

INTER-SOCIETY COLOR COUNCIL

NEWS LETTER

NUMBER 152

March 1961

Warren L. Rhodes
Graphic Arts Research Department
65 Plymouth Avenue South

Editor
Rochester Institute of Technology
Rochester 8, New York

THE PRESIDENT TALKS

Your president probably should have an item of interest for you in each Newsletter--however, I know that many of you already have too much reading to do, and anything that I might add would only be a repetition of what is already so well covered by our capable Newsletter editor, Dusty Rhodes, and his fine staff.

Elsewhere in this issue you will find summaries of our problem committees' activities, and most of our other news is so well covered that it is useless for me to repeat this in a "memo from the president."

For instance the above two paragraphs are certainly useless, and unnecessary reading for any busy man, and so is this paragraph, but read on. I have a couple of good thoughts for you, and they will be very brief.

1. Read all of your Newsletter! It's terrific!
2. Attend the annual meeting in Rochester, N. Y. April 10-12. "Color in photography and television"--presented by experts--will have some real meat for you with ideas useful in many other lines.
3. The ISCC Problems Committees are the heart of our organization. Follow this work closely, and offer suggestions to the chairman or to Ralph Pike, or to Secretary Evans, or to your president. We need your help, and advice.

Thanks for listening.

Yours very truly,

G. L. Erikson, President
Inter-Society Color Council

P. S. If you wish to serve on any of these committees, and feel that you can contribute some useful service, please advise any of the above.

PROBLEMS COMMITTEE MEETING
PROGRAM AND SUMMARIES OF
SUBCOMMITTEE ACTIVITIES

The first day of the 1960 Program for the ISCC Annual Meeting was formally designated as Problems Committee Day. In previous years a few of the most interested committees had been meeting in this manner on an unpublicized, informal basis. For the purpose of encouraging wider interest and participation in this important ISCC activity, this experiment was authorized by the Board of Directors. The Newsletter immediately preceding the Annual Meeting was principally devoted to a summary of the background and status of the active Problem subcommittees. The subcommittee meeting plans were included in the formal meeting announcement.

The response exceeded expectations in number, in degree of individual participation, in enthusiasm, and in fruitful results. A similar plan, therefore, will be incorporated in the Annual Meeting Program for this year. Members and friends of the Council are again encouraged to attend and to participate in the discussion of the problem subcommittee groups closest to their areas of interest. A brief summary of the current status of the active subcommittees which will meet is included in this issue. For additional information on the origin, history, and objectives of each we encourage you to refer to Newsletter Issue No. 146 of March 1960.

This year the annual business meeting will be held at the Sheraton Hotel, Rochester, New York, on Tuesday morning, April 11. A symposium under the general title of "Color in Photography and Television" will be held on Tuesday afternoon and Wednesday morning. The preceding Monday, April 10, has been designated as Problems Day and problems subcommittee discussions will begin at 9:30 a.m. and continue throughout the day. Meeting locations and schedules will be bulletinized in the hotel lobby. Open meetings of each of the active Problem Subcommittees listed in this Newsletter will be held.

R. E. Pike, Chairman
Problems Committee

ISCC 30TH ANNUAL MEETING

April 10, 11, 12, 1961

Sheraton Hotel
Rochester, New York

Monday, April 10

9:30 a.m. - 4:30 p.m.

Subcommittee Meetings

<u>Room</u>	<u>Subcommittee No.</u>	<u>Subject</u>	<u>Time</u>
A	Problem 21	Standard Practice for Visual Examination of Small Color Differences Norman R. Pugh, Chairman	9:30 a.m. - 12:00 p.m.

ISCC 30th Annual Meeting (Cont'd.)

<u>Room</u>	<u>Subcommittee No.</u>	<u>Subject</u>	<u>Time</u>
B	Problems 2 & 23	Color Names Kenneth L. Kelly, Chairman Expression of Historical Color Usage Everett R. Call	9:30 a.m. - 4:30 p.m.
A	Problem 22	Material Standards for Colorimetry of Opaque, Translucent, and Transparent Materials Fred W. Billmeyer, Jr., Chairman	2:30 p.m. - 4:30 p.m.
C	Problem 18	Colorimetry of Fluorescent Materials Eugene Allen, Chairman	9:30 a.m. - 12:30 p.m.
D	Problem 10	Color Aptitude Test Forrest L. Dimmick, Chairman	9:30 a.m. - 12:00 p.m.
D	Problem 14	The Colorimetry of Transparent Materials R. C. Stillman, Chairman	2:30 p.m. - 4:30 p.m.
C	Problem 16	Standard Methods for Mounting Textile Samples for Colorimetric Measurement J. R. L. Landry, Chairman	2:30 p.m. - 4:30 p.m.
E	Problem 17	Color in the Building Industry Waldron Faulkner, Chairman	2:30 p.m. - 4:30 p.m.

STATEMENT FROM REPORT OF EXECUTIVE
COMMITTEE, 1944, COVERING ISCC
ORGANIZATION AND FUNCTIONS

(Revised 1954)*

- IV. 2. PROBLEMS COMMITTEE - From time to time various inquiries on color problems come to the attention of the Council.
- a. Problems germane to a particular society are referred to the delegation chairman of that society.
 - b. Problems capable of immediate answer or solution by a recognized authority are so referred. Frequently problems have broad aspects which concern many Member-Bodies requiring a coordinated effort for their solution.

- c. Other problems are referred to the chairman of the Problems Committee for consideration. If the chairman of the Committee feels that the problem warrants individual study by a special subcommittee, he recommends appropriate action to the Board of Directors. Usually the chairman of the Problems Committee serves as a committee of one, but this is not necessary. Whenever possible, opportunity is provided the Member-Bodies to comment, through their delegation chairman, on the desirability of establishing the proposed subcommittee. An affirmative vote by the Board of Directors leads to the establishment of the subcommittee whose chairman is appointed by the President.

Members of the subcommittee may come from either the membership lists of the Member-Bodies, Individual Member list, or any other competent person chosen by the Chairman of the Subcommittee or suggested by the Board of Directors.

The purpose of the subcommittee is to solve the assigned problem and it is expected that written reports on progress will be made for presentation at the annual meeting. In recent years the Chairman of the Problems Committee presides at the meeting at which the reports of the Problems Committee Subcommittees' reports are presented.

SUBCOMMITTEE NO. 2 Color Names

Committee Membership:

Kenneth L. Kelly, Chairman
Room 305 East Building
National Bureau of Standards
Washington 25, D. C.

Deane B. Judd
Kenneth L. Kelly
Dorothy Nickerson

Reference is made to the previous report of ISCC subcommittee on Problem 2, Color Names, published in ISCC Newsletter No. 146, Page 3, March 1960. Since then Davidson and Hemmendinger prepared and submitted painted papers intended to correspond to the centroid colors. These papers were measured at the National Bureau of Standards, the results compared with the specifications of the centroid colors, and repaints of those that did not meet the specifications were based on these measurements. Of the 319 paintings submitted for centroid colors, 214 were accepted as meeting the specifications and 14 were accepted as guides for information purposes only.

A table containing the ISCC-NBS number and color-name abbreviations, the Munsell notation, the chromaticity coordinates and daylight reflectance, and the acceptance criterion was prepared and distributed to the purchasers of the \$500.00 sets. A paper is being prepared describing the production measurement, and acceptance of these centroid colors which will contain this table and it is hoped that it will be published in the Journal of Research of the National Bureau of Standards.

*The new terminology resulting from the incorporation has been substituted for the titles actually in effect up to 1954.

A set of blank color-name charts was developed in such a form that it would accommodate 1-by 1-inch samples, would have only one block per color name and would be of such size that it would fit into Circular 553 as a supplement on a future reprinting. Sets of these blank charts with a set of the accepted ISCC-NBS centroid color chips were distributed to each member of the ISCC Subcommittee on Problem 23, the Historical Expression of Color Usage, in fulfillment of the original charge to Problem Subcommittee 2. This completes the work of ISCC Subcommittee 2, Color Names.

However, there is one more duty of the chairman which is not exactly that of Subcommittee 2; it is the production of these ISCC-NBS centroid-color charts in sufficient number and sufficiently low cost that they can be obtained and used by anyone either separately or in conjunction with NBS Circular 553, the Color Names Dictionary. It is planned that this set of centroid charts will be bound with NBS Circular 553 at a future reprinting. Bids have been requested for the production of these chart sets and it is hoped that these sets will be completed in about a year.

SUBCOMMITTEE NO. 10 Color Aptitude Test

Committee Membership:

Forest L. Dimmick, Chairman
U. S. Naval Submarine Base
P. O. Box 400
New London, Connecticut

Paul Blackmore
Robert Hefner
Douglas Hamly

Carl Foss, Co-Chairman
72 Elm Road
Princeton, New Jersey

G. L. Erikson
Miss Hakin
Sidney Newhall
Daniel Smith

The history of Problem 10: The Color Aptitude Test, since its inception in 1940, has been reviewed in some detail in the ISCC Newsletter No. 115. A brief summary appeared in the report of the Problems Committee for 1960. Since 1953 when the present version of the test was put on the market through the cooperation of Federation of Societies for Paint Technology (FPVPC), activities of the committee have consisted largely in furnishing advice and information about the details of its application.

The test has found wide acceptance and a large portion of the original production of test materials has been distributed. Over 300 sets have been sold. In 1958-59, it seemed desirable to consider the possibility of developing additional or alternative series of colors that might expand the utility of the test.

The first definite proposal, discussed at the 1959 and 1960 meetings of the committee, is to try to use hue series as well as saturation. It was specifically suggested that such hue series be from the yellow-green and the yellow-red regions.

Two pairs of end points were designated, tentatively, and paints formulated for them. Experimental work with the first samples has been in progress and

data are now available from which the end points can be located more accurately. It has been necessary to determine with some precision the number of just noticeable differences between the end points.

Work on the discrimination of small steps between the tentative end points has been delayed because of re-construction going on in the laboratory. Unfortunately, it was not sufficiently clear what measurements needed to be made, or how to make them, to enable us to "farm out" the work to other members of the committee.

At the coming meeting of the Committee it is proposed to discuss the next steps in production of the new series. When new end points have been formulated and their perceptible distances determined we hope to make up the new series. Then we shall need help in evaluating them.

SUBCOMMITTEE NO. 14 The Colorimetry of Transparent Materials

Committee Membership:

R. C. Stillman, Chairman
The Procter & Gamble Company
M. A. & R. Building, Ivorydale
Cincinnati 17, Ohio

G. J. Chamberlin
R. S. Hunter

G. W. Ingle
T. G. Pett
W. B. Reed
Francis Scofield
H. G. Shimp
A. J. Werner

The purpose of this work is to study the colorimetry of existing transparent color standards in an effort to establish their color characteristics and their inter-relation with each other. During the past several years, chromaticity data on the various transparent color systems have been collected and tabulated. A detailed chromaticity diagram of these standards has been prepared. Work at the present time consists of adding to the information already obtained and studying ways in which numbers in one system can be related to those of another system.

SUBCOMMITTEE NO. 16 Standard Methods for Mounting Textile Samples for Colorimetric Measurement

Committee Membership:

J. L. Richard Landry, Chairman
Davidson and Hemmendinger
2857 Nazareth Road
Easton, Pennsylvania

A. Aronson
L. R. Easley
R. S. Hunter

E. Schweizer
L. Graham
R. E. Derby, Jr.
S. Goldwasser
F. J. Rizzo
R. Hoban
R. Jones
W. Mathews

The scope of the committee is to survey the sample characteristics, both methanical and optical, of the textile materials which might normally be measured with colorimetric equipment, and to set up standard methods for the

preparation of specimen and the mounting of specimen for any instrument which may be used. Reports are being prepared on various methods of preparing textiles including:

1. Felt Pad Method
2. Guillotine Method
3. Wiley Mill Method
4. Staple Behind Glass Method
5. Wound Filament Method (on yarn)
6. Random Matt Method
7. Sample Rotation Techniques
8. Solution Techniques

When these reports are complete they will be submitted to the ISCC Board for promulgation. The chairman feels that upon publication of these methods, constructive criticism will be forthcoming from otherwise inarticulate sources. Later on the various methods may be rewritten and republished together.

SUBCOMMITTEE NO. 17 Color in the Building Industry

Committee Membership:

Waldron Faulkner, Chairman
1710 "H" Street, N. W.
Washington 6, D. C.

Katherine Chandler
W. C. Granville

R. S. Hunter
H. J. Keegan
Dorothy Nickerson
Francis Scofield
Mildred Trimble

Although this subcommittee does not presently have an active program, the need for color standardization in this field was brought sharply into focus at the well attended informal meeting last year. It is hoped that specific objectives can be established and, a formal program initiated.

SUBCOMMITTEE NO. 18 Colorimetry of Fluorescent Materials

Committee Membership:

Eugene Allen, Chairman
American Cyanamid Company
Bound Brook, New Jersey

Seymour Goldwasser
A. C. Hardy
Henry Hemmendinger
C. W. Jerome

D. B. Judd
J. L. R. Landry
Norman Macbeth
W. E. K. Middleton
Dorothy Nickerson
G. H. Patterson
Alexander Strobl

Subcommittee No. 18 was originally set up to study "The Measurement and Specification of Energy Sources, and Procedures for Instrumental and Noninstrumental Measurement of the Color of Fluorescent Materials Produced by Irradiation by Ultraviolet, Fluorescent and Incandescent Lamps, and by a Combination of Sun and Sky."

Early in the course of the Committee's work, it was decided to concentrate on the problem of designing a suitable light source for the colorimetry of fluorescent materials, and postpone consideration of instrumental techniques until the light source problem has been solved.

After some difficulty with visual evaluation of several suggested light sources, we recently decided to emphasize the development of a source which would be suitable for instrumental measurement. Instrumental colorimetry of fluorescent substances is becoming more and more widespread, even for fluorescent whitening agents. Since Source C is the most widely used illuminant for instrumental work, a Source C distribution in the visible would be preferable. We are presently working on a split light source idea in which the light from a tungsten lamp would be divided; one portion would pass through a Source C-type filter and the other portion through a filter which would eliminate the visible and pass the ultraviolet. The two beams would then be recombined.

After such a lamp is constructed, we will compare its performance with that of an ordinary tungsten lamp (which is the most commonly used light source for instrumental measurement at present) and with that of a Xenon Lamp.

SUBCOMMITTEE NO. 20 Basic Elements of Color Education

Committee Membership:

Randall M. Hanes, Chairman
Applied Physics Laboratory
Johns Hopkins University
8621 Georgia Avenue
Silver Spring, Maryland

C. James Bartleson

At a meeting of the ISCC Board of Directors in 1954, Ralph M. Evans suggested that a problem committee be formed to study means of presenting accurate basic knowledge in the field of color. At the next board meeting, the subcommittee was formed for the specific purpose of reporting to the ISCC "a statement of the basic principles which should be included in any elementary teaching of color." The Board further requested that this subcommittee "should state the basic principles but should not attempt to specify exactly how they should be taught."

There was initially great divergence of opinion among the original members of the subcommittee, but it was finally agreed that the term "basic" be restricted to color facts about which there is broad general agreement and that there be prepared a detailed outline which would include facts useful at any level of instruction. Such an outline was then prepared by a working group comprised of Bartleson, Burnham, and Hanes. The outline was circulated for review to all members of the ISCC Board, to all delegates from the APA and OSA, and to other authorities.

On the basis of comments received from the reviewers, extensive revisions were made in the manuscript, and the resulting draft of the report, with the suggested title, "Facts of Color," was submitted to the Board in December 1959.

An editorial committee, consisting of C. J. Bartleson, R. M. Evans, R. M. Hanes, and D. B. Judd, was appointed at that time to review the draft and advise the Board on the question of publication. At the same time, the subcommittee was formally disbanded, with commendation, and immediately reconstituted with Bartleson, Burnham, and Hanes as committee members to expedite final editing and publication.

The editorial committee met several times during the past year and has now completed all major editing of the text. The only important problem remaining unresolved has to do with the illustrations.

SUBCOMMITTEE NO. 21 Standard Practice for Visual Examination of Small Color Differences

Committee Membership:

Norman R. Pugh, Chairman
Sears Roebuck & Co.
3301 W. Arthington Street
Chicago 7, Illinois

C. J. Bartleson
M. Bruno
Hugh Campbell
C. E. Foss
K. C. Gale
H. F. George
W. P. Greenwood
W. D. Hall
H. K. Hammond
R. M. Hanes
Martha L. Hensley

S. J. Huey
W. J. Kiernan
C. C. Krause
K. C. McCartt
R. W. McKinley
G. H. Mealley
W. J. Morgan
D. L. Obsenshain
Elizabeth D. Quackenbush
W. B. Reese
R. J. Rizzo
R. E. Rossell
Stewart Seass
Francis Scofield
R. C. Stillman
F. L. Wurzburg

This subcommittee was organized in the fall of 1957, at the request of A.S.T.M. and held its first meeting the following spring. Problems and objectives outlined by the Board were based on Committee E-12 unsolved Problem 8.

The objectives are:

1. To establish illuminating and viewing conditions suitable for judging small color differences of specimen panels for the purpose of determining the adequacy of a color match.
2. To determine whether it is practical to apply existing tests for color perceptibility or aptitude to define the eligibility of individuals to participate in such judgments.
3. To establish written procedures to cover good general practices with respect to viewing conditions, qualifications for observers and specimen preparation for the purpose of establishing uniform conditions for color matching so that unbiased observers, singly or acting as a jury, might examine color differences satisfactorily according to these written procedures (such procedures to be compatible with trade practices).

4. To publish recommendations based on the results of these studies in an authoritative journal in a form that will encourage wide-scale adoption by supplier and consumers of color commodities.

Future work will emphasize the production of a Recommended Practice that will cover:

- a. Classification of particular types of color difference evaluation problems.
- b. Illuminating and viewing conditions for different types of problems.
- c. Procedures for selecting and instructing observers.
- d. Statistical aspects of making critical judgments by means of an observer jury.

SUBCOMMITTEE NO. 22 Material Standards for the Colorimetry of Opaque, Translucent, and Transparent Materials

Committee Membership:

Fred W. Billmeyer, Jr., Chairman
E. I. duPont de Nemours & Co. (Inc.)
duPont Experimental Station
Wilmington 3, Delaware

Carl E. Foss
Vice-Chairman
72 Elm Lane
Princeton, New Jersey

R. G. Alexander
W. Budde
S. L. Davidson
A. J. Derr
P. R. Douglas
W. N. Hale
H. K. Hammond
H. Hemmendinger
S. J. Huey
R. M. Johnston (Miss)
H. J. Keegan
N. M. Komodromos
D. I. Morley (Mrs.)

I. Nimeroff
H. F. Parker
R. F. Patrick
S. A. Powers
N. R. Pugh
W. L. Rhodes
J. L. Rood
M. Saltzman
F. Scofield
S. Sease
Daniel Smith
R. C. Stillman
G. Wyszecki

The basic of Problem No. 22, accepted by the ISCC late in 1957, is the increasing need for stable, rugged material standards, readily available in a wide range of colors, for use in instrumental measurement of the appearance attributes of materials. The objectives of the Subcommittee for Problem No. 22 are to determine the types of materials most suited for use as colorimetric standards; to develop specifications for the preparation of a set (or sets) of representative standards; and to develop and recommend procedures for their care and use.

The initial objective of the Subcommittee has been the selection of materials for transparent and opaque standards. The chief property of interest for such materials is their long term color stability, evaluated through instrumental measurements of the highest precision and constancy. It was soon ascertained that instrumental measurements suitable for detecting small changes in color over long periods of time are available for only a few of the candidate materials for colorimetric standards. The objective of obtaining such measurements has been attacked by the initiation of the following two programs.

Program No. 1. A round-robin program of instrumental measurement has been initiated using materials of known good color stability. Two types of test specimens have been procured:

- A. Glass transmittance filters similar to those issued by the National Bureau of Standards for the calibration of spectrophotometers with tristimulus integrators.
- B. Carrara glass reflectance plaques in ten low-chroma colors including white and black.

Measurements of the test specimens have been made in several laboratories and are being studied to eliminate any discrepancies and allow the formulation of optimum measurement procedures. The specimens will then be circulated to Subcommittee members participating in the program. These include some fifteen laboratories with spectrophotometers and twelve with colorimeters.

The major purposes of the round-robin program are twofold:

- A. To study the precision of color measurement (1) among laboratories and (2) as a function of time within laboratories, in order to obtain a better quantitative picture of the requirements to be met by colorimetric standards.
- B. To aid in the selection of laboratories where long term color permanence studies can be carried out, and to aid those laboratories in maintaining the calibration of their instruments over long periods of time.

Program No. 2. Specimens of several candidate materials have been obtained, and studies of their long term color permanence have been initiated. Measurements are underway on specimens based on porcelain enamel, ceramic tile, molded acrylic plastic, molded urea-formaldehyde plastic, and acrylic lacquer coating. The Subcommittee hopes to add other materials to this list, including cast acrylic, cellulose acetate-butyrate, cellulose triacetate, and polyester plastics, high bake alkyd-melamine enamels, ceramic coatings on glass, and interference filter coatings. The Subcommittee solicits further suggestions and specimens in all categories.

Other problems which the Subcommittee hopes to consider in future studies include the use of material standards for calibrating colorimeters, and standards for translucency, gloss, and other appearance attributes.

SUBCOMMITTEE NO. 23 Expression of Historical Color Usage

Committee Membership:

Everett R. Call, Chairman
 United Marketing Services
 1000 Vermont Avenue, N. W.
 Washington 5, D. C.

Walter C. Granville
 Elschen Hood

Martha Jungerman
 Kenneth L. Kelly
 Frederic H. Rahr
 Mary J. Shannon
 William M. Stuart
 Ouida M. Weisman
 Midge Wilson

Problem 23 was accepted by the ISCC in late 1957. Since its inception, the committee has been extremely active. Council members other than those on the Committee participated in many Committee meetings and contributed much to the progress of the Committee.

In November 1960, the Board of Directors of the ISCC approved for publication, an Interim Report of this Subcommittee and decided to encourage the publication of this report in the various trade journals of member bodies. This Interim Report sets forth in complete detail, a technique of expressing historical color usage of consumer products that will permit individual companies to compare their use of color directly with other companies or industries.

The use of the term "Interim" was deliberate. While there is no question regarding the method, all concerned agreed that problems might well arise in the years ahead regarding the application of the method in different industries. The term "Interim" permits the continuation of Subcommittee 23 and allows for any changes or additions that might be found to be of value in assisting specific industries in the application of this method.

The Committee is now actively concerned with the application of this method in various industries. In this task, the Committee welcomes the opportunity to discuss application problems with any industry and of course welcomes all suggestions -- especially those pertaining to how the Committee might be of more help.

LIST OF ARTICLES ON
 COLOR RECEIVED BY
 NEWS LETTER

"Accuracy of Tristimulus Computations," G. W. Ingle, J. Opt. Soc. Amer., 48, No. 10, p. 761 (1958).

"Adaptation Level Theory," H. Helson, Psychology: A Study of a Science, Vol. I, pp. 565-621 (1959).

"Advanced Paint Chemistry 2. The Chemistry of Colouring Matters," Phillip M. Fisk, Paint Manuf., 30, No. 7, pp. 236-240 (1960).

"The Adventure of Technicolor," Herbert T. Kalmus, SMPTE, 67, pp. 829-830 (December 1958).

"Age Changes in Color Matching," J. G. Gilbert, Off. Digest, 30, No. 403, pp. 860-870 (August 1958).