis of the summary, this must include a concise statement of what is new and significant in the paper. Authors of accepted papers are encouraged to provide demonstrations at the conference at the Author Interviews, a time set aside for informal discussions between participants and authors. The deadline for submitting the abstracts is May 3, 1991.

For further details or a copy of the complete call for papers contact Palisades Institute for Research Services, Inc. (212) 620-3375; FAX (212) 620-3379.

Mail all abstracts and summaries to

Palisades Institute for Research Services., Attn: IDRC
201 Varick Street
New York, New York 10014.

Questions may be directed to General Chairman Webster Howard, IBM (914) 681-5620 or Program Chairman Thomas Credelle, GE (518) 387-5800.

COLOR RESEARCH AND APPLICATION

Volume 16 Issue #1, February 1991

In This Issue

What can deal with fuzzy real-world data, and improve its potential for performance over time as it acquires more knowledge about a problem? It sounds like a human being, but in this case we are talking about neural networks. The experienced colorist is able to extrapolate and interpolate from his accumulated knowledge of the behavior of colorants to predict formulas for new shades or adjust batches to produce on-shade material. Now J. M Bishop, M. J. Bushnell, and S. Westland describe how artificial intelligence techniques can be used on a computer to mimic the behavior of a trained shader. In "The Application of Neural Networks to Computer Recipe Prediction", the authors explain the basic learning procedure for the computer and show that neural network techniques may be useful for solving recipe prediction problems. ➛

MEMBERSHIP IN USNC/CIE

Membership in the USNC is open to anyone desiring to support the USNC and willing to participate in its activities. A brochure and membership application can be obtained from Mrs. LaRee Di Stasio, Membership Chairman, USNC/CIE, Illuminating Engineering Society of North America, 3454 East 47th Street, New York, NY 10017. Phone: 212-705-7916. FAX: 212-705-7641.

Technical questions about the activities of the USNC or CIE should be addressed to Dr. Jack J. Hsia, Secretary, USNC, National Institute of Standards and Technology, Rm B306, Bldg 220, Gaithersburg, MD 20899. Phone: 301-975-2342 FAX: 301-975-4091.

To the careful observer, the apparent relative lightness of objects shifts from dawn to daylight. Objects that appear red by day seem to be black under the stars, while blue objects that appear equally light during daylight appear gray. This effect carries the name of its discoverer, Johannes Purkinje. In "The Purkinje Effect: Some Considerations on the Interplay of Receptoral and Post-Receptoral Mechanisms", Lucia R. Ronchi examines some of the effects that are likely to be due to post-receptoral mechanisms, and which may confuse the student examining a practical demonstration of the Purkinje effect.

An achromatic and a chromatic object both of which have the same CIE Y value are observed to have different perceived lightness. This phenomenon is called the Helmholtz-Kohlrausch effect. It is believed that the perceived lightness of a chromatic object color consists of and achromatic lightness perception and a contribution from it chromatic component. However, the problem is complicated by the fact that the contribution of the chromatic component varies for different hues. In an earlier article Nayatani proposed a hypothesis explaining the perceived lightness of chromatic object colors. In "Lightness Perception of Chromatic Object Colors", he joins with Yoshifumi Umemura, Hiroaki Sobagaki, Kotaro Takahama, and Kenjiro Hashimoto to test his hypothesis.

There are two broad classes of applications for video display units, television and graphical displays. Because of the different objectives for each class, the calibrations and standards for the video display units have evolved separately. Michael H. Brill and Gunilla Derefeldt examine the choice of reference white points, D65 and 9300K correlated color temperature. In "Comparison of Reference White Standards for Video Display Units", Brill and Derefeldt suggest re-evaluation of the 9300 K standard.

Linear algebra and matrix theory have been used widely in many fields. However, their application to color science has been limited to describing the effects of metamers, determining fundamental vectors, describing the reproduction of color images, and synthesizing color for display of images. The main advantage of this approach is the arsenal of mathematical theory that can be brought to bear on the problems from the field of linear algebra and matrix theory. In "Applications of Set Theoretic Methods to Color Systems" Joel Trussell reviews the basis for the linear vector, then introduces some set theoretic methods, which have proved useful in the area of digital signal processing, to implement the necessary constraints of color systems that will allow the full wealth of linear algebra to be applied.

For almost fifty years, since MacAdam first reported his experiments, researchers have been using discrimination ellipses or ellipsoids to define the region of colors indistinguishable from a standard color. The first experiments were performed with lights that were continuously variable. However, since 1970 an increasing number of experiments are being performed with surface or object color stimuli, thus requiring new procedures. In "Construction of Discrimination Ellipsoids for Surface Colors by the Method of Constant Stimuli", Tarow Indow and Melvin Morrison describe an algorithm to define discrimination ellipsoids for surface colors.

In the Brief Look Back section, Robert W. G. Hunt describes the first Bartleson Symposium held October 4, 1989 and gives a tribute to C. James Bartleson's life and scientific career. The Symposium was organized by the Colour Group of Great Britain and was highlighted by the presentation of the first C. James Bartleson Award to Steven Shevell.

CALENDAR

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

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

1991 COLOUR GROUP 50th BIRTHDAY, Feb 13-14
Colour Group Golden Jubilee, Institute of Physics, 47 Belgrave Square, London, SW1X 8QX. Information: J. A. F. Taylor, National Physical Laboratory, Queens Road, Teddington, Middlesex, TW11 0LW.

SPIE/SPSE SYMPOSIUM, February 24 - March 1
Electronic Imaging Science and Technology, San Jose Convention Center, San Jose, California. Information: SPIE, P. O. Box 10, Bellingham, WA 98227-0010, (206) 676-3290.

CMG - SPRING MEETING, April 7-9
Color Marketing Group Spring Meeting, Hyatt Regency, Dearborn, Michigan. Information: Nancy Burns, (703) 528- 7666.

COLOUR AND APPEARANCE IN FOLKLORE AND DISPLAY, April 13
Sponsored by the Colour Group (G.B.) and the Folklore Society at the Institute of Classical Studies, Gordon Square, London, England. Information: John Hutchings, 6 Queen's Road, Colmworth, Bedford MK44 2LA.

ISCC ANNUAL MEETING, May 5-8
Held jointly with CAUS, Doral Inn Hotel, New York City, New York. Information: Evelyn Stephens, (212) 760-7871.

ASTM E-12 ON APPEARANCE, May 6-9
Anaheim Marriott, Anaheim, California. Information: Bode Buckley, (215) 299-5599.

SID INTERNATIONAL SYMPOSIUM, May 6-10
Society for Information Display -27th Annual Symposium, Seminar, and Exhibition, Anaheim Convention Center, Anaheim, California. Information: (213) 305-1433.

ASTM E-12 ON APPEARANCE, May 6-9
Anaheim Marriott, Anaheim, California. Information: Bode Buckley, (215) 299-5599.

FSCT SPRING WEEK, May 13-16
Sheraton Society Hill, Philadelphia, Pennsylvania. Information: (215) 545-1506.

CORM ANNUAL MEETING, May 21-22
Spectral Irradiance Measurements and Ultraviolet Radiometry NIST, Gaithersburg, Maryland. Information: Albert Parr, (301)-975-3739.

ASTM COMMITTEE D-1 ON PAINT, June 16-19
Chateau Laurier, Ottawa, Canada. Information: Scott Orthey, (215) 299-5507.

MEMBERSHIP IN THE ISCC

IS OPEN TO EVERYONE INTERESTED IN COLOR!!

For further information and membership application, please fill out the items below and mail to the address shown.

Your name _____

Address _____

City_____ State_____Zip _____

MAIL TO: Ms. Anne Laidlaw **OR:** Tel: (919) 274-1963
Shelyn Incorporated FAX: (919) 274-1971
1108 Grecade Street
Greensboro, NC 27408

The ISCC is composed of both individual members and member bodies who have an interest in color. If you are a member of a national organization that might be interested in this affiliation, please indicate its name below and we will get in touch with you about it.

Organization _____

Your Phone No. (daytime) (_____)_____

NEWSLETTER EDITOR

Michael A. Hammel

Send material for publication (photos should be black and white if possible) to the editor at:

98 Grand View Drive • Fairport, NY 14450
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