Inter-Society Color Council *News*

CONFERENCE ON HISTORIC COLORANTS

The Inter-Society Color Council will hold a conference entitled, "Colors of History: Identification, Re-Creation, Preservation," at the Lodge, Colonial Williamsburg, February 9 to 12, 1986. Papers by invited speakers will discuss various specialties. The audience will include experts from the many disciplines that make up ISCC and who can enrich subsequent discussions.

There is a growing interest in the restoration of the interiors and exteriors of historic houses and in the reproduction of the textiles and wallpapers contemporary with them. Custodians strive to restore and maintain the integrity of various historic types of decorative art. Nonetheless, many questions arise concerning the identification of the colors of paints, pigments, and dyes used in times past. The conference will review the latest knowledge and techniques of experts.

The technical program has been organized by Dr. Robert L. Feller of Carnegie-Mellon University, Pittsburgh, where he is Director of the Research Center on the Materials of the Artist and Conservator. He has been consultant for the US National Gallery of Art for many years. His work on varnishes and the effect of light upon colorants has been widely praised. Dr. Danny C. Rich of Applied Color Systems, Princeton, N.J., is assisting. Topics to be covered are interior and exterior architecture, wallpaper, and textile sampling and reproduction, identification of ancient and modern colorants, metamerism, fading, and enhancement.

Among the speakers will be Nathan Stolow, Colonial Williamsburg (18th Century Coatings), Kristen Fisher, Colonial Williamsburg (Textile Reproductions), Morgan Phillips, SPNEA, Boston (House Paints), Andrea Gilmore, Charlestown Navy Yard (Wallpapers), Margaret Fikioris, Winterthur (Textiles), Max Saltzman (Ancient Dyes), Elisabeth FitzHugh, Freer Gallery (Pigment Identification), Dana Hewson, Mystic Seaport Museum (Painting Ships), Robert L. Feller, Mellon (Literaature on Historic Colorants). W. A. Thornton, Prime-Color (Illumination), and John Asmus, USC (Image Enhancement).

Ample time will be available to visit the restoration of Colonial Williamsburg which is within short walking distance of the lodge. An additional attraction this year is the newly opened DeWitt Wallace Decorator Arts Gallery. This contains many British and American antiques of the 17th and 18th centuries, never before exhibited because they did not relate directly to Williamsburg.

The registration costs from $360 to $570 depending on length of stay and includes rooms at the Lodge and all meals, American plan. Registration begins at 4:00 on Sunday, February 9 and will be followed by a reception at 5:00.

Registration forms may be obtained from Norman W. Burningham, 357 True Hickory Drive, Rochester, NY, 14615.

Number 299 January-February 1986

FRANC GRUM, 1922-1985

The Color Science Community has lost a colorful, capable contributor. The life of Franc Grum was ended abruptly when his automobile was struck head on by another car late Friday afternoon, December 20, 1985. He was pronounced dead at the scene of the collision on Route 104 in Sodus, Wayne County, about 30 miles east of Rochester, New York. The driver of the other car was charged with driving while intoxicated.

After 32 years with Eastman Kodak Company, Grum took an early retirement in 1982 to become the Richard S. Hunter Professor of Color Science, Appearance and Technology at Rochester Institute of Technology (RIT), and to oversee the development of the newly established Munsell Color Science Laboratory. Two years earlier he had begun teaching an undergraduate course in Color Systems. Quite recently he had been working very hard to establish the master's degree program in color science. It was approved just two weeks before his death. Grum often worked 12-hour days at RIT while continuing to do consulting for Kodak.

Grum had long wanted to teach. A native of Slovenia, Yugoslavia, he earned a doctoral degree in classical languages from the University of Ljubljana. He was fluent in Latin, classical Greek and Hebrew as well as in a half-dozen modern languages. He planned to be a professor and briefly taught languages.

Grum was a fighter. He was a member of a national underground organization that fought for the liberation of Yugoslavia. However, after the communist takeover in 1945, Grum and his recent bride, Albina, fled their homeland to live in Austria after Franc escaped from a military prison and Albina was released from a refugee camp. In 1950 they emigrated to the United States, going first to Wisconsin and later to Illinois. Eventually they settled in Rochester, New York.

Realizing that it would be difficult to obtain a teaching position in the USA, Grum began to work as a technician at Kodak. He pursued his interest in science and mathematics by taking night courses at the University of Rochester. He obtained a bachelor's degree in physics and then a master's degree in optics in 1962. The university offered him a teaching post if he would pursue a PhD. After some deliberation, he decided to decline the offer. Instead he concentrated his effort on providing needed calibration and measurement services for Kodak. In 15 years he progressed from technician to Senior Laboratory

Head of the Photometrology Laboratory where he directed research in photometry, radiometry and color-image stability and evaluation.

Grum had worked with a number of technical societies to help solve difficult measurement problems, such as evaluation of the reflectance and color of fluorescent whitened paper. He worked on the development of a suspension of high-purity barium sulfate to provide a near-ideal white reflectance material now available as Eastman White Reflectance Coating. He reported the durability and usefulness of highly-pressed polytetrafluroethylene (PTF) or "Halon" as a standard of reflectance over a broad spectral range.

Grum was involved in the work of various national and international scientific organizations. He also held important administrative posts in them. He served as a director of the Inter-Society Color Council (ISCC) from 1974-76, as President-Elect from 1976-78, and as President from 1978-80. At the April 1985 ISCC Annual Meeting, he received the Godlove Award, bestowed biennially in recognition of outstanding contributions to the field of color. Grum was one of the organizers of the Council for Optical Radiation Measurements, formed to advise the director of the National Bureau of Standards (NBS) of the needs of Industry, and he was currently serving as Vice-President. Grum served as President of the U.S. National Committee (USNC) of the International Commission on Illumination (CIE) from 1979-1983. He was chairman of the international technical committee, TC 2.3, on Materials from 1975 until the CIE was reorganized into divisions in 1983, at which time he was appointed Director of Division 2, Physical Measurement of Light and Radiation, comprising 17 technical committees. In June 1985, the USNC Executive Committee nominated Grum as its candidate for CIE President for the quadrennium 1987-91.

Grum was also editor or author of a number of books. Five volumes have appeared in the series on Optical Radiation Measurements published by Academic Press: Radiometry (1979), Color Measurement (1980), Measurement of Photo Luminescence (1982), and Physical Detectors of Optical Radiation (1983), and Visual Measurements (1984). He also published three volumes of his personal experiences in war-torn Yugoslavia. These were written in his native language, Slovenian.

Grum is survived by his wife, Albina; daughters and sons-in-law, Iva and Richard Ester, Mary Ann and Anthony Mrva, Margaret "Peg" and James Bodine; six grandchildren, Tanya, Kim, Michael, Edward, Jennifer and Jonathan, all living in the Rochester area; three brothers and a sister in Yugoslavia; nieces and nephews.

Notes of sympathy can be sent to the family at 42 Shorecliff Drive, Rochester, NY 14612. Tangible expressions may take the form of contributions to the "Munsell Color Science Laboratory". They should be sent to Dr. Roy S. Berns, Munsell Color Science Laboratory, RIT, P.O. Box 9887, Rochester, NY 14623. Berns will notify the Grum family of your expressions. Contributions to the Munsell Color Science Laboratory are tax deductible.

Harry K. Hammond III

ISCC ELECTION

Officers and directors of the ISCC are standing for the current election. The nominees for officers for the term of 1986-1988 include Peter K. Kaiser and Joy Turner Luke, President-Elect; Therese R. Commerford, Secretary; and Edward T. Connor, Treasurer. Three Directors will be elected for the term 1986-1989 from among the six candidates: Paula J. Alessi, Christina M. Burton, Roland Connelly, Paul A. McManus, Milton Pearson and Mary Ellen Zuyus.

All delegation chairmen and voting delegates are reminded to return their ballot to the Office of the Secretary, Therese R. Commerford.

ISCC ANNUAL MEETING

The 1986 Annual Meeting of ISCC will be held June 15 to 18 at Ryerson Technical Institute in downtown Toronto. This will be the first joint meeting with our sister organization, the Canadian Society for Color. The schedule Sunday through Wednesday:

June 15 – Registration and Reception
June 16 – Problem committees, workshops, dinner
June 17 – Symposium on Color Reproduction
June 18 – Committees, workshops, lunch, Business Meeting

Joy Turner Luke has arranged three workshops, each of which will be given twice:

Update on Uniform OSA Color Scales – W. N. Hale
CIELAB and the Universal Color Card – Ralph Stanziola
Generation of Electronic Images – Eastman Kodak

The full-day symposium will be on Color Reproduction: State of the Art, organized by Prof. Peter K. Kaiser of York University and Paula Alessi of Eastman Kodak. Topics include:

Color in High Definition TV – Stan Quin
Color in Ceramics – Robin Harper
Color in the Automotive Industry – Helen Delp
Non-Impact Printing Technology – Robert Buckley
Negative/Positive Photographic System – Paula J. Alessi
Color from Video to Hard Copy – Richard Ingalls
Color Reproduction in Textiles – Roland Conelly

The luncheon meeting on June 18 will hear reports of officers and the annual awards. Joyce S. Davenport will turn over the presidency to Allan B. J. Rodrigues. Details and registration forms for this annual meeting will be sent to ISCC members. Others may contact the Arrangements Chairman, Norman W. Burningham, 357 True Hickory Dr., Rochester, NY 14615, phone 706-477-7466. Housing will be avialable at the Delta Chelsea Inn, three blocks from Ryerson.

ASTM Committee E-12 on Appearance will be meeting at the Delta Chelsea on June 13 and 14 under the chairmanship of W. N. Hale, assisted by Paula Alessi.

On June 19 and 20, also at Ryerson, AIC (the International Association for Color) will hold an interim meeting. The topic will be Computer-Generated Color Displays. In charge will be Prof. Peter K. Kaiser, Dept. of Psychology, York University, Downsview, Ontario.

CHARLES W. JEROME, 1911-1985

Charles W. Jerome, ISCC President, 1976-1978, died October 23, 1985, after a long illness. He was a resident of Marblehead, Massachusetts, since 1946 and lived at 92 Nanapashmet Street.

Jerome was a senior engineer and manager at Sylvania Lamp Division GTE Corp. when he retired in 1976. He was a member of the Army Reserve and a veteran of World War II, having attained the rank of lieutenant colonel, He was a graduate of Massachusetts Institute of Technology. A member of the Corinthian Yacht Club of Marblehead, he won many trophies for his sailing activities. Your reporter distinctly remembers the delightful setting for the ISCC Board Meeting in the summer of 1975 when we met, ate and slept at the Corinthian Yacht Club.

Jerome was also a member of the Optical Society of America and an elected Member-for-Life of the U.S. National Committee (USNC) of the International Commission on Illumination (CIE). At Sylvania he built and operated a spectroradiometer to evaluate the spectral power distributions of fluorescent lamps. He provided data to the CIE, Illuminating Engineering Society, and to Dorothy Nickerson for her research on color rendition of agricultural products. His measurements of typical U.S. lamp production of white and daylight lamps of 1959 for Nickerson's USNC/CIE Color Rendering Committee were reproduced in the book "Color Science" by Wyszecki and Stiles, published by Wiley in 1967; see page 37.

In addition to his wife, Constance, he is survived by two daughters, Mrs. David (Janice) Face of Nashua, NH, and Mrs. Wayne G. (Marcia) Hall of Marblehead; a brother, Frederick; three grandchildren and three great-grandchildren. Those of us who knew him regret not having kept in closer touch. We belatedly extend our sympathy to the family.

Harry K. Hammond III

NEWS OF MEMBERS

Ruth Johnston-Feller

Ruth Johnston-Feller presented the Joseph J. Mattiello Memorial Lecture at the Federation of Coatings Technology Annual Meeting in October, 1985. The lecturer was chosen from among those who made outstanding contributions to science and is selected to present a paper on a coatings related topic. The lecture focused on Mrs. Johnston-Feller's recent work in affiliation with the Research Center at Mellon Institute on the evaluation and quantification of colorant fading. Mrs. Johnston-Feller is the recipient of the ISCC's Macbeth Award and has been active in the organization for many years.

John S. Christie

John S. Christie, Vice-President and Senior Research Advisor at Hunter Associates Laboratory, Inc. retires in January after 24 years of service. Jack joined the Company with a B.S. from Drexel Institute of Technology in Philadelphia, a Professional Engineers License, several patents in the field of color measurement, and 15 years experience with Proctor & Schwartz (manufacturers of dyeing and textile processing equipment). Jack was developing an automatic dye solution color control for continuous finishing of nylon hosiery when he met Richard Hunter. Their shared interests led to the mutual development of experimental instruments. Later in 1958-1959 they met at an IFT show in New York. Hunter Associates Laboratory had been formed and Richard Hunter offered Jack a position in the company.

Jack moved to McLean, Virginia and brought his family as well as goldfish, airedale, a lathe, drill press and various "other tools," a Comet Class sailboat and an airplane. The family settled down; the lathe, etc., found a home in the newly refinished and enlarged basement of HunterLab; and the plane and boat were tied down elsewhere. Over the years, he has been an active and valuable participant in HunterLab Workshops and Seminars throughout the U.S. and Canada. He was instrumental in the design and development of several HunterLab instruments including the D47 Dorigon Glossmeter and has published various technical articles including "An Instrument for Measuring Geometric Attributes of Metallic Appearance," Applied Optics, V 8, N 9, September 1969 and "Review of Geometric Attributes of Appearance," Journal of Coatings Technology, V 51, N 653, June 1979. Internationally, he was a member of the CIE and Chairman of its Committee on Gloss as well as a member of the ISCC.

Peter K. Kaiser

The Lighting Research Institute recently elected Peter Kaiser to serve on its Board of Directors for a three year term. He is currently serving on the ISCC Board of Directors and is also a candidate in the current election for the office of President-Elect.

APPLICATION FOR INDIVIDUAL MEMBERSHIP APPROVED BY BOARD OF DIRECTORS

Mr. John Anderson c/o Boris Kroll Fabrics 41 State Street Paterson, N.J. 07501-3597	Is Assistant Vice-President of Dyeing & Print Finishing at Boris Kroll Fabrics. His work is concerned with color application and control on textiles. Interests include color formulations for textiles, and color problem solving.
Mr. Walter G. Ball 1812 Sherwood Street Allentown, PA 18103	Is associated with New Jersey Zinc Co. in technical services. His work has involved solving customer problems of titanium dioxide in coatings, plastics, paper and rubber formulations. Presently involved in chrome yellows and moly-oranges for coatings, plastics and inks.
Mr. Joseph J. Benenate 83 Burlington St. Woburn, MA 01801	Has been a member of the faculty at RIT. Presently, at Graphics Plus Corp. of Woburn, MA. His work has been in the photographic and arts

fields. Is interested in color measurement, perception, and color standards.

Mr. Thayer A. Brown, Jr.
433 Building, Dow Chemical Co.
Midland, MI 48640

Is in research and production of plastics; specifically the coloring of styrenic plastics, production of color concentrates, and precolor resins. Is interested in the precise definition and control of color in plastics manufacture and application.

Mr. Stephen B. Daniel
Decorative Products Division
3M
P.O. Box 2600
Farmington Hills, MI 48018

Has been a teacher of art, but presently supervisor in automotive color and graphics development. Is involved in paints, silk screen, and graphics. Interests include color matching, color measurement, pigments and color development.

Miss Judith Ann Frost
Box 279
4201 Henry Ave.
Philadelphia, PA 19144

Has just earned a degree in Textile Engineering at Philadelphia Textile and plans to enter Clemson as a graduate student in Color Science. Interests in color just beginning, and a result of having taken Dr. Howard's course in Color Science.

Mr. William Dean Jackson
P.O. Box 1551
Bainbridge, GA 31717

Is Color Control Manager, Amoco Fabrics Co. He is concerned with pigmentation of synthetic textile materials (color formulation, quality assurance economics). Interests are continued development of scientific/industrial color research & application, with emphasis on coloration of synthetic fibers, yarns and fabric.

Mr. David M. Johnson
491 Columbia Ave.
Holland, MI 49423

Is presently a Color Technologist for BASF Wyandotte Corp., working with dyes, pigments and fluorescent dyes. Interests include pigment and dyestuff quality control, computer color matching, color difference formulae, and color strength calculations.

Mr. William S. Laycock
EM Chemicals
5 Skyline Drive
Hawthorne, NY 10532

Currently Technical Service Manager of a manufacturer of AFFLAIR® pearlescent pigments. Has 30 years experience with coloring of plastics. Interests include sample preparations for measurement in plastics, coatings, paint and ceramics; and color measurement, including that of pearlescent items.

Miss Judy A. Manuel
11820 N.W. 37th St.
Coral Springs, FL 33065

Is employed by PMS Consolidated at the Corporate Technical Center. Her work involves teaching and product development in the plastics field. Interests include the interaction of pigments and dyes with various plastics, and educational resources that are available on color.

Mr. Matthew J. Plaza
5423 Hauser Way
West Bloomfield, MI 48033

Is with PPG where he directs development of colors for future model years of their automotive customers. Presents annual color shows of proposed colors. He is interested in development of unique, glamorous finishes for automotive products.

Mr. Edward N. Thomas
3900 South West Murray Blvd.
Beaverton, Oregon 97005

Art is his chief color interest. His work is in styling and design, related to paint and textiles.

Mrs. Barbara Tiffany
323 Spruce St.
Philadelphia, PA 19106

Is involved in textiles for home furnishings. Her professional concerns with color are as a textile designer, as a space planner, in product development for home furnishings, in marketing new products for the home, and as an advisor to retailers.

Mrs. Amparo R. de Torres
310 S. Easton Rd., A302
Glenside, PA 19038

Her work involves the control, fading and lighting of textiles in a museum environment. She has taken the Color Science course at Philadelphia College of Textiles and Sciences, and done research there. Her interests are in the application of color science to conservation of historical textiles, in museum illumination; and in natural dyes.

Mr. Dennis L. Williams
Mead Central Research
8th & Hickory
Chillicothe, Ohio 45601

Is currently responsible for coating and evaluation of unique prototype color imaging systems; including sensitometry, densitometry, colorimetric analysis, and aging studies. Interests include integral and analytical sensitivity, color densitometry, colorimetric analysis, color matching, color reproduction, and color purity.

NEWS OF MEMBER BODIES

ASTM Committee Meetings

Committee E-12 on Appearance of Materials met in New Orleans, LA, January 13 & 14, 1986, together with Committee D-1 on Paint and Related Coatings and Materials. The minutes of these meetings are just being written; so a full account of committee activities cannot be given in this issue of the News. However, it may be of interest to record here that Subcommittee E12.02 on Spectrophotometry and Colorimetry discussed the first draft of a Proposed Standard Practice for Obtaining Spectrophotometric Data for Color Evaluation as well as a Proposed Method of Specifying Color by the DIN Color System. Revisions of several methods were also discussed, among them being one designated D 2616, whose title is being changed to "Method for Visual Evaluation of Color Difference with a Gray Scale."

Harry K. Hammond III

Detroit Colour Council

The '85-'86 program year was off to a good start in September with a panel discussion on pearl-like pigments for automotive finishes. Applications of the coated mica materials were discussed by panelists Sigrid Teaney of EM Chemicals, Carl Reiger of Mearl and Leonard Dick of PPG, moderated by Debbie Weber, Ford Motor, for a turnout of 225 people. In November Calvin McCamy of Macbeth made an excellent presentation to 135 DCC members on many aspects of artificial daylighting, including evolution of the current D7500 lighting and European use of D6500.

The DCC committee on Automotive color difference measurement unanimously approved SAE J1545 Recommended Practice. DCC is planning a joint conference with the Federation of Societies for Coatings Technology on implementation of the practice for automotive parts. Separate sessions during the week of June 3, 1986 will address issues specific to coatings, plastics and soft trim. For registration information contact the FSCT office in Philadelphia at 215-545-1506.

DCC is planning s Spring tour of Center for Creative Studies, a Detroit college specializing in industrial design and automotive design.

Officers for 1986 are Jack Westerbeek, Matteson-Ridolfi, president; Robert Schneider, Ferro Corp., vice president; Steve Daniel, 3M Co., secretary; and James Keiser, DuPont Finishes, treasurer.

Bill Longley

MINUTES OF APRIL 15, 1985 MEETING OF PROJECT COMMITTEE #34 – COLOR DIFFERENCE PROBLEMS

The 1985 meeting was attended by 47 members of whom 17 indicated they would be active. The major subject of discussion was the experiment run by Dick Ingalls in producing samples for the color difference evaluation experiment. Dick brought in 24 samples (in the blue region as recommended by the CIE guidelines) plus a target. All samples had an equal Y value. It was proposed that these samples be measured on a Hunter D54, specular included, sphere illumination, at the center and each of the four corners to determine their color variation.

A subcommittee of Ingalls and Fred Billmeyer was formed to determine and issue guidelines on how to make visual observations of these samples. Ingalls reported that he expects to have the remainder of the colors (with the exception of the yellow which is outside the gamut of his photographic material) completed in time for the June 1986 ISCC meeting in Toronto, Canada.

In other matters, the Detroit Color Council reported on their efforts to establish a standard practice for the evaluation of automotive colors. This is to be submitted to the ASTM for inclusion in their standard practices. (A draft has been completed and submitted as SAE J1545, Recommended Practice: Instrumental Color Difference Measurement for Exterior Finishes, Textiles and Colored Trim.)

Sy Commanday

TO THE EDITOR – 1931 CIE STANDARD OBSERVER

As a consequence of the discussion of my talk at the annual ISCC meeting last April, I wrote W.D. Wright for clarification of the make-up of the 1931 CIE Standard Observer. I had mentioned hundreds of observers whereas Fred Billmeyer corrected me that there were only seventeen. I had in mind the data of Ives and Priest, while Fred was thinking of Wright and Guild.

From Dr. Wright's reply, enclosed, you will see there is more to the story, which I suspect few if any of us over here know about. I thought Wright's letter so interesting that I suggest it be considered for reprinting in the ISCC News Letter.

Walter Granville

Now for your question. The data which I contributed towards the 1931 Standard Observer included the spectral chromaticities for 10 observers and the white points in the chromaticity chart for 36 observers, these 36 being made up of the original 10 plus 26 additional observers. The logic behind this was based on the fact that the particular unit system that I used separated out the effects of absorption in the ocular media, especially the absorption due to the yellowing of the crystalline lens and by the yellow macular pigment. It then emerged from my results that the observer variation due to differences in the spectral sensitivity of the retinal receptors, as shown up by the spectral chromaticities (or spectrum loci in my particular co-ordinate system) were quite small. The main observer differences were due to differences in lens and macular pigment absorption, as shown up by the spread of the white points in my chromaticity chart. It therefore made sense to concentrate more effort on the number of "white point" observers than on the "spectrum locus" observers, expecially as it was not so easy to recruit observers for the rather time-consuming "spectrum locus" observations. I like to think that my average observer represented more than the 10 observers, although I could hardly claim that it represented 36. The pundits, though, usually credit me with only 10!

The 17 which Fred Billmeyer quoted was therefore made up of my 10 plus Guild's 7. This is not, of course, a very large number, but Guild justified going ahead with the definition of the Standard Observer by the average of our two sets of results, because our results were very similar indeed in spite of the completely different types of equipment we used and, of course, a completely different group of observers.

I hope this answers your question but there is a further complication, namely that our colour-mixture data had to be combined with the 1924 V_λ curve. This had been standardised by the CIE on the basis of several investigations all carried out in the U.S., the total number of observers adding up to two or three hundred, I think. All of this means that the 1931 Observer was more of a mongrel than a thoroughbred!

W. O. Wright

COLOR RESEARCH AND APPLICATION

Fred W. Billmeyer, Jr., Editor-in-Chief reports that he has asked Rolf G. Kuehni to accept the appointment of Associate Editor for the coming year and to take over as Editor-in-Chief at the end of 1986, and that Kuehni has agreed to do so. Kuehni was Associate Editor representing ISCC from the beginning of the Journal in 1976 until 1981. He is with Mobay Chemical Company, Dyes and Chemicals Division, Dyes Department, Post Office Drawer 2855, Rock Hill, South Carolina. Billmeyer indicated that he expects to continue a close association with COLOR as long as he can be useful. Perhaps the title of Editor Emeritus will be created. He looks forward to working with Kuehni during 1986 to assure a smooth transition.

Harry K. Hammond III

CONTENTS OF *COLOR RESEARCH AND APPLICATION:* MAJOR ARTICLES IN THE FALL, 1985, ISSUE

The article *Color-Vision Theory and Linear Models of Color Vision,* by Robert W. Massof, is a tutorial presentation of a general theory of vision that procides a framework underlying the wide range of models of color vision that have appeared in recent years. This is a complicated though important subject, and we have encouraged Dr. Massof to explain it in the simple terms appropriate to a tutorial article. Where he uses an equation, for example, he follows it with an explanation in words of its meaning for those with less mathematical training. We think our readers will find it worthwhile reading.

In *Comparison of Methods for Assessing Observer Metamerism,* Yoshinobu Nayatani and coauthors do a little detective work to compare results of two widely different methods of studying the importance of the differences in color vision among observers in judging metameric color matches. They show that the two sets of results are in good agreement in pointing out the wide range of color vision in any group of human observers.

Noboru Ohta also writes on observer metamerism in his article *Formulation of a Standard Deviate Observer by a Nonlinear Optimization Technique.* Such an observer is needed to provide a standard measure of how large the effects of observer metamerism will be in specific cases. It seems likely that this article, together with a previous one by Nayatani *et al. [Color Res. Appl.* 8, 47-56 (1983)], will soon provide the basis for a CIE recommendation on the calculation of observer metamerism.

Predicting the way colors appear is a largely unsolved problem of advanced colorimetry. In their article *A Colour-Appearance Transform for the CIE 1931 Standard Colorimetric Observer,* Hunt and Pointer take us a large step nearer that goal. Building on Dr. Hunt's earlier article *[Color Res. Appl.* 7, 95-112 (1982)], they add the ability to predict color appearance in tungsten-light as well as daylight illumination. The importance of the CIE standard observer in their title is that its use simplifies the calculations needed to apply their new model.

CONTENTS OF *COLOR RESEARCH AND APPLICATION:* MAJOR ARTICLES IN THE WINTER, 1985, ISSUE

In 1983 the CIE completed a revision of its document on *Colorimetry,* listing all CIE recommendations on that subject; it will be published early in 1986. One topic that was extensively revised and amplified was the methods for calculating tristimulus values, the basic CIE color coordinates. Today most users utilize tables of weight factors for this calculation, but the CIE chose not to publish such tables. Instead, they were published in 1985 by the ASTM. The article *The Calculation of Weight Factors for Tristimulus Integration,* by Hugh S. Fairman, tells how the ASTM tables were prepared, relates them to the new CIE recommendations, and gives instructions and a computer program for the user to prepare his own tables for special purposes in accord with the CIE methods.

Studies of color discrimination under various experimental conditions has proved vital to the understanding of human color vision. Keiji Uchikawa and Mitsuo Ikeda, in their article *Wavelentth Discrimination with a Chromatically Alternating Stimulus,* describe such studies in the less usual circumstances in which the two colors to be compared are separated in time rather than in space, that is, are presented as alternating instead of being seen side by side at the same time. Some unusual results were found as the rate of alternation was increased.

In today's world of computers and, more and more, robots, the need to program machines to recognize objects becomes important. Computer vision can be made to utilize not only color but also gloss, shadows, and other clues to aid such identifications. In his article *Using Color to Separate Reflection Components,* Steve Shafer tells us how this can work, in a fascinating glimpse into the future.

Haze is an optical property of transparent materials that you would not want to find, for example, in your automobile windshield. Its measurement has been standardized by the ASTM since the 1940s. Duirng the near half century following, instruments and methods have changed. In a revision of the ASTM haze method in progress, some of the fundamentals nearly got lost sight of. One of those present in the early days was concerned, and a little modern research led to an article *On the Measurement of Haze* by Billmeyer and Chen reminding us that the method is pretty flexible and potentially more useful than its usual practice would indicate.

Ever since Sir Isaac Newton told us over 300 years ago that the spectrum was made up of the seven colors red, orange, yellow, green, blue, indigo, and violet, people have been looking for indigo! Why did Sir Isaac choose it? What are we supposed to see? Keith McLaren tells us what he thinks *Newton's Indigo* was all about.

A favorite topic of complaint for all color TV viewers is how terrible the color is – as we forget just how wonderful the whole process is and how amazingly good the results usually are. How do the harried technicians test for color fidelity, among all the other tests they must make? Bjarne Hisdal tells us how, and also how the tests should be designed for accuracy and simplicity by the proper selection of *Color Samples for*

Colorimetric Fidelity Testing in Television.

Our population is getting older, we are told, and with old age comes a variety of ailments, many of which can be treated with the aid of color tests using reagent strips that take on a color, when in contact with body fluids, that is compared to the color of a portion of a chart on the container, thus supplying a diagnosis. For the color comparison to be valid, the manufacturer must use extreme care in designing these color charts. Marvin Genshaw tells us about these *Color Aspects of Reagents Used Visually in Clinical Analysis.* If you haven't met them yet, just wait; you will in time.

Those of us familiar with color order systems and color atlases often assume that all the details of them are neatly set out in the literature for those who need to know. Unfortunately, nothing could be farther from the truth. Roy Berns and his coauthor Fred Billmeyer did need to know, and found they needed to probe back into history. By great good fortune they were able to consult some of those who were there. The article *Development of the 1929* Munsell Book of Color: *A Historical Review* was the result. Within a few months of its completion, one of the major contributors to it, Dorothy Nickerson, passed away, removing forever a vital source of information only recently tapped.

MEETINGS

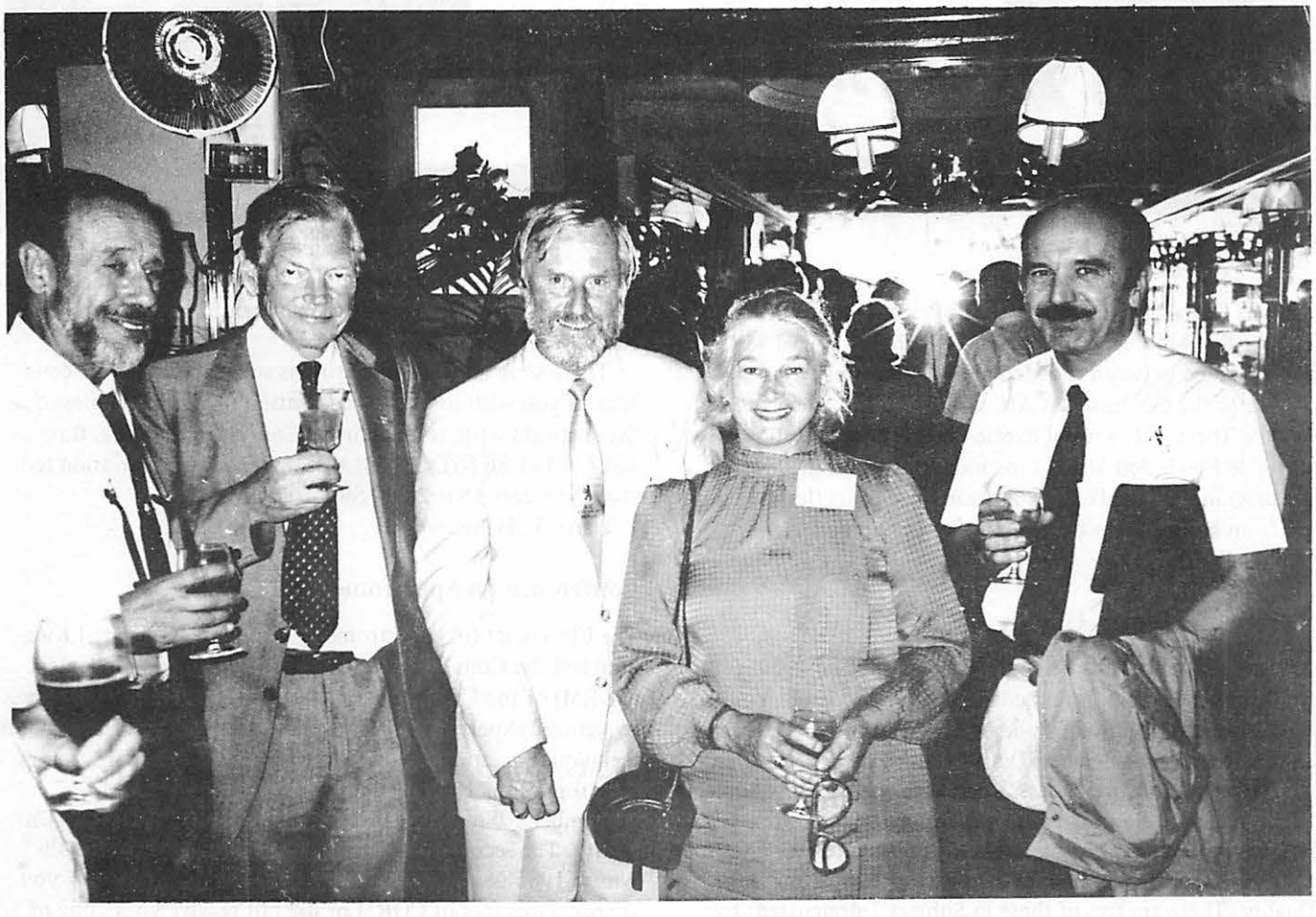
Officers of Color Organizations Meet

At the request of the ISCC President Joyce S. Davenport, Dr. Heinz Tersteige, President of Bundesanstalt Für Materialprufung (Germany) and President-Elect of AIC, graciously arranged a luncheon for the officers of the various international color groups. The luncheon was held during the 5th Congress of AIC in Monte Carlo, Monaco June 1985, and was attended by approximately thirty representatives. It proved to be an excellent opportunity to become aquainted with our peers and to be able to discuss views and ideas in the area of color and its application.

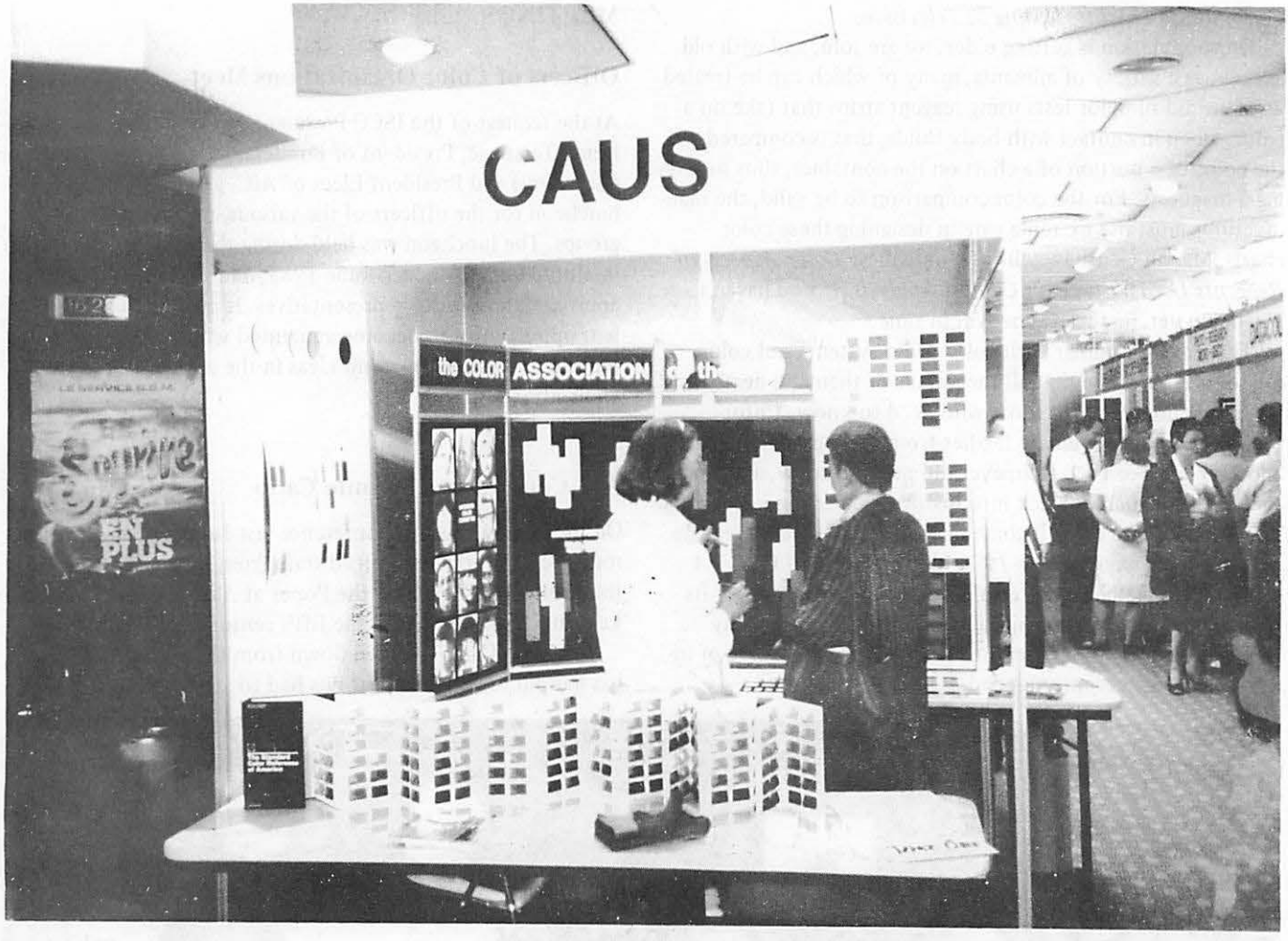
AIC Conference at Monte Carlo

On the way to the AIC conference last June a number of us rode the TGV, the high speed train from Paris to Lyons. We then visited the Palace of the Popes at Avignon and went on to Les Baux, a fortress since the fifth century.

In Monte Carlo the road down from the Upper Corniche has hairpin turns where our bus had to stop traffic in both di-



Taken at a luncheon for the Presidents and Pres-Elects during the 5th World Color Congress, Monaco, June 16-22, 1985
Left to right: Dr. Lorenzo Plaza, Pres., Comite Espanol de Color; Dr. R W G Hunt, Pres., AIC; Dr. Heinz Terstiege, Pres., Bun Germany; Pres-Elect AIC, Joyce S. Davenport, Pres., Inter-Society Color Council (U.S.A.); Dr. Roberto Lazano, Pres., Grupo Agentino Del Color.



Color Association Exhibit

rections. It was on one of these that Princess Grace of Monaco lost her life. Monte Carlo is a beautiful city, arranged vertically and squeezed between the Med and the Maritime Alps.

One of the exhibitors at AIC was the Color Association of the US. There were several exotic decorations. On a day off we visited le Fondation Maeght for modern art and the Musee oceanographique of Jacques Costeau. One of us flew by chopper from Monte Carlo to Nice on the way home.

Tom Webber

Work with Display Units

An international scientific conference on the above subject is being held in Stockholm, Sweden, May 12-15, 1986. Your reporter received a copy of Bulletin 3 – Scientific Programme and Abstracts in December. During the 3½ days there appear to be as many as fourteen sessions with as many as five subjects being presented simultaneously. Each session is allotted 1½ hours and includes as many as eight papers. Interesting sessions to ISCC members would appear to be those involving Image Quality. There are five of these in Subject 1 designated: E, contrast, filters; F, stability; G, methods; H, colour I; I, colour II. Other titles of interest are: Vision: work distance and refraction; Vision: accommodation and binocular functions; Working posture: line of vision and neck-back disorders; Image quality: Polarity; Lighting; Pregnancy outcome; Effects of computers on thinking.

There were almost 300 abstracts submitted from 27 countries. If you wish to obtain registration forms and copies of the abstracts write to Stockholm Convention Bureau, Box 1617, S-111 86 STOCKHOLM, Sweden. The registration fee after February 15 is 2,300 Swedish Krowns.

Harry K. Hammond III

Conference on Spectrometry

The Ultraviolet (uv) spectrometry Group of the United Kingdom and the Council for Optical Radiation Measurements (CORM) of the United States have invited 20 internationally recognized experts to discuss new spectrophotometric standards, techniques, instruments, and international standardization in spectrophotometry. The conference will take place 14-17 September 1986 at the Clarendon Laboratory of Oxford University. The second announcement is contained in the Fall-Winter 1985 issue of Optical Radiation News, No. 44. If you are not a member of CORM or did not receive your copy of the News sent out in December, write to Secretary-Treasurer, Norbert L. Johnson, 3M Center, Bldg. 582-1-15, 3M Company, Saint Paul, MN 55144. Invited papers will be presented by sev-

eral well-known members of ISCC, but better still the European location will attract many other nationals with whom to exchange information. Poster papers are invited on any of the topics. Requests for consideration for their inclusion in the program should be sent to Dr. K. D. Mielenz, Room B 306, Metrology Building, National Bureau of Standards, Gaithersburg, MD 20899.

Harry K. Hammond III

ANNOTATED BIBLIOGRAPHY ON PSYCHOPHYSICAL METHODS

A thirteen page report on the subject prepared by C. J. Bartleson, Research Laboratories, Eastman Kodak Company, Rochester, NY, appears in the CIE Journal, volume 4, number 1, June 1985, received by your reporter in December. The report is in English, but the Summary (appearing at the beginning) is given in French and German as well. The English summary is reproduced here.

The CIE TC-1.3 (Colorimetry) constituted a Task Force at its committee meeting in Tokyo, Japan, on the occasion of the 19th Session of the CIE, for the purpose of preparing a report on "Guidelines for Measuring Color." In 1981 in Berlin, at its committee meeting on the occasion of the AIC Conference "COLOR '81," the committee redefined the objective of that Task Force to be the preparation of an annotated bibliography relating to the application of psychophysical methods to the measurement of color.

This annotated bibliography is the final report of the Task Force. The purpose of the document is to provide a selective introductory guide to currently available literature that can serve to help those who are not already familiar with psychophysical methods to learn more about the subject. The document has been prepared by the chairman of the Task Force on "Guidelines for Color Measurement."

The document is divided into five sections as follows:

1. General experimental techniques and theory
2. Thresholds and matching
3. Differences
4. Ratio scaling of appearances
5. Multidimensional scaling of appearances

The bibliography includes material published as early as 1860 and as recently as 1984. It concludes with "A Basic Bookshelf on Psychophysical Scaling" containing 16 entries and an "Introductory Bookshelf on Psychophysical Scaling" containing 6 entries.

Individual copies of the CIE Journal are available for $10. A subscription costs $20 per year. In the United States, address your requests to: Dr. Klaus D. Mielenz, Secretary, CIE, NBS, Rm B 306, Bldg 220, Gaithersburg, MD 20899, or to the National Committee in your country.

Harry K. Hammond III

COLOR MEASUREMENT OF BOOK ILLUSTRATIONS

The 1985 PhD thesis of Carlota Josephine Campa at the University of Maryland is titled: "Using Color Computers to Measure Color: Clothes of the Main Characters in Caldecott Award Books."

A Caldecott Award has been made annually since 1938 to a book thought to be the most distinguished picture book for children. They contain very high quality graphics. The color measurement project had three objectives: (1) to develop a procedure for making instrumental color measurements and then converting the data to traditional color names, (2) to show an application of the procedure by obtaining the color names of male and female main characters illustrated in the books, and (3) to determine if a relationship existed between color and gender for the clothing of the characters illustrated in these books.

A colorimeter with microprocessor was used to measure the colors in CIE space. An area ¼ inch in diameter was used for measurement. Since the books are designed for children, the illustrations are large and the area-for-measurement requirement posed no problem. Uniformity of color printing also posed no problem since extremely precise measurement was not required to establish color names. The CIE data were first converted to Munsell notation and then to traditional color names by use of the book "Color – Universal Language and Dictionary of Names."

Campa discusses the problems encountered in the project. On the question of the relationship between color and gender she concludes that there was no significant difference between the hue of the colors of the clothing worn by male and female characters in the books; however, there was a small positive correlation in the value (lightness). ". . . male characters were portrayed in clothing with darker shades of gray in them then were the women. There was no significant difference between the intensity of color (chroma) worn by the male and female main characters. . ."

The dissertation was directed by John E. Splaine, EdD, Associate Professor, Department of Education Policy, Planning, and Administration, University of Maryland.

Harry K. Hammond III

CALENDAR

AIC
Interim Meeting, June 19-20, 1986, Ryerson Polytechnic Institute, June 19-20, 1986

FEDERATION OF SOCIETIES FOR COATINGS TECHNOLOGY
Annual Meeting, November 5-7, 1986, Atlanta, GA

ISCC-CSC 1986 ANNUAL MEETING
June 16-18, 1986, Ryerson Polytechnic Institute, Toronto

ISCC 1986 WILLIAMSBURG CONFERENCE
February 9-12, 1986, Williamsburg, VA

SOCIETY FOR INFORMATION DISPLAY
1986 International Symposium, May 6-8, 1986, San Diego, CA

SOCIETY OF PHOTOGRAPHIC SCIENTISTS AND ENGINEERS
Annual Conference, May 18-22, 1986, Minneapolis, MN

TAPPI
Annual Meeting, March 2-5, 1986, Atlanta, GA

1. Any person interested in color and desirous of participating in the activities of the Council for the furtherance of its aims and pusposes . . . . shall be eligible for individual membership (By-Laws, Article I, Section 2). Application forms for individual membership may be obtained from the Secretary (address given above).

2. The Council promotes color education by its association with the Cooper-Hewitt Museum. It recommends that intended gifts of historical significance, past or present, related to the artistic or scientific usage of color be brought to the attention of Cooper-Hewitt Museum, 9 East 90th Street, New York 10028.

Deadlines for submitting items to be included in the Newsletter are: February 15, April 15, June 15, August 15, October 15, and December 15; in other words, the fifteenth of the even-numbered months.

Send newsletter items to:
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