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ANNUAL MEETING UPDATE

Workshops

Workshops have come to be one of the interesting features of ISCC meetings in recent years. They have consisted of tutorial reviews of important subjects with adequate time for discussion by participants. The three scheduled for Toronto should be most interesting. We now have abstracts for two of them and the name of the presenter for the third. Note that each workshop will be given twice so that if you have conflicts with other portions of the program at one time you will be able to attend at another. Note also that there has been some rearrangement of the scheduling of the workshops. As this issue of

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the *News* goes to press (May 16) the revised workshop schedule and abstracts are given below.

SCHEDULE

| <i>Date and time</i> | <i>Subject</i> | <i>Leader</i> |
|------------------------------|---|---|
| Mon., June 16 09:00-10:30 | <i>Generation of Electronic Images.</i> | Mr. Jo S. Kirkenaer, Eastman Kodak |
| Mon., June 16 03:00-04:00 | | |
| Mon., June 16 10:30-12:00 | <i>CIELAB and a Uni- versal Color Card.</i> | Mr. Ralph Stanziola, Industrial Color |
| Wed., June 18 09:00-10:30 | | Technology, Bridge- water, New Jersey. |
| Mon., June 16 01:30-03:30 | <i>Update on OSA Uniform Color Scales.</i> | Mr. W. N. (Nick) Hale, Hale Color |
| Wed., June 18 10:30-12:00 | | Consultants, Phoenix, Maryland. |

ABSTRACTS

Generation of Electronic Images: (Abstract not available.)

CIELAB and a Universal Color Card:—Since many industrial and non-industrial groups interested in color and color control are using CIE $L^*a^*b^*$ (CIELAB) color space as a means of color communication, the author feels that a visually uniform color order system based on CIELAB would be useful. Therefore, a system is being developed in conjunction with a color-card manufacturer.

The system concept is based on the determination of starting points in CIELAB space which have equal lightness and equal saturation. For example, the starting points for eight colors for any lightness level could be as tabulated below:

| <i>Aim Point</i> | <i>Color</i> | <i>a*</i> | <i>b*</i> |
|----------------------|--------------|-----------|-----------|
| 1 | Red | +60 | 0 |
| 2 | Orange | +42.5 | +42.5 |
| 3 | Yellow | 0 | +60 |
| 4 | Yellow-Green | -42.5 | +42.5 |
| 5 | Green | -60 | 0 |
| 6 | Blue-Green | -42.5 | -42.5 |
| 7 | Blue | 0 | -60 |
| 8 | Purple | +42.5 | -42.5 |

The spectrophotometric curves of these starting points are then additively mixed with gray to uniformly fill out the space. The resultant aim-point colors can then be produced with a satisfactory group of colorants. Since the aim points were determined by the additive technique, the curve of any part of the space between aim points can be determined and produced if the right colorants exist.

Update on OSA Uniform Color Scales:—The renewed interest, world wide, in color order systems calls for another look at the OSA-UCS System and the colors produced to represent it. This improved color spacing combined with the unique ways in which it is sampled, provides color series that are quite attractive to artists and designers, as well as to the traditional users of color order systems.

PROJECTS

Human Response to Color (No. 33)

This project has had an active history since it was founded in 1973. However, the Chairperson for the past five years, Mary Buckley Parriott, has found it necessary to resign due to the pressures of other commitments.

At the meeting in Toronto, Anna Campbell Bliss, artist-architect, consultant on color and design, and partner in Bliss and Campbell, Architects, Salt Lake City, Utah, will report on her search of the literature for original references on human response to color.

David Johnson and Chris Burton are working on a proposal for a project on the office environment.

Bonnie Bender plans a slide presentation on changes in the color of daylight illumination at different times of day, season, and place.

Three hours have been reserved at Toronto for the presentations and discussion of these three items as well as discussion of new directions that should be explored by people interested in Human Response to Color. If you have an interest in this area, by all means plan to attend the Toronto meeting.

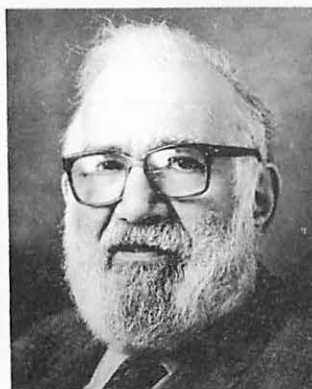
ARTISTS' MATERIALS (No. 37)

At Toronto there will be discussion about the development of ISCC publications on artists' materials, particularly (1) Development of an ASTM publication on artists' paints and related materials, and (2) Need for additional publications in light of "The Artists' Materials Pigment Dictionary Data File" and "The Acrylic Polymer Emulsion Paints Data File," currently being developed by the Ralph Mayer Center for Artists' Techniques of the University of Delaware.

AWARD PRESENTATIONS

At the Business and Awards Luncheon on Wednesday, June 18 at Toronto, two awards will be presented. The Macbeth

Award for 1986 will be presented to *Max Saltzman* and the Nickerson Service Award to *George B. Gardner*.



Max Saltzman



George B. Gardner

The *Macbeth Award* goes to *Max Saltzman*, an Honorary member of the Council, for his important contributions to the field of color science as co-author (with Fred Billmeyer) of *Principles of Color Technology*, Wiley-Interscience (1966, 1981), and for his papers on color, such as "The Analysis of Dyestuffs in Historic Textiles," presented at the 1986 Williamsburg Conference. Saltzman is a distinguished scholar and scientist in the field of color technology and a recognized authority on the history and technology of ancient dyestuffs.

He is currently head of the laboratory for Historical Colorants at the Institute of Geophysics and Planetary Physics, University of California, Los Angeles. For many years he has been associated with the dye and pigment industry. In 1973 he retired as manager of Color Technology of Allied Chemical Corporation's Specialty Chemical Division. During the period 1965 to 1982 he was an Adjunct Professor of Chemistry (Color Science) at Rensselaer Polytechnic Institute.

The *Macbeth Award* was established by the late Norman Macbeth, a past director and long-time treasurer of ISCC, to honor the memory of his father, a pioneering contributor to the science of color and illumination. The first award was made in 1972 to Peter Goldmark, a pioneer in the field of electronic video recording and color television.

The citation and presentation of the award will be made by Ruth Johnston-Feller, herself the 1984 recipient.

The *Nickerson Service Award* goes to *George Gardner*, a 45 year veteran of ISCC and an Honorary member, for his service as a virtual Assistant Secretary from 1952 to 1970, unofficial program chairman for many years, and as a Director 1970-72. President Joyce Davenport will read the citation and present the award.

The Service Award is given for outstanding long-term contributions to the Council and its aims and purposes. Early in 1986 the award was designated the ISCC-Dorothy Nickerson Service Award to perpetuate the memory of Dorothy Nickerson (1900-1985), herself an outstanding contributor to the work of the Council and to the advancement of color science.

Gardner graduated from the University of Rochester and until his retirement was employed by the Photographic Technology Department of Kodak Research Laboratories.

ADMINISTRATIVE ITEMS

Proposals to Strengthen Project Committees

The Problems Committee is made up of a number of Project Committees. It is "responsible for all activities and all color projects that are brought to the attention of the Council." The current chairman is President-Elect Allan Rodrigues. The other members are the four Project Coordinators: Hugh Fairman, Joy Luke, Danny Rich, and Daan Zwick. Each Coordinator is responsible for a group of Project Committees. In the Fall of 1985, the Problems Committee met to devise ways to strengthen the Project Committees. Proposals were formulated in three areas:

(1) Communications to the Board: Formalized planning and reporting procedures to ensure realistic, achievable goals for each committee as well as support from the Board,

(2) Communications to the Membership: Mechanisms for timely reports to the membership via ISCC News and at Annual Meetings,

(3) Leadership: The work of the Project Committees is of the greatest importance to the success of ISCC. Leadership for this work should be one individual's primary duty within the ISCC. By recent custom, the President-Elect has assumed the Chairmanship of the Problems Committee; however, experience has shown that he has too many other duties to do justice to this assignment. The President should appoint a Problems Committee Chairman with experience and proven leadership within the Project Committees who can assist the Project Committee Chairman to accomplish their objectives on schedule and report them to the Board together with recommendations on future needs.

After consultation with the Project Committee Chairmen, these proposals were approved at the February, 1986, Board Meeting. Details will be reported to the membership at Toronto. Implementation, however, has already begun. Attendees at the Annual Meeting will receive information to help them plan which Project Committee Meetings to attend. The Problems Committee will be working much more closely with each Project Committee. The Executive Committee has searched for and found a new Problems Committee Chairman.

Allan Rodrigues

Fairman to Chair Problems Committee

Subject to Board approval, the ISCC Executive Committee has appointed *Hugh S. Fairman* to chair the Problems Committee. He has served as Chairman of Project Committee 27, Indices of Metamerism, and as coordinator of a group of Project Committees; so he is well suited to the task. He is also active in the U.S.

National Committee of the CIE and in ASTM Committee E-12 on Appearance of Materials, organizations involved in important activities related to those of ISCC. He is a Vice-President of John L. Armitage & Co., currently working in their Powder-Coatings Department.

Fairman will officially take over the duties of Problems Committee Chairman after the ISCC Annual Meeting, June 1986, but he has been asked by President-Elect Rodrigues, the current Chairman, to begin to phase into the role at once. The two men met recently to plan implementation of recent Problems Committee proposals and to ensure a smooth transition.

Allan Rodrigues

Thomas G. Webber, resigns as Chairman of the Publicity and By-Laws Committee for personal reasons. The Council is grateful for his handling of these two committee assignments for the past two years.

Justin J. Rennilson has been appointed to Chair By-Laws Committee.

Wolfgang Walter will chair Publicity Committee.

ASTM

Meetings in Toronto

ASTM will hold color and appearance meetings in Toronto at the Brownstone Hotel, 15 Charles Street East, Friday, June 13 and Saturday June 14. The Brownstone is ten blocks north of Ryerson Polytechnical Institute. All ISCC members and guests are invited to attend these meetings. There is no registration fee. The meeting schedule is as follows:

Friday, June 13

08: - 09:45 D01.26.02, Task Group on Color Measurement, Optical Properties Subcommittee, Paint Committee, Calvin McCamy, Chairman.

10:00 - 12:00 E12.02, Subcommittee on Spectrophotometry and Colorimetry, Harry Hammond, Chairman. Results of two letter ballots will be discussed: (1) New Practice for Obtaining Spectrophotometric Data for Object-Color Evaluation, (2) Revision of Method for Evaluation of Visual Color Difference with a Gray Scale.

01:30 - 03:30 E12.03, Subcommittee on Geometric Properties, Norbert Johnson, Chairman.

04:00 - 06:00 CIE TC 2-19, Technical Committee on Retroreflectance.

Saturday, June 14

08:00 - 12:00 E12.07, Subcommittee on Color Order Systems, Nick Hale, Chairman. (US Technical Advisory Group to ISO TC 187 on Color Notations.)

01:30 - 02:30 E12.01, Subcommittee on Terminology, Paul Tannenbaum Chairman.

01:30 - 03:30 E12.06, Subcommittee on Appearance of Displays, Paula Alessi, Chairman, meeting together with CIE TC 1-10, Colorimetry of Self-Luminous Displays.

02:30 - 03:00 E12.04, Subcommittee on Planning, William Venable, Chairman.

03:00 - 03:30 E12.05, Subcommittee on Publications, Richard Hunter, Chairman.

04:00 - 06:00 E12, Main Committee Meeting, Nick Hale, Chairman. Action will be taken on Subcommittee recommendations and any items that have not been referred to a subcommittee.

E-12 writes Test Methods and other standards for a broad spectrum of materials, though it often meets with Committee D-1 on Paint and Related Coatings and material. However, the Paint Committee is meeting in Louisville, KY, June 15-18. Anyone wrestling with a color or gloss evaluation problem is invited to contact Committee E-12.

Nick Hale

MATRIX R CONFERENCE

What is Matrix R, you ask? Some of us have never heard of it. Yet on May 9 a group of 20 vitally interested persons gathered at the Munsell Color Science Laboratory to attend a conference on the subject sponsored by RIT. The conference leader was Professor Jozef Cohen, Department of Psychology, University of Illinois, Urbana-Champaign.

Matrix R is a set of numbers that, when used to multiply the data for the spectral curve of a sample, allows it to be separated into a "fundamental stimulus" or "fundamental metamer" (the terminology has yet to be standardized) and a metameric black. Metameric blacks are spectral curves with tristimulus values equal to zero that were studied extensively by the late Gunter Wyszecki as early as the 1950s.

Ten years ago neither Cohen nor most of those he talked with (including this reporter) understood the significance of Matrix R. That understanding developed slowly as Cohen worked on mathematical proofs in collaboration with Walter Kappauf, now deceased. Cohen also had many fruitful discussions with Wyszecki. Now we are at the point where applications of Matrix R can be identified and their importance assessed.

At the conference, Cohen reviewed Matrix R procedure in detail. There was much discussion from the attendees. Two short papers on applications were presented, one by Michael Brill on "A new index for camera sensitivity functions in terms of the most significant metameric black," the other by Hugh Fairman on "Metameric correlation using parametric decomposition." Fairman's paper was quite fully developed, and he has submitted a manuscript to Color Research and Application. His use of Matrix R offers enough freedom of parameters to

provide an index of color constancy.

Fairman considers the corrections that need to be made to the tristimulus values of a sample that is parametric to a standard. Parametric is the term recommended by ISCC Project 27, Indices of Metamerism, when a sample is not quite a perfect metameric match to the standard. The calculation of a valid index of metamerism, however, requires a perfect color match. The CIE states that the tristimulus values must be corrected to obtain a perfect match, but it does not say how to do so! Fairman proposes that the tristimulus values of sample and standard be adjusted through the use of Matrix R decomposition.

A considerable portion of the discussion at the conference was devoted to terminology, especially to what is meant by the term "fundamental" as used in fundamental stimulus or fundamental metamer. It was agreed that ISCC Project 27 should address the problem of recommending preferred terminology for Matrix R procedures.

Fred W. Billmeyer, Jr.

Editor's Note: See Note by Fairman, "New Terminology for Metamerism Revisited," in Color Research and Application v 11, n 1, Spring 1986, pp 80-81.

MS IN COLOR SCIENCE

A Master of Science (MS) degree in Color Science, Appearance and Technology will be offered beginning Fall, 1986, at the Rochester Institute of Technology through the Munsell Color Science Laboratory. The curriculum is a full or part time program designed for students whose undergraduate majors are in imaging science, photography, printing, textiles, physics, chemistry, psychology, physiology, graphic arts, fine arts, or any discipline pertaining to the quantitative description of color.

The color science, appearance, and technology major provides graduate level study in both color science theory and its practical application. Coursework stresses color measurement, color appearance, and colorant formulation. The program gives students a broad exposure to the field of color and will give them an opportunity to specialize in a particular area appropriate for their background and interest.

The program revolves around the activities of the Munsell Color Science Laboratory. The laboratory's activities include providing standardized measurement and calibration of optical radiation, contractual and academic research and development, and industrial seminars and symposia. A technical advisory board has been established to insure that the activities of the Munsell Laboratory are in concert with the industrial community.

For more information, contact Dr. Roy S. Berns, Program Coordinator, Munsell Color Science Laboratory, Rochester Institute of Technology, P.O. Box 9887, Rochester, NY 14623-0887, (716)475-2230 or -6013.

LETTER FROM PRES. DAVENPORT

Associate Professor Roy Berns
Munsell Color Science Laboratory
Rochester Institute of Technology
One Lomb Drive
Rochester, N.Y. 14623-0687

March 30, 1986

Dear Roy:

The tragic death of Professor Franc Grum, a dear colleague and former President of the Inter-Society Color Council, focused the ISCC's Board of Directors' attention to the giants of our Society who have recently passed away. In Franc's and their memory, we would like to express our loss by making a \$2,500.00 donation to the Munsell Color Science Laboratory.

In recent conversations prior to his death, Dr. Allen Rodrigues and I had spoken with Franc regarding the subject of a financial gift. Franc had mentioned the possibility of establishing a fund to give some assistance to students wishing to continue their studies in Color Science. We hope our gesture will encourage other organizations and individuals to donate to the Munsell Color Science Laboratory.

We will certainly miss Professor Grum. He was a man of impressive stature in the field of color and related studies whose very presence inspired those around him.

Sincerely,

Joyce S. Davenport
President, ISCC

COLOR VISION

Molecular Genetics of Human Color Vision is the basic title of two research articles in the 11 June 1986 issue of Science, the weekly publication of the American Association for the Advancement of Science.^{1,2} There is also a short "perspective."³ Your Editor is indebted to Fred Billmeyer and to Evelyn Stephens for bringing these articles to his attention. Note that reprints of the research articles can be obtained from one of the authors.

¹. Jeremy Nathans, Darcy Thomas and David S. Hogness, Molecular Genetics of Human Color Vision: The Genes Encoding Blue, Green, and Red Pigments, Science v232, n 4747, 11 April 1986, p. 193-202. Authors' abstract: "Human color vision is based on three light-sensitive pigments. The isolation and sequencing of genomic and complementary DNA clones that encode the apoproteins of these three pigments are described. The deduced amino acid sequences show 41 ± 1 percent identify with rhodopsin. The red and green pigments show 96 percent mutual identity but only 43 percent identity with the blue pigment. Green pigment genes vary in number among color-normal individuals and, together with a single red pigment gene, are proposed to reside in a head-to-tail tandem array within the X chromosome." The authors are in the De-

partment of Biochemistry, Stanford University School of Medicine, Stanford, CA 94305. Reprint requests should be addressed to David S. Hogness.

². Jeremy Nathans, Thomas P. Piantanida, Roger L. Eddy, Thomas B. Shows, and David S. Hogness, Molecular Genetics of Inherited Variation in Human Color Vision, *ibid*, p 203-232. Authors' abstract: "The hypothesis that red-green "color blindness" is caused by alterations in the genes encoding red and green visual pigments has been tested and shown to be correct. Genomic DNAs from 25 males with various red-green color vision deficiencies were analyzed by Southern blot hybridization with the cloned red and green pigment genes as probes. The observed genotypes appear to result from unequal recombination or gene conversion (or both). Together with chromosome mapping experiments, these data identify each of the cloned human visual pigment genes." Piantanida is the Sensory Sciences Research Lab, SRI Int'l, Menlo Park, CA. Eddy and Shows are in the Department of Human Genetics, Rosewell Park Memorial Institute, Buffalo, NY. Address reprint requests to Hogness at address in footnote 1.

³. David Botstein, The Molecular Biology of Color Vision, *ibid*, p 142-143. The following summary is taken from the article: The substantially correct theory of the mechanism of color vision, specifically the number and relationship of the primary receivers of color information, was first proposed by Young in 1802. Now new insight has come through the application of the modern methods of molecular genetics that shed light on the physiology of color vision, and also on the basic mechanisms of evolution. One can speculate how extra copies of the green opsin gene already present in most people could evolve into a pigment with a new spectrum that could extend inherited visual ability. If selective pressures are applied to human beings in future centuries for better color discrimination, anomalous trichromats may already have genes that will provide increased fitness for survival. David Botstein is a professor of genetics in the Department of Biology, Massachusetts Institute of Technology, Cambridge, MA 20139.

MENTAL IMAGERY AND PERCEPTION OF COLOR

Scientific American for March 1986 contains two interesting articles, one on mental imagery, the other on the McCollough effect. Your reporter will not try to review these articles in depth. Instead he will try to give you just enough insight so that if you have not already encountered the articles, you will be able to decide whether to make the effort to go to the library to read them.

In the article *Mental Imagery and the Visual System* by Ronald A. Finke, the question is asked: "What is the relation between mental imagery and visual perception?" The answer given is: "Recent work suggests the two share many of the same neural processes in the human visual system." The article contains a color reproduction of a landscape done in water-

color by a woman now 42 years of age who has been blind since she was 21. She paints from her mental images by lining up 24 watercolor jars in memorized order.

The article on the McCollough effect by Jearl Walker is found in the feature "The American Scientist." The McCollough effect, a puzzling phenomenon, is one in which the human visual system imposes color on a black and white grating. The McCollough effect is not to be confused with negative afterimages. To experience the effect, one first studies a grating of black stripes interspersed with a color. Later a black-and-white grating identical in orientation and spacing is viewed. The white stripes of the grating appear to be tinged with the complement of the color of the first grating. The color generated by the grating will grow fainter with time, but it is reported to appear even when the observer delays viewing the second grating for hours, days or weeks! The strength of the color observed after delayed viewing appears to be affected by the dietary and sleeping habits of the observer. Drugs are reported to alter its duration.

For more information, read the articles in the *Scientific American*, v 254, n 3, March 1986; Finke 88-95; Walker 112-118.

Harry K. Hammond III

BOOK REVIEWS

Color Model Environments: Color and Light in Three-dimensional Design, by Harold Linton with illustrations by Richard Rochon, Van Nostrand Reinhold. New York, 1985, 250 pp. Price: \$40.00.

There are nearly as many illustrations in this book as there are pages. Most of the illustrations are drawings or black and white photographs, but there are also 83 color plates. The text comprises ten chapters covering such things as design, materials, light, color, form, structures and dimensions — everything an architectural student needs to know. Harold Linton is a professor of design education at the School of Architecture at Lawrence Institute of Technology, Southfield, Michigan. Richard Rochon is a lecturer at the Institute and a principal of Rochon Associates, an architectural illustration firm. It is obvious that a great deal of thought and effort has gone into producing this book. It appears to be a very useful textbook, but this reviewer is not an architect. He will try to obtain a review by an architect for a future issue of the News.

As with most books, a reviewer can find flaws in specific areas. In this case in spectrum physics. The text states on page 56 that "the colors of the spectrum progress from red, with the longest wavelength, through orange, yellow, green, blue and finally to purple, with the shortest wavelength." Actually purple is not a spectrum color. Perhaps the author meant violet or indigo. My copy of Webster's dictionary defines purple as "a dark color that is a blend of red and blue." Small errors of this sort should not be permitted to detract from an otherwise use-

ful text for students of architecture and design.

Harry K. Hammond III

Your Colors At Home, Decorating with Your Seasonal Colors, by Lauren Smith and Rose Bennett Gilbert, Acropolis Books, Ltd, Washington, DC, 1985, 199 pp. Price: \$18.95.

The idea for the book, according to Lauren Smith in the Preface, began on a colorless, rainy day some two years ago. She goes on to state that "The second approach to choosing and using the colors that best become you represents a new liberation for all of us . . . But a houseful of wrong color choices can be depressing and a disaster economically if you just can't go on living with them." The Introduction is titled "The Seasonal Color Theory Works for Rooms, Too." The inference being, not just for wearing apparel. Chapter I goes on to expound on "The Seasonal Color Theory in Brief." The author states that "Latrice Eiseman in her *Alive with Color* (Acropolis Books Ltd, 1983) arrives at three categories in her Color Clock system, each corresponding to a different time of day, "Sunrise (A.M.), Sunlight (Midday), and Sunset (P.M.)." The solution is to know the undertones of your skin, as well as the colors of your eyes and hair. From this you can decide with the help of the book whether you are a Spring, Summer, Autumn or Winter person and decorate your home accordingly. In contrast to some books on color with few color illustrations, there are 22 pages of them in this book. The book also includes a 20-page glossary of house decorating terms to help the reader understand the language. There is also a four-page index. This book appears to be a very useful one for students of interior decoration as well as for do-it-yourselfers.

Harry K. Hammond III

Report on 1986 Williamsburg Conference The Colors of History: Identification, Re-creation, Preservation, February 10-12, 1986

Joyce Davenport, President of ISCC, opened the conference with some brief remarks on preservation and restoration. The artist creates and the scientist helps preserve. The history of color helps one to share ideas, knowledge and technology.

Robert C. Birney, Senior Vice President for Education, The Colonial Williamsburg Foundation, co-sponsor of the conference, welcomed the participants and attendees. He presented a brief overview of the Foundation. The Foundation Research Source for 17th and 18th century history has twelve major divisions with a budget in excess of \$2,000,000 for the Museum Collection and Research areas. The Department of Libraries is available for use on request as well as during regular hours. The research area employs ½ of its personnel on a permanent basis; the other ½ on funded work. Until 1960, funding was primarily by the Rockefeller family, but since 1970, independent resources have been used.

The conference objectives were brought into focus by

Robert L. Feller, Mellon Institute, Pittsburgh. He talked about the reproduction of houses (both interior and exterior) and the difficulties encountered in each. Does one try to duplicate the actual materials that were used or does one use similar present day substitutes? Spectrophotometric and colormetric methods of color matching were described.

Appearance Factors in the Conservation of Historical Collections was presented by Nathan Stolow, Foundation Conservator, The Colonial Williamsburg Foundation. He stated that the appearance factor is dependent on many things, one of these is the attitude of the person doing the display. An international conference was held about 1946 to discuss how far to go in cleaning works of art. Scientists are now having more input in this area. Questions that may arise are: How has the item been treated in the past? Have there been varnish coatings? Is the surface matte or glossy? Are the stains old or new? Are there fly specks?

Fills, cracks, oxidation, warps and the like all affect the surface. A surface-crack system may result from the environment, but a crack-free surface may cause the genuineness of an item to be suspect. Diffusion of chemical materials, application of varnish may be deleterious to the surface.

Should the item be made to look old? Environmental effects such as humidity and temperature, light, freeze-thaw cycles may affect appearance. These are some of the difficulties conservationists and exhibitors encounter.

The Practical Aspects of Reproduction Colors was presented by Robert F. Bitter, Scalamadre, New York. He presented a brief history of Scalamadre. It was started by Grandfather Bitter in 1929, and it continued to grow to the present time. Bitter described some of the problems encountered in today's reproduction market. Original materials and tools are not available; therefore reproductions and restorations are limited to the technology and dyestuffs of today. Colorants are basically synthetic. Matches are done visually with an eye for flare and/or metamerism.

Since color is what sells, achieving a correct color that is lightfast and resistant to dry cleaning solvents is crucial, thus time consuming and costly. For printed wall papers, it is necessary to know about the ground material, the paper coating and the colorants used. For good reproductions the artist, curator, and manufacturer must work together.

Reproducing Museum Objects, Special Opportunities, Perplexing Problem was presented by Kristin Fischer, The Colonial Williamsburg Foundation. Many of the problems faced in the restoration of Williamsburg are also areas of difficulty for other museums and historic areas. Descriptions of some of these possible solutions were presented.

In 1930, Raleigh's Tavern was the first building to be reconstructed at Williamsburg. It was planned to be an operating tavern. The need arose for dinnerware, silverware and glassware. Excavation yielded "creamware" which was reproduced

for use and also sold. As other buildings were restored, the need for furniture became apparent. As pieces were developed for display, they were also developed for sale. Shops were then opened and operated by the manufacturer. In 1936, Colonial Williamsburg started to market reproductions nationally. The Foundation received royalty on each item sold. These reproductions are exact copies of the antiques. Materials and modern fabrication techniques are adapted when necessary. Educational value often prevails over marketable value.

In 1937, a commission was formed to overview objects for sale. Knowledge of colors to be used comes from undisturbed areas or from the curators knowledge. There was little wall-paper used in Colonial Williamsburg, but present-day customers want paper coordinated with fabric. It may take 14-16 months to develop them. The crafts people use period tools in period settings, and this authenticity is reflected in the cost.

Basic Principles of Color Measurement was presented by Calvin S. McCamy, Kollmorgen, Inc., Newburgh, New York. Before 1900, there was no general way of describing colors except by comparison to objects in nature. In 1905, *A Color Notation* by Munsell was introduced. In 1931, the International Commission on Illumination (CIE) established three Standard Illuminants: A, B, and C, representation of incandescent lamp light, sunlight and daylight.

Metamerism and metamerism matches were discussed in relation to the use of different lighting conditions for display purposes. Some of the characteristics of spectrophotometers and colormeters were presented.

The Role of Textile Conservation in the Reproduction Program at Winterthur was presented by Margaret Fikoris, The Henry Francis du Pont Winterthur Museum, Winterthur, Delaware. The museum, part of the home of Mr. du Pont was opened in 1951 and is home to textiles which are changed seasonally. Conservation staff members have worked closely with marketing people in the selection, examination, and preparation for reproduction of the historic textiles from the Museum. Marketing of adaptations, reproductions, and interpretations is done through licensees who conform to strict specifications for handling, transportation, and the like. Guidelines for the care and handling of textiles being reproduced were described.

Reproduction Wallpapers - "Colours Proper to be Used for Paper Hangings" by Andrea Gilmore, North Atlantic Historic Preservations Center, Boston, Mass., was read by Morgan Phillips. Prior to 1850 wallpapers were blocks printed with pigments mixed with a water base glue or size. Later, the majority of papers were machine printed using rotating cylinders and thin distemper colors. Reproductions are screen printed with pigments in a petroleum base; obviously they are not exact reproductions. Documentation of original paper stock and colorants is necessary for exact reproduction. Embossed papers are difficult to identify. Metallic papers appear to have turned

black after periods of years. Many pigments used years ago are now classified as toxic and are no longer manufactured or used.

Problems in the Painting of Historic Vessels was presented by Dana Henson, Mystic Seaport Museum, Mystic, Connecticut. Historically wooden ships and boats were built with high standards and then thrown into the water. As working ships, these vessels were subject to the worst climatic conditions. When they were left in port, no provisions were made for maintenance. To restore these vessels, research must be done to determine the time period involved, usually by the curator. Colored pictures and schemes of that era help to identify the original colors. For newer boats, personal interviews, where possible, can be used to determine the colors. There is really no way to make certain a ship will look like it originally did. A great deal of research must be done to obtain the history of a ship.

The Study and Replication of Old House Paints was presented by Morgan Phillips, Society for the Preservation of New England Antiquities, Boston, Massachusetts. The examination of old paints in buildings requires special approaches as to sampling and replication. It is difficult to obtain samples that have been protected from dirt and light over the years. Each period of time being studied presents its own problem. Before 1715, white washes were primarily used. In the 18th and 19th centuries, oils that caused a yellowing of the vehicle predominated. One has to determine how much discoloration (yellowing, light bleaching) has occurred. Then one has to decide whether to try to reproduce the original paint or to use modern substitutes. Questions of color, appearance, durability, toxicity and availability must be addressed. In addition, one must try to avoid metameric color matches.

Identification of Historical Pigments was presented by Elizabeth Fitzhugh, Freer Gallery of Art, Washington, D.C. Identification methods were described for very small samples the size of the period at the end of this sentence. They involve the use of such techniques as chemical microscopy, scanning electron microscope, and x-ray diffraction for inorganic pigments. Red lead has been used in China since the year 15 BC. Difficulties in the identification, manufacture and use of this pigment were discussed.

The Literature Regarding Historical Colorants was presented by Robert L. Feller, Research Center on the Materials of the Artist and Conservator, Mellon Institute, Pittsburgh, Pennsylvania. A survey of the literature was presented relating pigment name with associated color, chemical identification and historical use. Some references mentioned were: *Nomenclature of Colors for Naturalists*, Ridgeway; *A System of Water Color Painting*, Winsor & Newton; *Color, Universal Language and Dictionary of Names*, Kelly; *Painting Materials*, Getten & Stout; *Technical Abstracts of Art and Archeology*; and *The Journal of Studies in Conservation*.

The Analysis of Dyestuffs in Historic Textiles was pre-

sented by Max Saltzman, Institute of Geophysics & Planetary Physics, University of California, Los Angeles. The analysis of the dyes used to color historic textiles provides valuable information to art historians, (use of particular colorants in a particular time; forgeries and fakes), curators (knowledge of what the dye is made of) and conservators (help to take better care of object). The most important requirement for successful analysis is a collection of properly authenticated dyeings made from known materials. Solution spectrography, dissolving a small amount of the material and measuring the light passing through the solution, was one of the analytical methods discussed. Other methods were thin-layer chromatography, infrared spectroscopy, and high performance liquid chromatography.

Aspect of Metamerism and Illuminant Sensitivity of Artists' Paints was presented by Roy Berns, Munsell Color Science Laboratory, Rochester Institute of Technology, Rochester, New York. Both conservator and exhibitor are aware of the need to select proper lighting for display purposes. Pigments dispersed in oil or in acrylic media have different appearances under different light sources in museums or in daylight. The amount of color change reported was based on computer colorant formulation and chromatic adaptation theory. Colorants did not change their appearance in the same direction when the illuminant was changed. Art historians might draw erroneous conclusions about historical artwork produced under daylight but viewed under museum lamp light.

A large decrease in chroma is noted when one changes from D65 (daylight) to Illuminant A (incandescent lamplight). The question arises as to whether we are conscious of this in complex situations or does the tendency for color consistency override the change?

Colorants of the same general hue, or of different hues do not change their appearance in the same direction when the illumination is switched from daylight to an incandescent source. This may cause confusion in color documentation of historical art work.

Digital Image Processing in Conservation, John F. Asmus, University of California, San Diego, and H. Joseph Meyers, IBM, Palo Alto. Dr. Asmus described some of the computer digital image processing techniques that have been applied to the enhancement of artwork features. Spectral and spatial filtering routines that were utilized to "remove" craquelure and darkened varnish effects from the *Mona Lisa* were discussed.

A Case History: Determination of Colorants in Traditional Japanese Prints was presented by Robert L. Feller, Mellon Institute, Pittsburgh, Pennsylvania. Roger and Keiko Keyes, in their examination of a collection of Japanese prints, noticed that some were in better condition than others. The question of what colorants were used and how they reacted to light became a research project supported in part by a grant from the National Endowment for the Arts. A number of authentic

samples of traditional Japanese colorants were obtained: ai (indigo), beni (safflower red), and aigami (dayflower blue). Reflectance curves were obtained and the presence of these colorants was identified in the prints. Fading tests were conducted under fluorescent lamps and compared with the International Organization for Standardization (IOS) blue-wool fading standards. These colorants are all very sensitive to light. Two small prints were wrapped in aluminum foil and small areas were subjected to light. These colorant areas also proved to be fugitive. Use of an ultraviolet filter did not help much to protect the colorant except for indigo.

Modern Assessment of the Lighting of Precious Objects was presented by William A. Thornton, Prime-Color, Inc., Wayne, New Jersey. The abstract of this paper was included with the preliminary report on the conference in ISCC News No. 300, March-April 1986. Therefore, only the "short abstract" prepared by the author, is included here.

"Seeing," and degradation of what is seen, go less hand-in-hand than has been supposed. Illumination need contain no wavelengths shorter than about 460 nm. Use of that wavelength, with the two other "prime-color" wavelengths, to compose ideal museum lighting, allows good visibility and beautiful coloration of the exhibit, with an absolute minimum of harmful content.

CONFERENCE WRAP-UP SESSION: WHAT HAVE WE LEARNED, WHERE, DO WE GO FROM HERE? was led by Rugh Johnston-Feller, Mellon Institute, Pittsburgh, Pennsylvania. A brief history of the ISCC from its inception in 1931 through 1986 was presented. There are 34 member bodies; artists, designers, architects, scientists etc; people of all backgrounds with a common interest, "color." There are 41 special study groups, problem committees that meet at the Annual Meeting. This meeting may be held in conjunction with another group. In 1986 the ISCC and the Canadian Society for Color will hold their first joint meeting.

The first Williamsburg conference was held in 1966; these conferences deal with special topics in color. The 1987 conference will be on Geometric Aspects of Appearance.

The discussion then shifted to the audience. Comments were made about the excellence of the conference; how the "smallness" of the conference makes for more interchange between the attendees and speakers. Some of the problems that arose during the conference were restated: photographic metamerism; differences and similarities between photography, printing and TV display. To try to make colors match in textiles, paints and plastics presents a real challenge. The identification of colorants, dyestuffs and pigments is often too expensive to be practical. The interdisciplinary nature of the ISCC was stressed.

The general feeling was that the 1986 Williamsburg Conference on *THE COLORS OF HISTORY* was a success.

Evelyn Stephens

NEWS OF MEMBERS

Levison Resigns

Every organization takes pride in listing the numerous new members that join its ranks, and ISCC is no exception. See ISCC News No. 300, March-April 1986. Not nearly as interesting or useful is a list of those who drop out or resign. On the other hand, when a senior member like HENRY LEVISON feels obliged to resign and writes the treasurer to explain why, your Editor feels the urge to bring the matter to the attention of the membership.

Under the date of April 28, Levison wrote as follows: "I am hereby resigning from the Inter-Society Color Council. I have been a member for many years and assisted Joy Luke in forming Subcommittee 37, Artists' Materials. Physical disabilities prevented me from attending meetings for the last several years (legal blindness and multiple myeloma as well as a wife confined to a wheelchair), and reading the mailed matter is difficult."

The Levisons live at 300 Diplomat Parkway, Apt. 702, Hallendale, Florida 33009. If you feel the urge, drop them a note or pick up the telephone 305-456-2159.

Alan Werner Dies

Alan J. Werner, a long-time ISCC member, died May 7, 1986, at the age of 77. Werner was a member of the staff of Corning Glass Works for 49 years, specializing in the spectral characteristics of colored glass filters and keeping track of the small differences in spectral characteristics of each melt of the 100 or so basic types of filter glass. He also made substantial contributions to the design of two-component filters for tristimulus colorimetry.

Werner had Alzheimer's disease, though not the late stages. Two strokes had affected the optic center of the brain so that he had difficulty reading. Death came rather suddenly due to a ruptured aneurism of the aorta. He is survived by his wife, Helen, and many foreign students who shared their home in Corning, NY, while getting an education in the United States. Our condolences to his family and friends.

EDITOR'S CORNER

Every editor has the chore of editing the news so that it fits the available space. He must also decide whether items are sufficiently newsworthy to be published. And when they are submitted by ISCC officers he has to decide whether to publish them or run the risk of being fired! The really HOT news item in this issue is MATRIX R. This item will not interest everyone, but color physicists will want to follow closely developments in this exciting area.

Your Editor tries to uncover interesting news items on what is happening in the various arenas of the world of color.

An important item is meeting plans for Toronto, including project committee activity, but this material is hard to come by. The close proximity of the June meeting has caused your Editor to request permission to limit the issue to eight pages so that it can be folded into a No. 10 envelope and mailed first class for 22¢, thereby putting it into the hands of the membership ten days after it goes to the printer, well before the start of the Annual Meeting. I hope you will approve. Please send reports and news items for the next issue. My rash promise in *News* No. 300 of "more on editors in next issue" will have to wait until space is available in a subsequent issue.

Harry K. Hammond III
Interim Editor

CALENDAR

1986

ASTM E-12 ON APPEARANCE

The Brownstone Hotel, 15 Charles Street East, Toronto, Ontario, Canada, June 13-14

ISCC ANNUAL MEETING JOINTLY WITH CANADIAN SOCIETY FOR COLOR

Ryerson Polytechnical Institute, Toronto, Ontario, Canada June 15-18

INTERNATIONAL COLOR ASSOCIATION (AIC)

"Color in Computer Generated Displays", Ryerson Polytechnical Institute, Toronto, Ontario, Canada, June 19-20

SUMMER COURSE IN COLORIMETRY

Cape Cod Community College, West Barnstable, MA 02668 June 23 - August 8

IES ANNUAL CONFERENCE

Marriott Copley Place Hotel, Boston, MA, August 17-21

ISO/TC 187, COLOUR NOTATIONS

"Stadsmissionen" House, Stockholm, Sweden, September 2-4

INTERNATIONAL CONGRESS OF PHOTOGRAPHIC SCIENCE (ICPS)

"Progress in Basic Principles of Imaging Systems." University of Cologne, Germany, September 10-17

INTERNATIONAL CONFERENCE

"Advances in Standards and Methodology in Spectrophotometry," Oxford University, Oxford, England September 14-17

SYMPOSIUM ON COLOUR IMAGING SYSTEMS

The Royal Photographic Society, Clare College, Cambridge, England, September 22-25

INTERNATIONAL DISPLAY RESEARCH CONFERENCE

Tokyo, Japan, Society for Information Display, September 30 - October 2

U.S. NATIONAL COMMITTEE, CIE

Town and Country Hotel, San Diego, CA, October 26-28

FEDERATION OF SOCIETIES FOR COATINGS TECHNOLOGY

64th Annual Meeting and 51st Paint Industries Show, World Congress Center, Atlanta, GA, November 5-7

1987

ISCC WILLIAMSBURG CONFERENCE

"Geometric Aspects of Appearance," The Lodge, Colonial Williamsburg, VA, February 8-11

ISCC ANNUAL MEETING

"Industrial Problems in Color Science", The Barclay Hotel, 18th & Rittenhouse Square, Philadelphia, PA 19103, April 5-7

CIE, 21st SESSION

San Giorgio Maggiore, Venice, Italy, June 17-25

FEDERATION OF SOCIETIES FOR COATINGS TECHNOLOGY

65th Annual Meeting and 52nd Paint Industries' Show, Convention Center, Dallas TX, October 5-7

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