

Inter-Society Color Council *Newsletter*

NUMBER 192
January - February 1968

1968 ANNUAL MEETING

Miss Midge Wilson, CAUS, who is arranging the two-part program "FORUM" and "SPOT NEWS" for Monday afternoon, April 8, gives the following description of this event.

"The world is full of happenings, but most exciting of all is what is happening in COLOR. This Forum offers members in diverse fields an opportunity to exchange ideas, ask questions and learn how color is being used in other areas.

"Guy Gattegno, who comes to us via Australia, will explain how color can be used in teaching reading. Imagine learning to read with a British accent, or in Hindustani, through the use of color!...As V.P. of Product Styling, Joan Glynn knows many secrets. She'll share some with us when she takes us behind the scenes and reveals how color convinces customers.... You can't have color without light. Lillian Barber combines color and light for carefully planned effects in business and residential areas.... Are modern painters mis-treating colors or are they the real trend-setters? Herb Aach's views may startle you and are bound to set you thinking."

FORUM

DOROTHY NICKERSON, presiding

MR. GUY GATTEGNO

Schools of the Future

Subordinating Teaching to Learning Through the Use of Color

MRS. MARY JOAN GLYNN

V.P., Product Styling

Dir., Doyle Dane Bernbach, Inc.

Coloring Your Thinking

MRS. LILLIAN BARBER

Interior and Lighting Designer

Color and Lighting Techniques for Contract and Residential Areas

MR. HERBERT AACH

Painter

Color and Color Lighting in Art

"With SPOT NEWS we'll go round-robin to catch the color pulse. Each speaker will give a five-minute capsule report, to be augmented by audience participation. Bring facts and figures for your area and help complete the picture.

"Is color changing people? Have we had too much color? What's new next? Help us discover."

SPOT NEWS

MISS JEANETTE WRIGHT

Editor and Publisher

THE WRIGHT REPORT FOR HOME FURNISHINGS

Upholstery, drapery, carpets

MISS MARY C. HEALY

Director of Color Planning Division

Benjamin Moore & Co.

Paints

MR. BILL STARK

Director of Design

Fieldcrest Mills, Inc.

Bed and bath

MRS. MELBA HOBSON

Designer and Consultant

Fashions - men and women

MISS MARY KAY McALLISTER

Beauty Editor

Avon Cosmetics

Cosmetics - men and women

MR. KARL FINK

Industrial Designer

Packaging

MR. ARTHUR GROTH

Asst. Color Marketing Manager

Automotive Sales

E. I. du Pont de Nemours & Co., Inc.

Automotive

SYMPOSIUM AND BANQUET, TUESDAY, APRIL 9

Chairman: Karl Fink

This year's symposium and banquet program will explore certain new directions in the fine arts. At 10:30 A. M., there will be a presentation by E. A. T. (Experiments in Art and Technology). Billy (Dr. J. Wilhelm) Kluver of Bell Laboratories, president of E. A. T., will speak on the prospects of collaboration between artists and engineers. He will show how E. A. T. is acting as a "matchmaker" for inventive technologists and creative artists, who together are producing new art forms uniquely expressive of today's world.

At 2:00 P. M., art historian Willoughby Sharp will present a paper, "Kineticism and Luminism: An Introduction to the Art of Light and Movement." Through tapes, slides and films, this demonstration will show some of the background of the current interface between art and science and will examine its implications for the immediate future.

Starting at 2:45, three leading creators of these new art forms will speak about their work and the important influences on them. Their talks will, of course, be amply illustrated:

2:45 Hans Haacke. Haacke teaches sculpture at Cooper Union. He is best known for his utilization of natural phenomena for works in wind, water and plexiglass. He makes things which react and change to their environment. He articulates things natural.

3:30 Earl Reiback, an M.I. T. nuclear engineer, will explain how he has harnessed technological phenomena for aesthetic expression. He will demonstrate his lumia, kinetic luminage, and a dramatic technique involving polyesters, nuclear radiation, and polarization.

4:15 Otto Piene. Piene is at present a fellow at M.I. T.'s Center for Advanced Visual Studies. He is a specialist in light sculpture and projected, programmed light manifestations. He will speak of his involvement with Group Zero in Dusseldorf, his "Light Ballet", and some of Zero's festival happenings.

The traditional banquet address will be delivered by Tony Martin, of the New York University faculty. His techniques for scoring, or notating and programming light, in conjunction with sound, to create a new multimedia environment are the attraction of New York's Electric Circus and were recently presented at Carnegie Hall, in a concert collaboration with the New York Pro Musica. Mr. Martin will have more than adequate equipment on hand for his lecture-demonstration, enough voltage, decibels and saturation so that the Statler-Hilton Skytop may never be the same.

HONORARY MEMBERS

At its January meeting the Board of Directors named

the following distinguished individuals for honorary membership in the ISCC. In addition to five present honorary members (whose names are starred below), these include founding members who took part in one or more of the preliminary, organizational, or first meetings of the Council in 1931; other members active in the work of the Council since its early days in the 1930's and whose interest has continued, usually up to and often after retirement; and several others, most of them older and long-time members, who have made major contributions to the purpose, growth, and activities of the Council.

William D. Appel
Isay Balinkin
Charles Bittinger
Elizabeth Burris-Meyer
C. R. Conquergood
Forrest L. Dimmick (deceased)
Carl Z. Draves
G. L. Erikson
Ralph M. Evans
Dean Farnsworth (deceased)
Carl E. Foss
E. N. Gathercoal (deceased)
*Kasson S. Gibson
I. H. Godlove (deceased)
L. A. Jones (deceased)
Deane B. Judd
William F. Little
Norman Macbeth, Sr. (deceased)
R. G. Macdonald
A. E. O. Munsell
*Elsie Murray (deceased)
Sidney M. Newhall
Dorothy Nickerson
*M. Rea Paul
Irwin G. Priest (deceased)
Frederic H. Rahr
Margaret Hayden Rorke
Walter M. Scott
E. I. Stearns
*Helen D. Taylor
V. C. Vesce
*Michael J. Zigler (deceased)

During the annual meeting, there will be a reception on Monday, April 8, from 5:30 to 7:00 p.m., for the honorary members.

NEW MEMBERS

The following applications for individual membership were accepted at the last meeting of the Board of Directors held in New York City on January 8, 1968.

Individual Members and Their Particular Interests

Mr. F. C. Breckenridge
5301 Broad Branch Rd.
Chevy Chase, D. C. 20015

Measurement, representation, specification,

inspection, and use of colors in luminous signals.

Mr. Kenneth P. Conroy, Jr.
121 Floy Street
Spartanburg, S. C. 29301

Production control of color through application of instrumentation and digital computer techniques. Establishment of commercial color tolerance system.

Mrs. Louise Dotterer
Munsell Color Company, Inc.
2441 N. Calvert St.
Baltimore, Md. 21218

Color standardization. Education and color quality control.

Mr. James B. Gable
1942 Thornwood Ave.
Wilmette, Illinois 60091

Dr. Edwin Gordy
137 Walnut St.
Newtonville, Mass. 02160

Color instrumentation.

Mr. William L. Heaps
Macbeth Corporation
P. O. Box 950
Newburgh, New York 12550

Light sources for color matching, spectroradiometry.

Mr. Russell K. Johnson
527 Paper Mill Rd.
Oreland, Pa. 19075

Graphic arts.

Mr. Hugh W. Lowrey
Indurall Coatings, Inc.
P. O. Box 2371
Birmingham, Alabama 35201

Color matching of paint by visual and instrumental methods. Colorant selection and prediction of quantity required for color match. Preparation and preservation of color standards.

Dr. Paul R. Noyes
E. I. du Pont de Nemours & Co.
Marshall Development Laboratory
3500 Grays Ferry Avenue
Philadelphia, Pa. 19146

As a manufacturer of paint and related products, development of colors, color matching and color measurement.

Mr. Robert H. Quint

85-02 Midland Pkwy.
Jamaica, N. Y. 11432

Use in medical diagnosis of internal organs of the body via endoscopes.

Miss Donna Read
Texas Technological College
Dept. of Art
P. O. Box 4720

Color in artistic expressions: in my own work particularly in textile dyes and pigments available to individual craftsmen and in enamel (ground glass) colors which when fused to metal give a multitude of variations dependent on color over color, firing time, etc.

Mr. Robert L. S. Sheppard
Northern Electric Co. Ltd.
1261 Shearer St.
Montreal, Quebec, Canada

Instrumentation, color tolerances and formula, control of color, effects of pigmentation, metamerism and its effects on instrumental readings.

Mr. U. V. Subba Rao
J. P. Stevens & Co. Inc.
P. O. Box 1010
Charlotte, N. C. 28201

Color measurement and control of textile products.

TRIBUTE TO RICHARD S. HUNTER

Richard S. Hunter, a former Director of ISCC, a voting delegate from both the OSA and TAPPI, and president of Hunter Associates Laboratory, Inc., was honored by friends in December at an anniversary dinner commemorating his forty years of outstanding work in the field of appearance measurement. Friends from around the world sent messages that were bound into two volumes and presented to Mr. Hunter at the dinner.

While Dick Hunter's long and distinguished career is familiar to *N. L.* readers, the following quotations from the congratulatory messages will be of interest both as historical commentary in the field of color and as a testimonial to his work.

Dr. Deane B. Judd, National Bureau of Standards:

"I remember with pleasure our early collaboration on the problems of color and gloss measurement, how quickly you mastered the techniques and meaning of transforming tristimulus values from one set of primary colors to another, and how readily you came to appreciate that the first task of the designer of instruments to measure appearance properties is to

discover a measurable physical property of the specimen correlated with the appearance property to be assessed."

Dr. Kassen S. Gibson, retired from National Bureau of Standards:

"At the Bureau of Standards you designed the famed Hunter Multipurpose Reflectometer, which I believe was the first of the many instruments and methods that you have developed in your field. During the war you cooperated with various military and civil agencies along the technical lines in which you had become so well informed. I particularly remember the heavy packages of metal signaling mirrors which came to you (by first class mail!) for hurried testing."

Miss Dorothy Nickerson, retired from U. S. Department of Agriculture:

"Color measurement and specification have come a long way since 1927. In that year I recall that there were several beginnings of work that have since proved significant to progress in this field. In 1927, the year that you went to work in the Colorimetry Section of the National Bureau of Standards, Irwin G. Priest was Chief. In 1927 Deane Judd became a member of the Bureau staff. In that same year I went, as "color technologist," to the U. S. Department of Agriculture. And do you remember that it was in 1927 that the Hardy automatic recording spectrophotometer was unveiled to the public at M.I.T.?"

Dr. Jack Francis, University of Massachusetts:

"Your name has become synonymous with appearance, primarily color, in the food industries. This is due, in large part, to the wide application of the instruments which bear your name, to color problems in foods. The wide application itself is due mainly, in my opinion, to your willingness to develop a variety of instruments and attachments in order to handle a diversity of problems. Another advantage, and a major one in my opinion, is that the instruments are easy to use and easy to interpret. I speak only for the food area, since this is the one I know best, but I'm sure it is true for many other areas."

Mr. George Ingle, Monsanto Chemical Company:

"I know, also, that a large share of this dedication must be credited to your good wife, Elizabeth."

J. A. VAN DEN AKKER RECEIVES TAPPI GOLD MEDAL

Dr. J. A. Van den Akker, a voting delegate from TAPPI and Chairman of the Department of Physics and Mathematics and Research Counsellor at The Institute of Paper Chemistry, has received the Gold Medal for 1968 from the Technical Association of the Pulp and Paper Industry. The award was made in

February at the annual TAPPI luncheon, held in the grand ballroom of the New York Hilton, and was presented by Dr. C. R. Calkins, a member of the TAPPI Board of Directors, Vice-President of Riegel Paper Corporation, and a former student of Dr. Van den Akker's.

In his citation, Dr. Calkins said, in part, "Most of you are familiar with the highlights of Dr. Van den Akker's career -- outstanding student at Caltech, where he received his B.S. and Ph.D. degrees, teaching and research, first at Washington University, St. Louis, and then his long tenure at The Institute of Paper Chemistry, his tremendous scientific contribution to our industry in the field of physics.... The optical measurements we make owe much of their accuracy, reliability, and their acceptance, to him.

"He is one of the pioneers in the study of mechanical properties and structure of paper. The progress we have made to date in such understanding -- upon which so much future practical and commercial improvement of paper, in all its multitudinous uses, depends -- owes much to Dr. Van den Akker's application of fundamental principles combined with creative and heuristic thinking.

"Yet, to me, his greatest contribution has been as a teacher -- and I mean this in the broadest sense. He can be proud of the numerous students who have entered our industry with sound training, in, and understanding of physics, and its applications. He can be proud of the scientific knowledge contributed by doctoral students under his guidance, and in a few cases, at least, of their continuing scientific work in these fields.

"But more important than all this has been his inculcation of higher values -- the demand for excellence, the insistence upon rigorous and logical thinking (and not just in physics), the appreciation of science, not only as a discipline, but as a creative art, and finally, by example -- by being himself -- demonstrating the perhaps somewhat old-fashioned virtue of character...."

Dr. Van den Akker is a fellow of the American Physical Society, the Optical Society of America, and the American Association for the Advancement of Science; he is a member of the American Association of Physics Teachers, the American Institute of Physics, TAPPI, and the American Arbitration Society.

In 1961-62, he was an invitational Fulbright Scholar in England, lecturing at the University of Manchester Institute of Science and Technology. He is the author of more than 100 scientific and technical papers, and coauthor of five monographs.

OBITUARY -- FORREST L. DIMMICK

Friends and associates were grieved to learn of the death of Forrest L. Dimmick in St. Petersburg, Florida on January 21st. Dr. Dimmick's accomplishments in color and his years of devotion to the field are well-known. Most recently, the Color Marketing Group provided formal recognition of certain of his achievements through the establishment of the Forrest L. Dimmick Color Communications Award. This award was established to honor those who build "bridges" from government and science to business.

Born in 1893 in Dansville, N. Y., Dr. Dimmick grew up in that region and graduated from Cornell in 1915. After about two years in the Army, he came back to Cornell for graduate study in Psychology and was awarded his Ph.D. in 1920. In 1920 and 1921 Dr. Dimmick served as an Instructor at Northwestern University. From 1921 through 1925 he was an Instructor and later Assistant Professor at the University of Michigan. In 1925 he was appointed Professor of Psychology at Hobart College and remained in that post until 1947, when he left to become Head of the Vision Bureau at the U.S.N. Medical Research Laboratory, New London, Conn. Since that time he has been a consultant in vision.

His interest in vision, particularly color vision, began during graduate days. Color vision was a major topic of psychology in the Study of the Mind. The Color Pyramid interested and fascinated him as it did a long line from Leonardo da Vinci to Hering and Titchener. His first publication in 1919 proposed that Gray is a color in its own right. In teaching psychology, he used Color Vision as a major topic.

In 1933 Dr. Dimmick became a delegate to the ISCC, and he served as head of the APA delegation for about 15 years. He served on the Board of the ISCC during its formative years and was elected Chairman of the Council in 1938. At that time M. Rea Paul was Vice-Chairman, Dorothy Nickerson was Secretary, Margaret Hayden Rorke was Treasurer, and the Counsellors were J. L. Parsons, R. G. Slauer, and I. H. Godlove.

In 1940, with Carl Foss as Co-Chairman of the Subcommittee for Problem No. 10, Dr. Dimmick began the years of work on the Color Aptitude Test. A commercial edition of the test was first offered for sale in 1953, and its success is indicated by the fact that the 500 copies of the test were sold out and a second edition was produced in 1964. Dr. Dimmick continued to work on the test, collecting data and reporting on committee work each year.

At the time of his death he was working on a Psychometric Color Specification, a three-number specification based on spectral reflectance and describing a color in terms of: Red or Green; Yellow or Blue; White or Black.

Along with his concentration on color, Dr. Dimmick's

interests ranged broadly over the field of sensory psychology, being directed at various times to cutaneous and olfactory sensitivity, audition, night vision, perception, and psychophysics. Among numerous publications were the section on perception in the Encyclopedia of Psychology and chapters in Foundations of Psychology.

Dr. Dimmick was a member of the Armed Forces-National Research Council Committee on Vision, a Fellow of the American Psychological Association and of the Optical Society of America, and a member of Sigma Xi.

This brief account is not intended to do justice to Dr. Dimmick's long and fruitful career; it is intended only as an interim tribute until a more fitting one is prepared.

SUMMER SEMINARS AT CLEMSON

This year the two Clemson University Color Measurement Seminars will cover different subjects. The first, May 6-10, 1968, will deal with "Color Measurement Methods" and have a course content similar to that of last year's seminars, covering behavior of light, color measuring devices, methods of color measurement, methods for determining dye formulation, and systems available for determining color tolerance.

The second seminar, July 22-26, will be entitled "Color Computer Technology" and will deal with color measurement methods and techniques connected with the use of digitizers and computers to obtain color-matching data from either spectrophotometers or colorimeters.

Instructors will include: Dr. E. I. Stearns, Dr. Roland E. Derby, Miss Therese R. Commerford, Mr. Chet Harris, Mr. Fred Simon, Dr. Eugene Allen, and Professor Harry J. Keegan, who will direct the sessions. Details can be obtained from Professor Keegan, Clemson University, Clemson, S. C.

IDL COLOR INSTRUMENTATION SEMINARS

Instrument Development Laboratories will again conduct a series of seminars on color and color measurement. The seminars are described as technical in nature and designed to provide participants with fundamental understanding of color theory and of the use of instrumentation to solve practical industrial problems.

The schedule for this year:

March 5, 6	-- Charlotte, N. C.
March 28, 29	-- Houston, Texas
May 14, 15	-- Princeton, N. J.

June 20, 21 -- Los Angeles, California
 Sept. 10, 11 -- Boston, Mass.
 Sept. 24, 25 -- Cleveland, Ohio
 Oct. _____ -- Montreal, Canada
 Nov. 18, 19 -- Chicago, Ill.

Details can be obtained from James Shearer, IDL,
 67 Mechanic Street, Attleboro, Mass. 02703.
 Telephone No. 617-222-3880.

SUMMER PROGRAM AT RENSSELAER

In July, 1968, The Rensselaer Color Measurement Laboratory will offer its fourth summer program in Color Technology. This year, two intensive one-week courses will be given: Principles of Color Technology, July 8-12, and Advanced Color Measurement, July 22-26. Principles of Color Technology is an elementary course intended to provide both theory and practice in the description, specification and measurement of color. Advanced Color Measurement is a limited-attendance laboratory course which provides individual instruction to a small group of qualified participants. Both courses are described in the brochure accompanying this issue of the N. L.

The courses will be under the direction of Fred W. Billmeyer, Jr., assisted by Max Saltzman, Senior Scientist, Allied Chemical Company and Adjunct Professor of Chemistry at Rensselaer, and other outstanding authorities on color science who will present guest lectures in the areas of their specialties.

For further information, write the Office of Continuing Studies, Rensselaer Polytechnic Institute, Troy, New York, 12181, prior to June 1, 1968.

NYU--ISCC SYMPOSIUM

As noted in the last issue of the N. L., New York University, in cooperation with the ISCC, will sponsor a symposium on "Color Measurement for the Graphic Arts" at the Hotel Commodore in New York City on March 18, 1968. Program details are now available.

Opening Remarks -- Mr. Richard F. Shaffer

Progress in Standardized Viewing Conditions for the Graphic Arts Industry -- Mr. Albert J. Blanc

Fundamentals of Densitometry -- Dr. Brent Archer

Application of Color Measurement in the Graphic Arts -- Prof. Miles F. Southworth

The Effect of Variables on Color and its Measurement -- Mr. Robert W. Bassemir

In-Plant Utilization of Color Systems -- Mr. Arnold L. Spear

DETAILS OF CMG'S SPRING MEETING

As noted in the last issue of the N. L., the Color Marketing Group will hold its 11th semi-annual meeting at the Carrousel Motor Lodge, Cincinnati, Ohio, on March 24 to 26, 1968. The theme of the meeting is "The Name of the Game is Color for Profit," and details of the program are now available.

The Colormart will be opened on Sunday evening. At the general session on Monday morning, James Merrick Smith, President, AIID, will speak on the professional interior designer's use of color, following which there will be a panel discussion on the topic "How has the Use of Color as a Marketing Tool Changed in the Past Ten Years?" In the afternoon, R. J. Wanamaker will present "The Dynamics of Color in Advertising," and there will be six workshops dealing with: effects of color preferences on marketing opportunities, effects of advances in chemistry and physics on color trends, changing demands for color, obsolete color inventories, use of advance color information in planning, and overcoming of old problems of color variation in production.

On Tuesday morning, Kenneth L. Kelly will speak on the topic: "The Centroid System--What It Means to Industry and the Consumer." In the afternoon, Dale Brubaker will discuss the total corporate color program, after which the workshops will reconvene.

EXPERIMENTS IN ART AND TECHNOLOGY INC.

Following a series of performances last year under the title "Nine Evenings," an artist, Robert Rauschenberg, and a scientist, Billy Kluver, decided to work toward further collaboration between the scientist and the artist. Experiments in Art and Technology Inc. (E.A.T.) was the result. The organization hopes to put technology at the disposal of the artist while, at the same time, exposing the technologist to the imagination of the artist. The movement has gained the support of industry and labor as well as that of artists and scientists.

A series of 32 lectures for artists by scientists and engineers was started on February 4, 1968. The series is divided into eleven general topics entitled: computer music, polymers, television, paper, computer-generated images, sound, honeycomb structure and materials, light, computer poetry and language, color, and lasers and holography. The sessions on color are in April, with subjects and speakers as follows:

April 19 -- Perception of Color -- R. M. Evans

April 21 -- Color Theory -- D. B. Judd

April 23 -- Physiology of Color Vision -- J. Krauskopf

April 24 -- Color Theory -- J. Letvin

April 25 -- Brightness, Lightness, Gloss -- R. S. Hunter

April 26 -- Colors, Dyes, Pigments -- R. L. Feller

COLOR PROBLEMS AT SPE TECHNICAL CONFERENCE

The Society of Plastics Engineers will hold its annual technical conference at the Americana Hotel in New York City, May 6-10, 1968. A full program on color problems will be presented under the auspices of The Coloring and Finishing Professional Activities Group of this Society. It will begin with the Wednesday morning session on May 8 and include papers on special problems in the coloring of plastics.

SYMPOSIUM AT WALTERS ART GALLERY

On March 11 and 12 there will be a symposium at the Walters Art Gallery in Baltimore on the subject "Scientific Aspects of Art Conservation." The program will begin at 8:15 on Monday with a "Technical Examination of a Bellini Painting from the Doge's Palace in Venice" by Elizabeth Packard of the Gallery. On Tuesday morning two ISCC members will speak: Max Saltzman on "Identification of Colorants in Ancient Textiles" and Robert Feller on "Research on Durable Thermoplastic Polymers for the Conservation of Works of Art." The afternoon subjects will be "Analysis of Binding Media Used in Italian Paintings" and "Scientific Examination and the Conservation of Antiquities," presented by Mrs. Meryl Johnson and Robert M. Organ.

At 3:30 p.m. there will be a visit to the Gallery's Conservation Laboratory and viewing of recently cleaned Italian paintings.

THE COLOUR COUNCIL OF CANADA

The subject of the February meeting was "Colour Properties of Agfachrome Film." Edward Thomas, of Drake Delta, Ltd., planned to use twin projectors and screens in illustrating his lecture.

The meeting on March 4 will feature William Rowland who will speak on the subject: "How Colour T. V. Depends on Lighting."

An editor's note by Leonard A. Wheeler in Colour Comment will be of particular interest to many ISCC members:

"In answer to several requests, here is the latest address to which you may send cards, or letters, or even go on a personal visit to our good friend Charlie Conquergood, 'Mr. Colour'. Address him at:

Tullamore Nursing Home, 133 Kennedy Road, South, Brampton, Ontario."

THE COLOUR GROUP (GREAT BRITAIN)

The next meeting of the Group will be on March 6, 1968, at Imperial College. The general subject is thin films. Dr. A. Thetford will talk on the theory of Interference Filters and Mr. H. A. Macleod on their manufacture.

Scottish Section:

Scheduled for January 1968 was a discussion, to be led by Dr. R. Lakowski, on "Colour Memory--Fact or Fiction."

Symposium on Colour -- September 1968. Preliminary notice is given of a symposium on colour organised by the Scottish Section of the Colour Group to be held in Edinburgh University from 5th-7th September 1968. It is hoped to include a number of papers indicating the research work on colour being carried out in Scotland. These will include papers on Colour Measurement, Colour Vision, Pigments and Dyes, etc.

Colour Meetings in Birmingham:

"Did Land revolutionise colour photography?" -- a short paper with demonstrations by R. W. Brocklebank.

"Colour problems in the plastics industry" -- a paper by R. P. Best followed by discussion.

A SURVEY OF ENVIRONMENTAL COLOR RESEARCH

In a report entitled "The Therapeutic Effect of Environment on Emotionally Disturbed and Mentally Subnormal Children," Kenneth Bayes has provided a summary of opinions and research findings related to the effect of environmental color on human behavior. The report was prepared as part of a Kaufmann International Design Award Study, 1964-66. (The Kaufmann International Design Award is administered by the Institute of International Education, New York.)

As a result of visiting, consulting, or contacting nearly 200 persons and institutions in Europe, North America, Australia, Japan, and South Africa, plus the study of about 100 primary and secondary literature sources, Mr. Bayes concludes that "very little" has been done on form and color therapy for mal-adjusted and subnormal children. However, he extended his study into the relationship of therapy to behavior for normal as well as handicapped children and for adults as well as children. He considers the report to be an interim statement that he hopes will serve as a stimulus to systematic research and planned experiment.

Starting (as it properly should) with a discussion of

terminology, the report proceeds to: background studies on the nature of space and perception, behavior, and architectural psychology; planning and form with respect to social organization and needs; color and other sensory perceptions; and the future approach to research. While all of these sections contain information that is of general interest, the section on color is, naturally, the most relevant from the standpoint of N. L. readers.

Much of the material in the color section will be found familiar by the informed reader, but Bayes' summary is, nevertheless, an interesting one and deserves perusal. After a brief discussion of color perception, he turns to research and opinion on psychophysiological effects, preferences, color-form relationships, and applications. As might be expected, there is more opinion than research, and the implications for architectural application are often obscure. The difficulties involved in doing definitive research in this field are great and are discussed by Bayes. Nevertheless, there are some capable and conscientious investigators at work.

Following are two examples of directions being taken or suggested in the use of color.

In individual therapy for children, Wilson, Geuter, and others at Clent are using projected images that change constantly, but gradually, in hue, chroma, and value. The design of the non-representational pattern and the color sequence is usually worked out for individual subjects by a professional group comprising a psychiatrist, a color specialist, an educator and artists, but the approach is empirical, with changes being made as a result of observation. Colored lights are used also in hydrotherapy by Wilson in the hope that they will help the maladjusted child to become aware of his own body. Red and blue lights are installed below water in such a way as to illuminate the body but not the water or the room.

Bayes suggests that each student's desk top in a classroom could be colored to suit his individual temperament, thus providing for recognition of different personalities in an environment that must be generally the same for all.

The report was copyrighted in 1967 by Kenneth Bayes, 37 Duke St., London W1.

NEW TINTOMETER BOOKLETS ON COLOR

Two interesting booklets on color by F. J. Heath are available from The Tintometer Limited, Salisbury, England. One is entitled: Colour, how we see it and how it is measured; the other: An introduction to the C.I.E. system. The booklets contain the substance of lectures given by Mr. Heath in colleges and learned societies all over the U.K.

The booklets are priced at 3/6 and 5/0 respectively.

COLOR DISCRIMINATION TRANSFORMATIONS

From Japan has come a reprint from the Journal of the Illuminating Engineering Institute of Japan, Vol. 52 (1968) No. 1, of a paper by Yoshio Sugiyama that provides Transformations of Color Discrimination Ellipses. The paper is in Japanese, but the following abstract in English provides information that may be of interest to a number of English-speaking workers in this field of small color-difference studies.

Abstract: Color discrimination ellipses measured by Brown and MacAdam are transformed into the CIE-UCS $U^*V^*W^*$ and modified Adams system. From these results the relations between lightness difference and chromaticness difference are checked in the $U^*V^*W^*$ color solid, and new relations between lightness and chromaticness difference in the uniform color solid are written as, $U' = 6W^*(u - u_0)$, $V' = 6W^*(v - v_0)$. From this result and Hioki and Sato's result, a new system is proposed:

$$W'' = 25Y^{1/3} - 17$$

$$U'' = 13(W'')^{5/6}(u - u_0)$$

$$V'' = 13(W'')^{5/6}(v - v_0)$$

NEW GTA INK STANDARDS

The Gravure Technical Association is producing a new Gravure Ink Standards book which will show the inks used in the industry by gravure printers of magazines and newspaper supplements. This book will have the inks printed in the form of three step bars or tone wedges ranging from solid, through middletone to highlight in values of 100%, 50%, and 5%. They will be printed in the respective inks and on the respective paper stocks of the magazines involved, and in the case of Sunday supplements on a 34 pound newsprint. The inks come in four groups, as follows:

Group I - Supplements, Boys' Life and Look Magazine.

Group II - Family Circle, Woman's Day, Hairdo, Eye, Macfadden-Bartell Publications and Dell Modern Publications.

Group III - Seventeen, T. V. Guide, and Ingenue.

Group IV - Good Housekeeping and Popular Mechanics.

The distribution of this book will be to advertising agencies and gravure engravers and it is to be used as a color guide to be followed by engravers when submitting progressive proofs to advertising agencies. This is another effort on the part of the G. T. A. to standardize the inks in the gravure publication printing industry and is a welcome addition to the G. T. A. printed tone scales which also have been reprinted as of last November, 1967.

MEMORIAL MAPS IN PORCELAIN ENAMEL

The following interesting account of some of the scientific problems of the artist was supplied by J. Scott Williams, a voting delegate from the AAPL.

"This is an explanation of an interesting problem of coloring by furnace fire which the United States Government needed over ten years ago.

"As a result of World War II the American Battle Monuments Commission of Washington, D. C., featured various locations in England, Europe, North Africa, Manila, and Hawaii (with decorated memorial maps), in which were located the cemeteries needed as the result of local military action. These maps were usually executed in colored mosaics. Besides this local tribute the Commission required a series of small identification maps showing the progress of the whole war. The maps were in a series of six to the set, three of which showed the progress of the war against Germany and three of the war against Japan. Sixteen sets of map size 24 by 32 inches was the specification, plus one special set 30 by 40 inches, making 102 maps total.

On consultation with executives of the Commission and their supervisory architect, I recommended the use of porcelain enamel as the most effective and permanent method for their needs. Seaporcel Metals of Long Island City, New York, was the porcelain enameling plant available for this specialized firing problem. Tests were submitted to the executives of the Commission to prove the efficiency of the enamel process.

"In connection with the temperature problem of the enamel process, I researched in the Science section of the New York Public Library for the latest data on Centegrade scale of the periodic table of the elements. This was done while waiting type changes by the Army Maps Service and owing to the difficulty of printing small Roman lettering by the silk screen process, which had to be used on the inflexible 16-gauge metal plates to be used in the execution of the maps.

"The materials used in making the maps were: Titanium Dioxide, Zirconium, Antimony, Cadmium, Selenium, Sulphur and Cobalt, also Silicon and Oxygen. The application medium was an oil prepared by the laboratories of plants that furnish standardized ingredients used in the commercial enameling industry. The maps used a blue for all ocean and sea areas, and a manila-type yellow for all land areas engaged in military action. Neutral areas such as Spain, Denmark, and Norway were in a grey tone. The progress of the war was shown by a series of graduated fronts and dated. Each map showed four fronts, making twelve fronts total. These red fronts were applied by brush manipulation, in all areas personally applied.

"Because the war against Japan was principally an ocean area, whose range was from the Aleutian Islands

in the upper right to New Guinea and the Soloman Islands in the left lower corner of the plate, these maps were predominantly blue. Cobalt has a high boiling or vapor point, but I found that two thin applications of the color gave a better absorption into the white enamel base than one application could serve.

"In the use of the colorants I translated their Centigrade scale to the Fahrenheit scale. Selenium was approximately 250 degrees lower than my firing temperature and Cadmium about 150 degrees too low. Sulphur was about 1,000 degrees lower.

"It was found that once the absorption was obtained in the firing the colors remained stable, thus permitting the graduated selenium fronts to be efficiently applied, the outlines of the countries, the rivers, the lettering, and other identifications to be superimposed. A large scale registering frame was needed with precise adjustments for accuracy. Two expert silk screen men were available in the Seaporcel plant. The 60-foot furnace provided plenty of opportunity for accurate testing and for a proper absorption rate and 'curing' procedure in controlled firing.

"The problem required ten firings per plate and sixty total per set of six. I found it possible to unify the six plates that might need a slight fading adjustment by an overfire. The graduated red war fronts were in critical areas of adjustment. The firing was completed by a light acid resistant overglaze. In this problem the plates were prepared by the usual ground coat and the two cover coats in white, the standard practice in high grade commercial work.

"I found romance and mystery in the periodic table of elements. Why is the vapor point of Carbon so high and its near neighbors of the table so low? This seems to be a physical characteristic of the table and somewhat independent of the octave plan for the table. What is the relation of high vapor point to the nuclear structure? Has much research been done in this design field? A few variables of the Bentley snow crystals seem to encourage the design of an oxygen nucleus.

"Design should be the bridge between Science and Art."

MORE ON MODERN ART

N. L., #190 contained a reprint of an editorial on modern art that appeared in the May 1967 News Bulletin of the American Artists Professional League. That commentary was included in the N. L. because it was--and is--your editor's opinion that its message had significance for the role of color in art.

The reprint aroused some interest, and at least one different view of modern art and its implications for the role of color. Herb Aach, an individual member of ISCC, has requested that his reply to the editorial be printed in the N. L..

To the Editor: "As a painter, writer/contributing editor to Arts Magazine and Color Engineering, teacher on color, and above all, as a member of ISCC, I am much dismayed by the reprint of the AAPL editorial comments on 'Modern Art' in the Sep/Oct '67 issue of the ISCC News Letter.

"For one, tho we assume Art to utilize color, relevancy here is on the nature of Art and not on its use of color.

"For another, since this is written by artists against the efforts of other artists, in effect internecine, by its very nature this is very seldom if ever either objective or esthetically relevant. A washing of dirty linen in public which usually results in internal political fratricide. Ultimately the comments are more so illuminating not about the quality of Art but what is happening on the Art market. Thus, aside from being sad that the usual objective and factual stance of the ISCC News Letter lent itself to this purpose, the inaccuracies on its own terms contained within are all the more shocking. I have with the AAPL many more esthetic and ethic reservations in common than not. However, if Picasso is so undesirable, why then does the City of Chicago now have a huge Picasso sculpture? New York is to follow suit and like the Wyeth show at the Whitney Museum, the Picasso Sculpture show at the Museum of Modern Art here also broke all attendance records. Further, the quotation by Warren E. Cox dating back to 1960, pronouncing the decline of the non-representational art market. Perhaps this is desired, but unfortunately this is far from being the case. Frank Stella, one of the younger painters of this persuasion, has just sold 48 (forty-eight) works for \$7,000.00 a piece. Olitski and Noland, to mention two Color Field painters, not even around in 1960, have sold out their last show this season as well as last season. But so has Raphael Soyer. Further, the Whitney Annual following the recent Wyeth show, should, thereby, be dominated by representational works which it is decidedly not. Nor is this to be seen on the Gallery circuit, tho for certain, more representational work is to be seen today than in 1960. If anything, it appears that such style diversity is now a matter of coexistence, rather than the exclusion of one over the other. For that matter, there is plenty of bad work abounding, but like all such discriminations, it is to be found among all camps. And quoting Thomas Hoving, the director at the Metropolitan Museum, that in the art world, New York no longer has the bomb, well, he just dropped one. The largest painting ever, a Pop work at that, called 'F-III' and quite representational by James Rosenquist, lent by N.Y. collectors Robert and Ethel Scull, who reputedly paid \$55,000.00 for this, is being installed at the Met. It is also quite likely that this will be its permanent installation. If this is what the AAPL really wants, they are most welcome to it. But this is fighting fire with fire. If Picasso is declared undesirable, how about the unmentioned ones in the same boat? What then about Matisse and Bonnard and if so, how about the influence these two

have had on the Bread and Butter use of the Color Market? On the other hand, if the AAPL really has the gumption to become the Avant Garde, I'll cut my nose in spite of my face and join them, if they'll let me.

"Really, if the readership of the ISCC News Letter requires edification on Modern Art, one would hope for a more informative and less illtempered source."

LIGHTFASTNESS OF FELT-TIPPED MARKERS

The following article is reprinted with the permission of the author.

Feller, Robert L.* Felt-tipped markers and the need for standards of lightfastness for artists' colorants. Bulletin of the American Group-IIC, 8, No. 1 (1967), pp. 24-26.

When artists' oil paints are purchased in America, few buyers may realize the significance of the words that appear on many tubes: "Statement of contents as recommended by the American Artists Professional League. Conforms to all requirements of Commercial Standard CS98-42 issued by the National Bureau of Standards." Twenty-five-year-old Standard CS98-42 relates principally to the nomenclature, lightfastness, and tinting strength of artists' oil paints. R. J. Gettens was the first Chairman of the National Bureau of Standards' Standing Committee on CS98-42, and Ralph Mayer is the current Chairman. The original Standard may be read in the back of The Artist's Handbook, by Mr. Mayer. The revised Standard, CS98-62, may be purchased for 15 cents from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., 20402. Save for this document regarding oil paints, the artist today does not have a standard for lightfastness for pigments and dyestuffs used in other mediums.

Recently, a question arose concerning the permanence of architectural renderings done in felt-tipped markers. This medium is based largely on dyes dissolved in a solvent, and dyes generally have a poor, or at least "suspect," reputation for lightfastness.

Felt-tipped markers perhaps may not be considered to be a fine arts material and are seldom sold primarily for that purpose. Yet today, creative work in this medium is being bought, sold, and exhibited in increasing numbers. It was considered worthwhile to survey the lightfastness of currently available markers. This would appropriately fit into our general program of study regarding the effects of light on museum and artists' materials.

The colorants in about 75 individual felt-tipped markers were tested, representing products from at least 8 different companies. More than half were found to possess little fastness to light; that is, half of the markers tested had a lightfastness equivalent to British Standard 1006:1961 Class 3 or lower when exposed to

fluorescent lamplight. It is estimated that they would fade noticeably (at least to a BS2062:1961 Grey Scale Contrast of 3) in about 10 years on the walls of an art gallery that received about 100,000 footcandle hours of exposure per year of natural illumination. Many were capable of fading practically to complete colorlessness. **

Among the colorants that were fast to light in these tests were most blacks, some of the blues, and an occasional yellow or green. The lightfast blues and greens may have been based on phthalocyanines. Yellows of good fastness are the Allied Chemical Company's National Dye, Wool Yellow Extra NS (for water-based inks) and the General Aniline and Film Corporation's Azosol Fast Yellow RCA (alcohol soluble).

Although manufacturers are continually bringing out new lines and improving the qualities of this popular new medium, the results of these tests suggest that an artist interested in the lightfastness of felt-tipped markers may wish to make a few comparative tests on his own.

The results are also of interest to conservators. They warn against the indiscriminate exposure of works in this medium to excessive light. Moreover, they suggest that disfiguring marks by felt-tipped markers may occasionally be bleached by light as well as by chemical means.

A convenient minimum standard for artists' colorants would consist of at least three classes of lightfastness, such as: (1) fugitive; (2) intermediate; and (3) lightfast. Those in the latter case would be suitable for fine arts use. The first class might consist of those having a lightfastness of BS1006:1961 Class 3 or less; the last perhaps those of lightfastness equivalent to BS1006:1961 Class 6.5 or better.

The establishment of standards of lightfastness is not a simple problem to solve because variations in the illumination, temperature, relative humidity, vehicle, and colorant concentration all influence the results of fading tests. Until more precise tests and specifications are devised, a sample of alizarin paint may serve as a convenient standard of comparison to be exposed along with the other materials being tested. Alizarin is a colorant widely available in a relatively standard form (a lake based on synthetic 1,2-dihydroxyanthraquinone rather than the natural madder extract). The alizarin should not be used at full strength but "let down" to a tint equivalent to a Munsell "value" of between 6 and 8. For convenience, the paint may be a mixture of alizarin in white lead or titanium white; or it may be a transparent wash or glaze of alizarin. The fading rates of such paint-outs will not be precisely the same, but the results should be reasonably close for most practical purposes. When in doubt, several different types of alizarin coatings can be used in the "control." ***

If a new pigment, exposed to diffuse daylight or fluorescent lamplight along with such an alizarin paint, fades appreciably faster than the alizarin, it should be discarded for work which requires pigments of the highest possible fastness to light. If it fades in less than one-quarter the time it takes for alizarin to fade, the colorant may be considered to be in the "fugitive" class.

Admittedly, much work would be required to establish a precise standard; but an alizarin paint can be a convenient "rule of thumb" standard that the artist, himself, can employ. When mixed with whites or applied as a glaze as suggested, it has a lightfastness equivalent to about BS1006:1961 Class 4 or 5 (noted previously in the Bulletin of the American Group-IIC, 4, No. 1 (1963), pp. 10-12).

The results of this brief survey of the lightfastness of felt-tipped markers emphasize again the need for well-recognized standards of lightfastness for artists' pigments and dyestuffs. One of the first requirements to change the present lack of such standards is to have the artist, himself, become aware of the problem. Should he then demand such standards, he will find the suppliers of his materials able and more than willing to meet the challenge.

* National Gallery of Art Research Project, Carnegie-Mellon University, Mellon Institute, Pittsburgh, Pa.

** This was even true of one set which was labeled "permanent." The word "permanent" perhaps refers to their ability to withstand water rather than light, as the word does in the case of writing inks.

*** The use of tints of alizarin as a convenient control has also been suggested by Mr. Henry Levison in Russell Woody's book, Painting with Synthetic Media, New York, Reinhold, 1965, pp. 141-149.

INTERNATIONAL COLO(U)R ASSOCIATION

The formation of this Association was announced in the Sept.-Oct. 1967 issue of the N. L. Following the meeting of June 1967 at which the AIC was founded, Italy applied for membership, thus becoming the ninth member country. The original eight are: France, Great Britain, Japan, Netherlands, Spain, Sweden, Switzerland, and U. S. A.

Following are the statutes of the Association:

Article 1. Name

The

International Colo(u)r Association
Internationale Vereinigung für die Farbe
Association Internationale de la Couleur

was founded on 21st June 1967 in Washington, D. C.

When referred to by initials, the abbreviation AIC will be used.

Article 2. Objects

The objects of the AIC are to encourage research in color in all its aspects, to disseminate the knowledge gained from this research, and to promote its application to the solution of problems in the fields of science, art and industry on an international basis.

The AIC shall also aim at close co-operation with existing international organizations, such as, for example, the International Commission on Illumination, the International Standards Organization and the International Commission for Optics, in as far as color is concerned. The AIC will not, however, duplicate the work of these bodies nor attempt to take over any of their responsibilities.

Article 3. Congresses

In particular, the AIC shall be responsible for arranging international color congresses to take place at convenient and appropriate intervals, initially every 4 years.

The congresses shall be organized in turn by the national member associations on a self-sustaining basis without incurring expense for the AIC. The AIC can also organize or promote special international or regional congresses or symposia.

Article 4. Membership

Only one organization from each country can become a member of the AIC. To be admitted, the organization shall be one

(a) whose aims are essentially in conformity with the objects of the AIC as defined in the first paragraph of article 2;

(b) which is broadly representative of those people in its country interested in these aims;

(c) which is properly constituted so as to enable an authorized representative to speak on its behalf.

Where no single organization adequately meeting these conditions exists in a country, a national color committee may be set up representative of the various organizations and interests concerned with color in that country. This committee may then apply for membership of the AIC.

Persons domiciled in a country in which no such organization exists, may be affiliated with the AIC as observers if they are interested in the aims of the AIC and show they have knowledge in the field involved. Ob-

servers shall have no right to vote, but may take part in the activities of the AIC and receive the information and documents intended for the member organizations.

Admission of member organizations and observers shall be decided by vote of the executive committee on receipt of a written application addressed to the president, and effective upon payment of an annual subscription fee. It will be the responsibility of the executive committee to determine whether the organization applying for membership satisfies the conditions 4(a), (b) and (c) above.

Withdrawal of member organizations and observers is possible at the end of each calendar year; notice must be given in writing to the president and the secretary at least three months in advance.

Expulsion of member organizations shall be upon majority vote of the executive committee on recognition that the conditions of membership are no longer met by the organization or upon non-payment of subscription fees. Expulsion of observers will be automatic on non-payment of subscription fees.

Article 5. Meeting of delegates

A meeting of delegates shall normally be held at least every 4 years on the occasion of each congress. If required, additional meetings may be held by a decision of the executive committee or at the request of a majority of the member organizations. At least 3 months notice must be given for any meeting of delegates.

Each member organization can delegate any number of representatives from among its members to the meeting. Observers shall also be entitled to take part.

The meeting of delegates shall discuss all matters submitted to it by the executive committee or by a member organization.

Article 6. Resolutions and elections

The executive committee and each member organization can require that a resolution be taken upon any matter.

Resolutions and elections shall be notified by means of a registered circular from the executive committee. In the case of elections, the executive committee shall previously invite the member organizations to make nominations in writing and inform them of its suggestions for the election, if any, and list all the nominations made in an election circular.

Each member organization shall have one vote. The member organizations may vote either in writing to the president within 60 days after receipt of the circular, or at a meeting of delegates designated in the circular. In this case the vote shall be cast by a

delegate duly appointed by the member organization.

Resolutions notified in the above manner are decided by a simple majority of the votes cast within the specified period. The same procedure will be used in elections, further ballots being carried out until one candidate has a majority.

The right is reserved for extraordinary resolutions - other than such mentioned in article 9 - to be taken or emergency elections to be made by a meeting of delegates without prior notice, provided this is agreed by all those delegates present who are entitled to vote. No such resolution or election will be valid unless it is approved by an absolute majority of votes of all member organizations.

Article 7. Executive committee

The executive committee shall consist of a president, a vice-president, a secretary-treasurer, and four ordinary members.

One member of the executive committee shall always belong to the member organization in whose country the next congress is to take place; the others shall each belong to one of the other member organizations.

The executive committee shall be elected for a 4-year term commencing from the end of each congress year. The 4 ordinary members of the executive committee shall retire at the end of the 4-year period. The retiring president and vice-president, however, will automatically continue as ordinary members of the executive committee for an additional term. The secretary-treasurer shall be eligible for re-appointment. If a vacancy occurs during the tenure of office a by-election shall be held for the remainder of the tenure.

The executive committee shall be responsible for the administration of the AIC, the preparation and execution of resolutions, elections and meetings of delegates and shall represent the AIC in any discussions or negotiations with other bodies.

Article 8. Financial

The members of the executive committee shall serve without financial compensation. Secretarial expenses will be met from the funds of the AIC derived from the subscriptions of member organizations and observers. Travelling and other expenses of the executive committee will not be a charge on AIC funds.

The annual subscription of the member organizations shall be the same for each member organization and shall be fixed at the 4-year meeting of delegates for the subsequent 4-year period. It shall not exceed 100 U.S. dollars per annum.

The annual subscription for an observer shall be determined by the executive committee but shall not

exceed 25 U.S. dollars per annum.

The secretary-treasurer shall keep proper accounts of the income and expenditure of the AIC and shall present an annual financial statement to the executive committee and a 4-yearly statement to the meeting of delegates.

The member organizations shall not be under any financial obligation to the AIC beyond their member subscriptions.

The executive committee has the authority to raise funds only by means of voluntary contributions, membership subscriptions, or profit derived from sponsored congresses or symposia.

Article 9. Amendment of statutes and dissolution of the AIC

These statutes may be amended and the AIC dissolved only upon a vote by at least a two-thirds majority of all member organizations, a discussion at a meeting of delegates having immediately preceded the vote. In the event of a dissolution, any balance remaining in the funds of the AIC would be equally divided among member organizations.

Article 10. Languages

The languages of the AIC shall be English, French and German. Each member organization and each observer may choose in which of these languages it or he wishes to carry on correspondence with the AIC. In the event of any dispute arising in the interpretation of the statutes, the French version shall be regarded as the official document.

REPRINT ENCLOSED WITH THIS ISSUE

"Chromatic Strength of Colors: Dominant Wavelength and Purity" by Ralph M. Evans and Bonnie K. Swenholt. J. opt. Soc. Amer., 1967, 57, No. 11, 1319-1324.

MISCELLANY

Department of Definitions

"Color order systems are emotional arrangements of colors in an imaginary space according to some idea thought to be scientific." Ralph M. Evans.

Colorama. From the notebooks of Howard Ketchum.

"Where color is a factor, women make the selection of products 72% of the time."

"Blue is the second most popular color for food packages."

"In some African countries blue is traditionally reserved for royalty."

"Medium blue is preferred by today's car buyers."

**LIST OF ARTICLES ON COLOR RECEIVED BY
NEWS LETTER**

"Accuracy of Hiding Power Determinations Based on the Kubelka-Munk Theory" by W. L. Boyer, J. A. Manasso, & A. C. Elm. J. Paint Tech., Vol. 39, No. 515, Dec. 1967, 763-768.

"Another Color Difference Formula" by Manfred Richter. Color Engineering, Vol. 6, No. 1, Jan.-Feb. 1968, 38-40.

"Chemical Background of Some Colour Masking Techniques" by K. O. Ganguin & E. Macdonald. J. Photographic Sci., Vol. 14, No. 5, Sept/Oct 1966, 260-277.

"Chromatographic Analysis of Dyes in Paper." Color Engineering, Vol. 6, No. 1, Jan-Feb 1968, 41-42.

"Color Prediction Using the Two-Constant Turbid-Media Theory" by H. R. Davidson & H. Hemmendinger. J. opt. Soc. Amer., Vol. 56, No. 8, Aug. 1966, 1102-1109.

"Colored Signal Lights: Their History, Development and Speculation" by Paul M. Fisher & Ronald E. Bostick. Color Engineering, Vol. 6, No. 1, Jan-Feb 1968, 28-33.

"Colour: Some Practical Problems in Camera Work" by G. Baxter. The Litho-Printer, Vol. 9, No. 6, June 1966, 32-34.

"Dickens Cites Basic Guidelines to Color" by R. L. Dickens. Printing Views, Vol. 32, No. 6, June 1966, p. 20, 65.

"Economical Method of Analyzing Perceived Color Differences" by J. O. Ramsay. J. opt. Soc. Amer., Vol. 58, No. 1, Jan. 1968, 19-22.

"Flicker HTRF as Test of Color Vision" by Mitsuo Ikeda & Mitsuo Urakubo. J. opt. Soc. Amer., Vol. 58, No. 1, Jan. 1968, 27-31.

"The Impact of Colour Scanners on Process Engraving" by W. G. Ryman. British Printer, Vol. 79, No. 6, June 1966, p. 110, 112, 114.

"Intersections of the Spectral Reflectance Curves of Metameric Object Colors" by W. S. Stiles & G. Wyszecki. J. opt. Soc. Amer., Vol. 58, No. 1, Jan. 1968, 32-40.

"Particle Size as a Formulating Parameter" by Fred B. Stieg, Jr. J. Paint Tech., Vol. 39, No. 515, Dec. 1967, 701-715.

"The Significance of Recent CIE Recommendations for Color Measurement" by Fred W. Billmeyer, Jr.

Color Engineering, Vol. 6, No. 1, Jan-Feb 1968, 34-38.

"Ultraviolet Light Absorbers in Clear Coatings for Wood." J. Paint Tech., Vol. 39, No. 515, Dec. 1967, 736-751.

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