

# INTER-SOCIETY COLOR COUNCIL

## NEWS LETTER

NUMBER 175

March-April 1965

**34TH ANNUAL ISCC MEETING**

The 34th Annual Meeting of the Inter-Society Color Council will be held at the Statler Hilton Hotel, New York, New York, on Monday and Tuesday, April 26 and 27, 1965.

Monday, April 26, will be devoted to subcommittee meetings of the Problems Committee. A brief agenda and objectives of the subcommittees currently active on ISCC problems are included in this Newsletter. Members and friends of the Council are encouraged to attend this Monday session. The following active subcommittees have scheduled meetings:

<u>Room</u>	<u>Subcommittee No.</u>	<u>Subject</u>	<u>Time</u>
Town Room	Problem 7	Survey of American Color Specifications Francis Scofield, Chairman	9:30 - 12:00
Village Room	Problem 10	Color Aptitude Test Forrest L. Dimmick and Carl E. Foss, Co-Chairmen	9:30 - 12:00
Albany Room	Problem 18	Colorimetry of Fluorescent Materials Eugene Allen, Chairman	9:30 - 12:00
Empire Suite	Problem 21	Standard Practice for Visual Examination of Small Color Differences Sam Huey, Chairman	9:30 - 12:00
Town Room	Problem 16	Standard Methods for Mounting Textile Samples for Colorimetric Measurements W. L. Matthews, Jr., Chairman	2:30 - 4:30
Village Room	Problem 17	Color in the Building Industry Waldron Faulkner, Chairman	2:30 - 4:30
Empire Suite	Problem 22	Procedures and Material Standards for Accurate Color Measurement Fred W. Billmeyer, Jr., Chairman	2:30 - 4:30

<u>Room</u>	<u>Subcommittee No.</u>	<u>Subject</u>	<u>Time</u>
Albany Room	New Problems	Open meeting for discussion of ideas on new problems and problems procedures Roland E. Derby, Jr., Chairman	2:30 - 4:30

Registration will start at 8:30 a.m. This will be followed at 9:00 a.m. by reports of the chairmen of the delegations from the thirty member-bodies and of the various subcommittees that are now active, and by the Annual Business Session.

A very stimulating symposium has been arranged for Tuesday afternoon on the topic "Colorants for Industry and Design." Mr. George W. Ingle of the Monsanto Chemical Company will be chairman of the symposium which will take the form of a dialogue between colorant users and colorant suppliers. First will be statements by the users to indicate what is desired in improved colorants to permit the development of better products and to eliminate the frustrations resulting from present colorant limitations. Next, the suppliers will discuss the situation from the standpoint of recent advancements, patents, and research in an effort to provide a realistic assessment of the outlook for the future.

The speakers are:

Mr. Robert S. Foster, Associate Laboratory Director, Columbus Coated Fabrics Company, Division of Borden Chemical Co., Columbus, Ohio, "Colorant Needs in Industry."

Mr. Bruce Unwin, Executive Art Director and Associate Creative Director, Kenyon and Eckart Advertising Agency, Detroit, Michigan, "Color and How I See It."

Mr. William Huckle, Research Supervisor, Imperial Color and Chemical Department, Hercules Powder Co., Glens Falls, New York, "Inorganic Pigments: Present and Future."

Dr. Julian J. Leavitt, Manager of Exploratory Research, Organic Chemicals Division, American Cyanamid Co., Bound Brook, New Jersey, "Advances in Organic Colorants."

The reception and banquet will be held on Tuesday evening in the Gold Ballroom. Following the banquet will be the final two highlights of the meeting: the presentation of the Godlove Award to Dr. Isay Balinkin, Professor of Experimental Physics at the University of Cincinnati, and an address by Dr. Robert H. Brill, Director of Scientific Research at the Corning Museum of Glass, Corning, New York. Dr. Brill's subject will be "Color, Archeology and Ancient Glass." The reception is scheduled for 6:00 p.m., with dinner at 7:00 p.m. Registration fee, including banquet, is \$14. Banquet tickets are \$9. Guests are invited.

PROBLEMS COMMITTEE  
MEETING PROGRAM

The Problem Subcommittee meetings on the day before the Annual Meeting have become an important and stimulating part of the meeting.

The purpose of the various subcommittee meetings is to solve their assigned problem. This solution usually takes the form of a written report. Publication of these reports over the years has provided very valuable additions to the literature and techniques of color science. The Board of Directors of ISCC has noted the completion of their respective problems by the Subcommittees on Problem 2 (Color Names) and Problem 23 (Expression of Historical Color Usage). With the disbanding of these two subcommittees, the chairman of the Problems Committee would like to take this opportunity to thank the chairmen and members for their efforts. The data included in these reports will undoubtedly provide new tools for the solution of certain practical color problems.

Members with new problems or new aspects of old problems are invited to attend the meeting on "New Problems." As a result of discussion at this meeting last year, two new problems are being considered by the Board of Directors. One problem is concerned with cataloging color measuring instruments, the other with the determination of strength of colorants.

The agenda for the various subcommittees are listed below. Anyone interested is urged to attend and participate in the various discussions following the business meeting. In general, each chairman will devote a few minutes to reviewing the history of the problem and the progress to date.

PROBLEM NO. 7 Color Specifications  
Francis Scofield, Chairman

This subcommittee is engaged in a revision of the report on color specifications published in 1956. The agenda of this meeting will be devoted to a discussion of progress on a draft of the revised report.

PROBLEM NO. 10 Color Aptitude Test  
Forrest L. Dimmick, Chairman

The meeting of this subcommittee will be concerned with the status of the second edition of the Color Aptitude Test. The suggestion of the Board of Directors, that useful information might be gathered from the experience of users of the test over the last twelve years, will be discussed. Possible modifications to provide testing for other aspects of color vision will also be considered.

PROBLEM NO. 14 The Colorimetry of Transparent Materials  
Wesley B. Reed, Chairman

There will be no formal meeting of this subcommittee pending assignment of further work. Any comment on the published report or suggestions for further investigations should be directed to the chairman.

PROBLEM NO. 15 Definition of Color Terms  
Dorothy Nickerson, Chairman

This subcommittee has been reactivated to revise a report originally entitled, "The Comparative List of Color Terms." It will meet in closed session to discuss the status of the proposed revision.

PROBLEM NO. 16 Standard Methods for Mounting Textile  
Samples for Colorimetric Measurements  
William L. Matthews, Chairman

A rough draft of the report of this subcommittee will be discussed. Future directions of work on the assigned problem will also be considered, with particular emphasis on new techniques.

PROBLEM NO. 17 Color in the Building Industry  
Waldron Faulkner, Chairman

The application of color specification methods, such as the Munsell or other color systems, to building materials will be considered.

✓ PROBLEM NO. 18 Colorimetry of Fluorescent Materials  
Eugene Allen, Chairman

At this meeting of the subcommittee, a preliminary theoretical report encompassing the original scope of the problem will be considered. In addition, a possible restatement of the scope, in the light of current problems in this area, will be explored.

PROBLEM NO. 20 Basic Elements of Color Education  
Randall M. Hanes, Chairman

Although this subcommittee is not planning a meeting, a note should be taken of a forthcoming questionnaire on the utilization of the book Color: A Guide to Basic Facts and Concepts. The questionnaire was sent out with an issue of the Newsletter. Comments from all interested persons are encouraged.

✓ PROBLEM NO. 21 Standard Practices for Visual Examination  
of Small Color Differences  
Sam Huey, Chairman

The agenda for the meeting consists of the reports of the sub-chairman and an evaluation of the present ASTM method D1729-60T as follows:

1. Illuminating and viewing samples and standards. Carl F. Lyon, Sub-Chairman.
2. Instructions for observers for making panel judgment. Dan Genin, Sub-Chairman.
3. Rating observers for skill in color matching and color vision. Michael Jordan, Sub-Chairman.
4. Discussion on present ASTM methods on Visual Evaluation of Color Difference of Opaque Materials. D1729-60T.
5. Reorganize the committee to active participants.

✓ PROBLEM NO. 22 Procedures and Material Standards for  
Accurate Color Measurement  
Fred W. Billmeyer, Jr., Chairman

The agenda for this subcommittee is as follows:

1. Presentation and discussion of rigorous calibration and operating instructions for G. E. Spectrophotometers.
2. Formulation of plans for Round-Robin II, for G. E. Spectrophotometers using instructions of Item 1.
3. Formulation of plans for Round-Robin III, extending Round-Robin I (the results of which constituted the subcommittee's 1964 report, to appear in the May 1965 Journal of the Optical Society of America) to other G. E. Spectrophotometers and to spectrophotometers of other makes.
4. Discussion of samples which have been offered for a color difference round-robin, and formulation of non-restrictive instructions for such a round-robin.
5. Formulation of plans for Round-Robin IV on color-difference measurement.

NEW PROBLEMS

Roland E. Derby, Jr., Chairman

The status of the new problems under consideration by the Board of Directors will be discussed. In addition, any members are encouraged to present current problems in color that may require formal study by the ISCC.

Problems Committee Chairman  
Roland E. Derby, Jr.

HISTORY OF THE  
COLOR MARKETING GROUP

In May 1962, following private discussions and as a separate outgrowth of meetings of the ISCC subcommittee for Problem 23 on "Historical Color Usage," persons from three companies issued invitations, which were accepted from some thirty-three individuals, to meet and review inter-industry color merchandising problems of mutual interest. As a direct result of this meeting at the New York Hotel Roosevelt in June, a steering committee was formed which met and planned for a November 1962 New York meeting on the premise originally proposed that "much could be accomplished in the field of color marketing among the various industries through mutual cooperation without invading the competitive aspects of individual companies."

To demonstrate the possibilities envisioned, Kaye A. Leighton of the General Electric Company was asked to speak on "Lighting and Color" and Dr. Forrest L. Dimmick on "Color Psychology - Fact and Fiction." Fifty-five persons met in four workshops and general sessions, finally voting into existence the "Color Marketing Group" and electing the steering committee as the first Board of Governors. This Board was: Miss Beatrice West of Beatrice West Studios;

Miss Ruth L. Strauss of Ruth L. Strauss, Inc.; Mrs. Ouida Wessman of the Scott Paper Company; Richard Haskel of Seneca Textiles; Dwight Wardell of Sandoz, Inc.; Paul Olive of American Telephone and Telegraph Company; Joseph Roby of the Wallpaper Council; Everett R. Call of the National Paint, Varnish and Lacquer Association; Robert Eppinger then of Baumritter Corporation; and Louis A. Graham of American Viscose Corporation (now a division of FMC Corporation). Messrs. Graham, Eppinger, and Call were subsequently elected by the Board to the respective offices of Chairman, Vice-Chairman-Treasurer, and Secretary.

In the following months the Color Marketing Group (CMG) selected its colored "hang-tag" emblem, attracted its first one hundred charter members and held a May 1963 meeting. At this meeting a "brain-storming" workshop evolved the idea of collecting and presenting colored swatches of available products from all companies, organizing these samples primarily on a color basis rather than by usage, industry, or type. Under Miss Beatrice West as Board Advisor and two successive Chairmen, Don Sturtz of Baumritter and Jess Levine then of Pantone Press, this exhibit became the "Color Fair" and has been the outstanding attraction of three semi-annual CMG meetings, producing much favorable comment. The story of the Color Fair was reported with pictures in the February 1964 issue of Color Engineering, and CMG also received full page coverage in Upholstery magazine, the American Paint Journal, Home Furnishing Daily, American Dyestuff Reporter, as well as many others.

The happy result of all these efforts has been an increase in individual membership to over 250, incorporation as a non-profit organization, acceptance of company memberships, and currently and very important the acceptance of CMG's application to become a member body of the Inter-Society Color Council. Grateful of this honor and with many of its members also members of ISCC, CMG fully endorses the basic concepts of ISCC, and yet hopes to bring to this mutual relationship a new outlook on the role of color in the marketplace.

CMG welcomes to its membership any individual and companies from all "industries which offer the consumer a choice in color and who are actively engaged in styling, manufacturing, promotion, communication, and other phases of the marketing aspect of color."

As it has in the past, CMG invites all those with genuine interests along these lines to attend its semi-annual fall and spring meetings. The next meeting will be held in New York at the Waldorf on May 3 and 4 under the theme, "Color at Work," with Dr. Deane B. Judd as the banquet speaker and twelve workshops in three sessions each to discuss and plan future activities. For fall 1965 CMG will meet at the New York Plaza on November 4 and 5 when the theme will be "The Color Marketing Revolution," and in spring 1966 at Williamsburg, Virginia, on "Color - Then and Now." The Color Fair exhibit is currently planned for only the fall sessions because of the effort in displaying thousands of color swatches. Examples and discussions of past fairs are a feature of each meeting, while between sessions the fair constitutes a CMG "road show."

The CMG Board now consists of Mrs. Elizabeth Burris-Meyer, House and Garden; Miss Kaye A. Leighton, General Electric Co.; Miss Beatrice West, Color Consultant; Miss Ruth L. Strauss, Color Stylist; Mrs. Ouida Wessman, Scott Paper Co.;

Walter Olson, Valspar Corp.; Dwight Wardell, Sandoz, Inc.; Everett Call, NPVLA; Joseph Roby, Wallpaper Council; Joseph Radigan, Kentile; Carl E. Foss, Consultant; Louis A. Graham, American Viscose Div. of FMC Corp.; Jesse Levine, Mervin and Jesse Levine Agency; Robert Eppinger, Futorian Mfg. Co.; and Landon Stocks, Formica. CMG's voting delegates to ISCC will be Miss Martha Jungerman, W. T. Grant & Co.; Kenneth L. Kelly, National Bureau of Standards; and Louis A. Graham.

#### THE ISCC-NBS CENTROID COLOR CHARTS

In 1939 the Inter-Society Color Council and the National Bureau of Standards (ISCC-NBS) published jointly in Research Paper 1239, "Method of Designating Colors," the results of an extensive research project directed toward the development and application of a simple, accurately defined and easily understood system of color names. This project was initiated by the American Pharmaceutical Association and the United States Pharmacopoeial Revision Committee. The early work on this project resulted in the formation of the Inter-Society Color Council in 1931, and by 1933 a plan for the system had been outlined.

Work was commenced on the project at the National Bureau of Standards on May 1, 1936 when a research associate representing the pharmaceutical groups began the development and application of this method of color designation. The plan for the system outlined by the ISCC Committee on Measurement and Specification, was to divide the psychological color solid into blocks whose boundaries were carefully specified in terms of the Munsell scales of hue, value, and chroma. It was decided to use only simple hue names such as red, orange, green, or purple and simple modifiers such as moderate, light, dark, strong, or vivid. Each block was assigned a hue name and one or more modifiers. An attempt was made to adjust the size of each block to include the variations in hue, value, and chroma which would be acceptably described by that color name.

In 1949, the Inter-Society Color Council recognized that this system of color designations developed for drugs and chemicals was actually applicable to other materials and objects. Research Paper 1239 was revised, enlarged, and republished in 1955 as NBS Circular 553 under the title of the "ISCC-NBS Method of Designating Colors" and a "Dictionary of Color Names." The color-name block boundaries were revised to take account of suggestions especially from the textile field, and methods were included for determining the designations of any powdered, solid, liquid, or microscopic sample. The "Color Names Dictionary" part contains the interpretations of the color names assigned to thousands of standard color samples in terms of the ISCC-NBS color designations.

The "Color Names Dictionary" needed one more part to make it complete. This missing part consisted of colored samples illustrating the centers or most typical colors of the color-name blocks. These most typical colors were found by computing the centers of gravity or centroids of the color-name blocks. For many years the cost of producing these colors was considered prohibitive, but in 1960 the Inter-Society Color Council provided funds to have the prototype centroid colors formulated and the National Bureau of Standards has had sets of charts showing these colors produced. They are now available for purchase by the public from the Standard Reference Materials Office at the NBS as Standard Sample No. 2106 for \$3.00 per set.

*Pigments*  
 In contrast to the constant-hue charts of the Munsell color system, these are constant-hue name centroid charts and contain 251 colored samples illustrating the centers or near centers of the color-name blocks. When the theoretical center or centroid is outside the gamut of available, the nearest available color that falls within that block has been used for illustration. The Munsell notation of each such chip in the table distributed with the centroid charts is marked with a star.

There are a number of technical and scientific applications for which these ISCC-NBS centroid color charts are admirably suited. These designations have been used in the color descriptions of drugs and chemicals, in qualitative analysis, in dermatology, and in the descriptions of mica, building materials, soils, and rocks. The centroid charts are well suited to statistical studies of trends in industrial color usage, and in planning lines of merchandise intended to have coordinated colors. Besides being used to designate the colors of manufactured items, the chips of the centroid charts, since they are carefully specified and their Munsell notations are listed in the table published with each set of the color charts, can also be used as standards of pin-pointing accuracy upon which the colors of these items can be based.

ISCC-NBS Subcommittee on Problem 23, the Historical Expression of Color Usage, used this method of color designation as the basis of the statistical description of color trends. The work of this subcommittee is contained in ISCC Interim Report of the ISCC Subcommittee on Problem 23, dated November 20, 1960. Handmade centroid charts using the prototype centroid colors formulated by Davidson and Hemmendinger, were provided the members of Subcommittee 23 for this work. A number of companies interested in the centroid colors, purchased sets of the prototype centroids thus assisting the ISCC in the financing of this worthwhile project. An article covering the ISCC-NBS Method of Designating Colors and the centroid color charts will appear in a forthcoming issue of Color Engineering.

Kenneth Kelly

A set of charts representing the centroid colors are included with this Newsletter. As Mr. Kelly stated, additional charts are available from the Standard Reference Materials Office at the National Bureau of Standards. Ed.

U. S. LECTURES FOR INTERNATIONAL  
 COLOR MEETING, LUCERNE

International Color Meeting in Lucerne, Switzerland, June 1-4, 1965.

The following is a list of lecturers from the United States who are scheduled to present papers at the

Mr. Fred Billmeyer  
 Prof. of Analytical Chemistry  
 Rensselaer Polytechnic Institute  
 Troy, New York

Precision and Accuracy of Industrial  
 Color Measurement

Mr. George P. Bentley  
 Vice President  
 Kollmorgen Corporation  
 347 King Street  
 Northampton, Massachusetts

Automatic Color Difference-  
 Determination in Process Control

Mr. Forrest Lee Dimmick  
5 Mine Street  
New Brunswick, New Jersey

Color Specification Based on Just  
Noticeable Differences

Mr. Gerald B. Ewing  
Great Pasture Road  
W. Redding, Connecticut

Color Theory Applied in the Study of  
Art and Design

Mr. L. A. Graham  
P. O. Box 455  
Marcus Hook, Pennsylvania

Precision Measurement of Very Small  
Color Samples for Color Matching;  
Application of Part I Techniques in  
Color Matching to Color Styling of  
Textiles

Mr. Henry Hemmendinger  
Davidson and Hemmendinger Inc.  
2857 Nazareth Road  
Easton, Pennsylvania

Education in Color Measurement for  
Colorists in Industry

Mrs. Angela C. Little  
University of California  
Dept. of Nutritional Sciences  
Berkeley 4, California

Problems in Color Measurements Relating  
to Instrumentations and Sample Prepara-  
tion

Mr. R. E. Pike  
E. I. du Pont de Nemours & Co.  
Marshall Development Lab  
3500 Grays Ferry Road  
Philadelphia, Pennsylvania

An Index of Color Constancy

Mr. J. J. Rennilson  
Jet Propulsion Lab  
California Institute of Technology  
4800 Oak Grove Drive  
Pasadena, California

A Television Colorimeter for Lunar  
Exploration

Dr. Lawrence Wheeler  
Assistant Professor of Psychology  
California State College  
Hayward, California

Modification of Induced-Color Responses  
by Means of a Forced-Matching Technique

Interested readers who have not made reservations should write to Secretary,  
Internationalen Farbtagung 1965, Seefeldstrasse 301, 8008 Zürich, Switzerland.

COMMITTEE TO SAVE THE  
COOPER UNION MUSEUM

In a letter to the committee, H. F. duPont, Chairman, stated, "We can now advise you with great satisfaction that the detailed proposal and plan submitted by our committee to the Regents of the Smithsonian Institution for transference of the Cooper Union Museum to the Smithsonian has met with a favorable response. The Regents have authorized the initiation of negotiations for the accomplishment of the purpose, and for a determination of the terms upon which the transfer would be made.

"We have made substantial progress toward our goal of \$200,000 a year for a period of four years. The individual pledges have reached approximately \$75,000 a year for four years, or a total of \$300,000. The goal for gifts from foundations, which was a matching \$100,000 per year for four years, has been only partially met so far, with a substantial pledge from one of the important foundations; and two of our requests are still under active consideration. We have good reason to expect that we should be able to reach our goal for the remaining pledges from foundations, and also our goal for the remaining \$25,000 a year for four years that is still required in individual pledges."

TWO NEW COLOR BRIGHTNESS TESTERS  
FROM MARTIN SWEETS COMPANY

The Martin Sweets Company has announced the availability of two new brightness and color testers.

The Model S1 tester was designed for measurement of paper brightness and color values. It is a manually operated instrument normally used to measure paper brightness. Its peak value when used in this way is 457 millimicrons as specified by TAPPI Standard T452ts-64. It is also supplied with filters which the company claims have an over-all spectral response closely approaching the CIE function for the standard observer for illuminant C.

The automatic color brightness tester is a digital readout automatic null instrument comparable to the S1 standard brightness tester. In addition to measuring color and brightness, the automatic meter can be used as an abridged spectrophotometer.

A feature common to both instruments is the calibration service provided by the Institute of Paper Chemistry. Users may take advantage of the monthly service provided by the Institute in which calibrated standards are sent to users by the Institute for checking and calibrating the instrument. According to the brochures, maximum deviation from the master instrument when used with the calibration service is 0.3% with respect to the absolute standard and 0.2% with respect to the working standard.

The price of the Model S1 (manual instrument) is \$1,715 to \$1,965 depending on the filters required. Price for the Model S2 (automatic) is from \$4,675 to \$4,925.

HUNTERLAB ANNOUNCES  
NEW COLOR MONITOR

A new color monitoring device is announced in the December 1964 Hunterlab Reflections and Transmissions. The Hunterlab D44 color monitor

is recommended for production line monitoring and for laboratory measurements. It measures color difference and can be read in terms of delta L, delta A, and delta B, or in terms of X, Y, Z. As a color difference meter the device is said to detect small differences between a reference specimen and the actual color being monitored.

According to the report each of three previous instruments has had at least one year of successful operation. The instrument can be used on webs of textile fabric, paper, plastic, painted metal, etc. For continuous records of color difference, outputs of the appropriate meters can be fed into standard recorders and controllers of types that are widely used in industry. One coil coating installation uses a cross web scanning technique.

LIST OF ARTICLES ON  
COLOR RECEIVED BY  
NEWSLETTER

"Colour Formations of the Unconscious Psyche,"  
Jolande Jacobi, Palette, No. 12, pp. 13-25  
(Spring 1963).

"Colour Measurement -- Its Possibilities for the Colourist," H. W. Ellis, J. Soc. Dyers and Colourists, 78, p. 437 (1962).

"The Colour of Light and the Colour of Objects," Miguel Masriera, Palette, No. 18, pp. 13-22 (Autumn 1964).

"Colour Perception and Colour-Rendering," M. H. Wilson and R. W. Brocklebank, Transactions of the Illuminating Engineering Society, 28, No. 2, pp. 45-49 (1963).

"Colour Television," D. Gabor, Endeavour, XXI, No. 81, pp. 25-34 (January 1962).

"Colour Vision," W. D. Wright, Paint Tech., 25, No. 8, pp. 22-23, 36 (1961).

"Colour-Rendering Tolerances and the Colour-Rendering Properties of Light Sources," B. H. Crawford, Transactions of the Illuminating Engineering Society, 28, No. 2, pp. 50-65 (1963).

"Colours and Patterns in the Animal Kingdom," Prof. Dr. A. Portmann, CIBA Review, 1963/4, pp. 1-27.

"Comments on the Society of Dyers and Colourists' Symposium 'Light Fading and Colour Assessment,'" Roland E. Derby, Jr., Lab Notes, 4, No. 3, pp. 2-8 (December 1963).

"Comparison of Colorimeters," J. M. Adams, Paint, Oil Col. J., 144, No. 3397, p. 1086 (1963); BPV, 37, No. 236, p. 326 (May 1964).

"A Comparison of Colorimeters," J. M. Adams and S. Bergling, Printing Technology, VIII, No. 1, pp. 16-27 (July 1964).

"Competing Theories of Receptor Excitation," R. M. Boynton, Psych. Bull., 61, pp. 262-267 (1964).

✓ "Compound Hemizygotes for Red-Green Colour Vision Defects," R. W. Pickford, Vision Res., 2, pp. 245-252 (1962).

"A Computed Colour Catalogue of Fiber Blends and Its Use in Match Prediction," A. Miller, J. Moir, J. C. Guthrie, and P. H. Oliver, J. S. D. C., 79, p. 604 (1963).

"Computers Make the Batches Match," Chem Week, 93, No. 12, pp. 107-108, 110 (September 21, 1963).

"Contributions to Color-Discrimination Theory: Review, Summary, and Discussion," Leo M. Hurvich, J. Opt. Soc. Amer., 53, No. 1, pp. 196-201 (January 1963).

"Contributions of Threshold Measurements to Color-Discrimination Theory," Robert M. Boynton, J. Opt. Soc. Amer., 53, No. 1, pp. 165-178 (January 1963).

"Control and Specification of Fluorescent Whites and Colours," J. M. Adams, J. Soc. Dyers and Colourists, 77, p. 670 (1961).

"Control of Color Standards," Ruth M. Johnston and Robert P. Ericson, Color Engineering, 2, No. 11-12, pp. 10-13, 23 (November-December 1964).

"Controlled Modification of Color Rendering," L. B. K. Happe, SMPTE Journal, 72, No. 9, pp. 690-691 (September 1963).

"Correlate for Brightness in Terms of CIE Color Matching Data," C. L. Sanders and G. Wyszecki, Publication of Museum of Natural History, Paris, P-63.6 (1963), 10 pp.

"The Correlation between Constitution, Configuration and Colour in Carotinoids," Paul Karrer, Palette, No. 11, pp. 21-27 (Autumn 1962).

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Newsletter Committee:

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Katherine Chandler  
Waldron Faulkner  
Calvin S. Hathaway

William J. Kiernan  
Dorothy Nickerson  
Helen D. Taylor

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