Inter-Society Color Council Newsletter

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ANNOUNCEMENT

Members of the Council are invited to submit nominations for the 1978 Macbeth Award. The provisions for the award state that "The Macbeth Award shall be given in recognition of recent important contributions in the field of color, preferably within the 5 to 10 years preceding the Award. The work may concern a specific project, application, service or use of color, or other accomplishment related to color in science, art, industry, education, merchandising, etc. The candidate need not be a member of the ISCC, nor be a citizen of the United States."

Nominations should be submitted by 30 June 1977 to the Chairman of the Awards Committee: Henry Hemmendinger, R. D. 1, Box 213, Pequest Bend, Belvidere, New Jersey 07823.

BOARD OF DIRECTORS MEETING, APRIL 17, 1977

APPLICATIONS APPROVED FOR INDIVIDUAL MEMBERSHIP

Miss Rita J. Adrosko Division of Textiles Smithsonian Institution Washington, D.C. 20560	Natural dyes and dyeing in all its aspects. Costume Society of America, Victorian Society of America, Society for the History of Technology, American Crafts Council, Handweaver's Guild of America.
Mr. Harry A. Barber 7565 Bridge Lake Road Clarkston, Michigan 48076	FSCT. Dispersion and formulation for application and color.
Mrs. Janina V. Edwards 7709 Huntmaster Lane McLean, Virginia 22101	ASID. General and office interior design. Theory and application.
Mr. Kenneth Edwards 4 Greythorn Park Glenageary, County Dublin IRELAND	Colour manipulation, where it is used to solve design problems involving factory production, hospital patients, educational buildings, etc. F.B.I.D., A.I.P.D., F.I. Arch. S., Vice-President of the British Institute of Interior Design.
Mrs. Rosalie Gorfkle 16544 Southeast 28th Bellevue, Washington 98008	Human response to color. Lighting and color relationships as they affect the elderly and visually impaired.
Mrs. Herta E. Ouellette 6718 Holford Lane Springfield, Virginia 22152	ASID. Psychology, chemistry, use in interior materials, decorative purposes, selections of color and combinations thereof, color systems. Relationship with color and artificial light.
Mr. Toshio Hayasi Tokyo Medical & Dental University 3rd Department of Prosthodontics 1-5-45 Yoshima, Bunkyo-ku Tokyo 154, JAPAN	Color analysis of the tooth crown and gingival mucosa for duplicating the natural appearance in complete dentures. Surveying the process of healing after extraction of teeth by following up changes in the color of gingival mucosa. International Association for Dental Research.
Ms. Martha Helzel PPG Industries, Inc. Glass Division P. O. Box 11472 Pittsburgh, Pennsylvania 15238	AChS. Measurement of color in colored and clear glasses; measurement of color for coatings on glass; establishment of specifications for both colored and coated glass for the purpose of quality control and assurance. Sigma Xi; Coblentz Society, SSA.
Ms. Catherine L. Jenkins 22 Pierrepont Street Brooklyn, New York 11201	AChS. Pigment permanence, pricing, and safety with respect to the arts and crafts fields.
Mr. Ray Josephs Chairman, International Public Relations Company, Inc. 230 Park Avenue New York, New York 10017	Color standards for carpeting and home decor products. Also maintain continuing interest in the House and Garden Color Program.
Mr. George M. Lorditch Macbeth Division Kollmorgen Corporation P.O. Drawer 950 Newburgh, New York 12550	Measurement and analysis.
Dr. Arthur R. Maret 595 East Forum Roselle, Illinois 60172	AChS, OSA, SPSE, TAPPI. Printing inks, powder coatings, theoretical relationships between size, surface properties and color for such systems. Royal Institute of Chemistry.
Ms. Maribeth McMahon 100 Endicott Street Danvers, Massachusetts 01923	IES, OSA. Lighting. Laser Institute of America, Society of Women Engineers.
Mr. Ralph D. Nelson, Jr. Pigments Department E.I. Du Pont de Nemours Co. 256 Vanderpool Street Newark, New Jersey 07114	AChS. Computation of Kubelka-Munk coefficients for off-specification pigments due to various process problems. A.I.Ch. E.

Mr. Don W. Parker 233 Greenwood Avenue Alenwood, Illinois 60425	FSCT. Control systems, theory (mixture, color difference), education, computer application of theory, instrumentation, human perception. National Coil Coating Association. (Sherwin-Williams Company)
Dr. Robert A. Prosser Room S 121 CEMEL, NARADCOM Natick, Massachusetts 01760	AChS. Color specification, color matching, and color tolerances in textiles.
Mr. Irving Shack c/o M. Grumbacher, Inc. 460 West 34th Street New York, New York 10001	AChS, NPCA. Research, development and production of artists' paints
Ms. Betsy Willingham Coats & Clark Sales Corp. P.O. Box 48266 Doraville, Georgia 30362	Seasonal forecasting--mens, womens, and childrens wear.
Mr. Wayne T. Wozhiak 1335 Fortune Bay Hoffman Estates, Ill. 60195	AChS., Society of Applied Spectroscopy. Color stability of dental restorative materials; shade matching; additives for dental porcelain for matching natural teeth.

FOR INFORMATION:
NEW DELEGATE FROM FSCT

Mr. Alexander A. Chasan General Services Administration Federal Supply Service Crystal Mall No. 4 Washington, D.C. 20406	AChS, ASTM, FSCT, MCCA. Color matching, visually and instrumentally; effects of gloss appearance; metamerism. Steel Structures Painting Council, American Institute of Chemists.

ERRATUM

Ms. Iris Weinstein reported that she had not yet become a member of GATF as reported in the January-February 1977 issue, No. 246.

PROBLEMS SUBCOMMITTEE 37: ARTISTS' MATERIALS

Scope

The Subcommittee will accumulate the information for artists' handbook which will describe the characteristics of artists' materials – pigments, media, solvents, and formulations – currently available to the practicing artist, art conservator, and designer. The purpose of this Subcommittee's project is to translate the technical information on materials into the language and terminology of the artist and artisan. It is envisioned that this study will include identification of commercial materials as well as standard methods of evaluation and description of performance and salient features of materials.

First Project: Artists' Paints

Art galleries, museums, and the public expect the artist or decorator to use quality materials, and his professional reputation rests on his knowledge and choice of these materials. At the present time, due to confusion in the use of terms, there is no way that the artist or decorator can be certain of the quality, particularly in terms of permanence, of the paint he buys.

As a whole, the artists' and decorators' paints on the American market are of good quality, well made, and honestly but often incompletely labeled. Cases of mislabeling usually arise from an effort to describe the appearance of a paint to artists or decorators who are unfamiliar with the names of the pigments used. This problem has become acute in recent years because of the introduction of new organic pigments and new media such as the acrylic emulsion paints.

The purpose of the Subcommittee is to gather information, preferably from the manufacturers but otherwise by testing, which would allow the preparation of a list of the paint lines of major artists' and decorators' suppliers, giving the following: identification (by Colour Index name and number) of the pigment or pigments used; description of the color of the paint in Munsell or ISCC-NBS terms; a rating of lightfastness; and a rating of tinting strength.

The work of the Subcommittee is related to and should be carried out in cooperation with the NBS, which is currently revising the 1962 Voluntary Standard for Artists' Oil Paints CS 98-62. The proposed list might appear as an appendix to the new standard.

Objectives

1. Compile a list of the art and decorator paint lines of major manufacturers, with the main pigment or pigments used in each. Request this information from the manufacturers, but check it by spectrophotometric or chemical pigment identification to insure against incorrect information.

2. Select appropriate rating scales for lightfastness, tinting strength, opacity, oil absorbency, compatibility with various media, and possibly other desirable information. Compile the necessary data, using available sources in the ink and paint industries.

3. Determine the color of the paints in Munsell or ISCC-NBS terms. It will be necessary to select the means for so doing, including sample preparation, mixture with white as required, and use of spectrophotometric or visual techniques.

4. Compile the data from objectives 1-3, as a handbook or as an appendix to an appropriate standard, and prepare it

for publication.

5. Develop, for separate publication, other useful information or teaching aids resulting from the Subcommittee's studies.

Joy Turner Luke

THE STORY OF THE INTER-SOCIETY COLOR COUNCIL

This brief story about the Inter-Society Color Council is intended for the new member who wants to know its historical background, its aims and purposes, and its accomplishments. For the new and old member, it is also a reminder of privileges and duties.

AIMS AND PURPOSES

The aims and purposes of the Inter-Society Color Council, founded in 1931 and now an organization of international repute, are to stimulate and coordinate the work being done by various societies, organizations and associations leading to the standardization, description and specification of color, and to promote the practical application of these results to the color problems arising in science, art and industry.

MEMBERSHIP

Member-Bodies

The By-Laws of the Council (incorporated in the State of New York) state, "Subject to the laws of the State of New York, the ultimate general authority and responsibility for the policies and affairs of the Council shall be vested in the member-bodies acting through their voting delegates and the Board of Directors." A member-body may be any non-profit society, association, or organization of national scope interested in color and desirous of participating in the activities of the Council for the furtherance of its aims and purposes. Each may be represented by ten delegates. The chairman and two additional delegates are entitled to vote. It is the duty of the chairman to report to the member-body all proceedings of the Council which are of interest to the member-body and to transmit any reports of the Council which should appear in the publications of the member-body. All delegates should bring to the Council any problems in the field of color of particular interest to the member-body. At least one meeting a year should be held by each delegation, probably at a meeting of its member-body. Reports of such meetings should be made part of the annual report of the member-body to the Council, which is published in the Annual Report issue of the ISCC *Newsletter*.

A current list of the member-bodies of the ISCC is given in the accompanying table.

By action of the Board of Directors in 1969, the President-Elect of the Council is designated as Liaison Officer for Member-Body Delegations. It is his function to communicate with the member-bodies through their delegations and to transmit their comments and recommendations to the Board of Directors.

Individual Members

The Council also provides for membership of individuals who desire to support the work of the Council on color. Their association in the Council's work has been found to be very rewarding. Until 1977, the individual members, unless they also represented one of the member-bodies, could not vote or hold office. Now, however, individual members who are chairman of a standing committee or chairman, vice-chairmen, or subcommittee chairmen of the Problems committee, but do not represent a member-body, make up an Individual Member Group delegation with full privileges of voting and holding office. Currently there are nine members of the IMG voting delegation. It is the function of this delegation to communicate with individual members of the Council and to transmit their comments and recommendations to the Board of Directors.

Individual members, as well as member-bodies, support the Council by the payment of annual dues. Individual members who are retired are eligible for a reduced dues rate.

Sustaining Members

The By-Laws of the Council provide that any person or corporation, or society, association, or organization not of national scope is eligible to become a Sustaining Member of the Council.

Honorary Members

Also by Board action, the classification of Honorary Member of the Council has been created to recognize members of long standing who played a prominent role in the founding and the early formative years of the Council. The Honorary Members of the Council, some deceased, are listed in the Membership List. Honorary Members may be nominated by any Council number, and are elected by the Board of Directors after a minimum of sixty days from its receipt of the nomination.

International Colour Association

The Council itself is a member of an international organization, the International Colour Association, known as the AIC from the initials of its French name. The AIC is organized around the leading national color societies of the various countries. It sponsors a major international color meeting every four years, the third Congress being COLOR 77, held in Troy, N.Y., in 1977 under the spon-

sorship of the ISCC and the Canadian Society for Color. The Secretary of the Council is Liaison Officer with the AIC, and through the ISCC *Newsletter* transmits news of the AIC to its members.

MILESTONES IN COUNCIL HISTORY

The Inter-Society Color Council had its beginnings in a "color conference" held in Washington, May 14, 1930. This color conference was called by Professor E.N. Gathercoal of the University of Illinois College of Pharmacy in connection with the decennial meeting of the National Formulary 1929 Revision Committee of the U.S. Pharmacopoeia. This committee needed help in the selection of color names for describing drugs and drug products in the U.S. Pharmacopoeia. This "color conference" aroused so much interest that the Executive Committee of the Optical Society of America adopted a resolution on October 30, 1930, that "the need for better organization of those interested in the description or specification of color which found expression at the color conference . . . can be met by the formation of a joint council consisting of officially designated representatives of the several national societies and associations interested in the description and specification of color." On February 26, 1931, at the Museum of Science and Industry in New York City, forty-seven persons – thirty-one of them representing fourteen national associations and sixteen of them interested individuals – met in a preliminary conference to discuss this resolution. Chairman of this first preorganization committee was Royal Bailey Farnum. Lloyd A. Jones chaired the next sessions until the election of the first Inter-Society Color Council Chairman, Professor E. N. Gathercoal. The decision was made to form the Inter-Society Color Council at the first meeting held at the Museum of Science and Industry in New York City, September 21, 1931.

The preliminary conference on organization of an inter-society committee on color specification, held on February 26, 1931, preceding the first meeting of the Inter-Society Color Council, passed as its first resolution the principle of membership:

"Resolved: It is the sense of the meeting that an Inter-Society Color Council be formed composed of delegates from national societies and associations interested in the standardization, description, and specification of color."

The first meeting, held on September 21, 1931, recommended expansion of the membership provisions to include individuals vitally interested in the activities of the Council who might not be designated as delegates by the affiliated societies or associations. It should be noted that the principles of membership adopted in 1931 still hold today. At the fourth annual meeting on February 21, 1935, articles of organization and procedures were adopted. At that time there were nine member-bodies with 30 official delegates.

Another milestone in Council history was passed on October 13, 1953, when the Inter-Society Color Council was incorporated. The incorporation and the adoption of By-Laws did not change the primary objectives of the Council. Equipped with sound principles of organization, an imposing list of unsolved color problems, committees taking aggressive action on problems of terminology, specification, and measurement, and an established *Newsletter* publication, the Council could be considered to have come of age.

In 1961 and again in 1976 the By-Laws were revised in keeping with the requirements of a growing national organization. It should be noted that the By-Laws are in essence supplemented by a statement from a 1944 Report of an Executive Committee covering the Inter-Society Color Council organization and functions as revised in 1954. The purpose of this statement was to review the procedures which had been developed during the operation of the Council since its inception in 1931. This was done in the hope that the statement would prove helpful in guiding future Inter-Society Color Council activities and responsibilities. It is recommended that the By-Laws of the Inter-Society Color Council and its attached Policy Statement be read for a detailed description of its organization and functions.

In the 1976 revision, the content of the former By-Laws was divided among a Constitution, By-Laws, and Standing Rules. These are now published, together with the above-mentioned Policy Statement, and a copy will be sent to any interested member on request to the Secretary.

GROUND PLAN FOR THE COUNCIL

To understand and interpret today's activities, let us return to the beginning of the Council. Professor E.N. Gathercoal, at the completion of the first full year of the activities of the Inter-Society Color Council, brilliantly gave a plan for the future:

"1. The Council should very definitely enlist the hearty cooperation and support of those industries of the United States which are definitely interested in color.

"2. The Council should definitely interest the two great groups of teachers of color; i.e., the Eastern Arts Association and the Western Arts Association, as well as other national organizations of art, teachers, and artists.

"3. The Council should definitely undertake to assign for study every problem relating to color that is presented to the council. This does not mean that the Council should finance and actually carry out research and study in connection with all of these problems, but it should undertake to bring together the problem and the person, committee, or organization that is best qualified to study the problem and present a solution of it. This means that the Council should develop a very wide acquaintanceship among persons and organizations interested in color science so that these problems can be assigned to the very best advantage.

"4. The Council should make its purposes and objects known and should initiate and request suitable publicity to do this.

"5. The Council should definitely endeavor to enlarge its membership in order that its influence may be more widely felt and that its activities may be more highly developed.

"6. The Council should endeavor to place as its executive head on its executive committee the strongest execu-

tive that can be drawn from the ranks of those deeply interested in the study of color."

The recommendations of Professor Gathercoal apply today as they did in the beginning.

AWARDS

The Godlove Award

Any historical survey of the Inter-Society Color Council would be incomplete without mention of the great contributions to the Council of Dr. I.H. Godlove, chairman of its first committee on measurement and specification and for many years editor of the Council's *Newsletter.* His *Newsletter* was an authoritative information resource in all fields of color. It became the source for the voluminous ISCC bibliography on color. While he was alive he spoke of establishing a fund with the Inter-Society Color Council to make possible a modest medal or award to members doing outstanding work in color over a designated period. After his death, the Board of Directors at their April 5, 1956, meeting voted to accept with gratitude the generous proposal for the establishment of the I.H. Godlove award made by Mrs. Margaret Godlove. This award is now presented biennially to worthy persons for their contributions to the knowledge of color.

The Macbeth Award

In 1970 the Board of Directors of the Council accepted with gratitude the offer of Norman Macbeth, Jr., to establish a Macbeth Award in memory of his father, Norman Macbeth (1873-1936). This award is presented biennially on even years, alternating with the Godlove Award, the first presentation being made in 1972. The Macbeth Award is given in recognition of recent important contributions in the field of color, preferably within 5 to 10 years preceding the Award. The work may concern a specific project, application, service, or use of color, or other accomplishment relating to color in art, industry, education, merchandising, etc.

ACTIVITIES OF THE COUNCIL

Problems Committee

This standing committee is responsible for investigating color problems which are brought to the attention of the Council. Such problems should preferably be in fields of activity lying properly within the domain of more than a single member-body. To date subcommittees have worked on 37 officially designated problems. Each member of member-body delegations should remain continuously alert to color problems which arise in that member-body. These problems should be brought to the attention of the Board of Directors of the Inter-Society Color Council. Once a problem has been accepted by the Board, delegates and individual members are expected to contribute to its solution. The Inter-Society Color Council will only thrive if it has continuously before it those new problems on which the Council members should be working. Otherwise a need for its existence largely disappears. The opportunity for people across many lines of activity to work together in solving color problems furnishes a common link to colorists, both intellectually and socially.

Solutions to the problems studied by the Inter-Society Color Council are published, preferably in the member-body publications which originally sponsored the unsolved problem. However, the report which may contain a solution in the whole or perhaps be only a progress report may be published in other journals in order to obtain the widest dissemination of the findings. No discussion of the ISCC Problems Committee is complete without mention of some of the accomplishments which have been made. These include the ISCC-NBS Method for Designating Colors, a Comparative List of Color Terms, a Survey of Color Specifications, the Color Aptitude Tests used internationally, the standardization of Color Blindness Tests, a very thorough study of the Illuminant in Textile Color Matching, widely used as reference material and as the basis for establishing standards for color matching lamps, a study of the Colorimetry of Near-White Surfaces, the Report of Problem Committee No. 20 entitled "Color – A Guide to Basic Facts and Concepts," (published by Wiley, 1963) and many other reports too numerous to mention at this time. The membership list contains information on both past and currently active problems, including their scopes and a listing of published reports.

Other Committees

Much of the work of the Council is carried out by the Problems Committee. In addition, mention should be made of the valuable roles played by the Finance Committee, the Membership Committee, the Publications Committee, the By-Laws Committee, and the Executive Committee, all of which are also standing committees. The Council also appoints Liaison Representatives for Long-Range Planning and for interaction with the AIC and the American National Standards Institute (ANSI).

Annual Meeting

An outstanding activity of the Council is its Annual Meeting at which time colorists have an opportunity to meet and discuss their mutual problems as part of the continuing effort to sponsor color education. At many of its meetings, or with a meeting of a member-body, the Council has supported symposia on some particular aspect of color, of interest to its members. These symposia have been held quite regularly since 1938. The whole gamut of color usage, color science, color in education, and color in art have been treated in these symposia. Problems Subcommittees traditionally hold open meetings at the Annual Meeting to review their work and to hear comments and suggestions from members of the Council.

Symposia

In addition to holding symposia at annual meetings and participating in symposia at meetings of member-bodies, the Council has sponsored a series of Technical Conferences which have become known, because of their location, as the Williamsburg Symposia. These have been limited-attendance meetings at which a single subject is discussed in detail by invited speakers and through audience participation. Topics have included instrumental colorant formulation (1966 and 1976), color perception (1969), the optimum reproduction of color (1971) and the objectives of pictorial color reproduction (1978), fluorescence and the colorimetry of fluorescent materials (1972), and color metrics (1979). These symposia are not scheduled on a regular basis, but are planned according to the timeliness of the subject matter.

Newsletter

A major activity of the Inter-Society Color Council is the publication of the ISCC *Newsletter,* under an editor who is also chairman of the Publications Committee. The first *Newsletter* was published in 1931; the year 1977 began with No. 246. The *Newsletter* tries to call attention to important literature on color, to report on the activities of ISCC and to report on activities of member-bodies, individuals relating to color, and activities of other color societies. Delegates and individual members are expected to make contributions to the *Newsletter.* The *Newsletter* also includes a selected Bibliography, which is currently being compiled by The Colour Group (Great Britain) with the assistance of the Council.

Journal

In 1976 the Council, together with The Colour Group (Great Britain) and the Canadian Society for Color, endorsed the independent journal *COLOR research and application,* published by Wiley-Interscience, a division of John Wiley and Sons. The journal reports on the science, technology, and application of color in business, art, design, education and industry.

Munsell Color Foundation

The Munsell Color Foundation, Inc., was founded in 1942 as a nonstock, nonprofit organization whose chief purpose was similar to that of the Council, "to further the scientific and practical advancement of color knowledge and in particular knowledge relating to standardization, nomenclature, and specification of color, and to promote the practical application of these results to color problems arising in science, art, and industry." A further purpose was "to acquire by gift, donation, contribution or otherwise, property and assets of every kind; to give, contribute, or otherwise dispose of property so acquired as . . . shall further the purposes of the Foundation. . ."

In recent years the Foundation has actively pursued these purposes under its tax deductible IRS classification. Because of the community of interest between the Inter-Society Color Council and The Munsell Color Foundation, the Board of Directors of the Council nominates one trustee to serve on the Foundation's seven-member Board of Trustees, and the Foundation serves as the Foundation Associate of the Council. The Council recommends and encourages contributions to the Foundation for the advancement of its purposes.

EPILOGUE

This brief survey of the Inter-Society Color Council could fittingly close with verses Dr. I.H. Godlove wrote expressly for the Council:

"It's not the brains or genius
Nor money that we pay;
It's the close cooperation
That's bound to win the day.
It's not the individual
Nor Council as a whole,
But the everlastin' teamwork
Of every bloomin' soul."

The foregoing item about the Inter-Society Color Council was originally prepared by W.J. Kiernan. It appeared first in ISCC *Newsletter* Number 173, September-December 1964, and was revised by the Secretary in 1970 and 1977.

TABLE. Current List of ISCC Member Bodies

1. American Artists' Professional League
2. American Association of Textile Chemists and Colorists
3. American Ceramic Society
4. American Chemical Society
5. American College of Prosthodontists
6. American Institute of Architects
7. American Psychological Association
8. American Society of Interior Designers
9. American Society of Photogrammetry
10. American Society for Testing and Materials
11. Artists Equity Association, Inc.
12. The Color Association of the United States, Inc.
13. Color Marketing Group
14. Dry Color Manufacturers Association
15. Federation of Societies for Coatings Technology
16. Gemological Institute of America
17. Graphic Arts Technical Foundation
18. Gravure Technical Association
19. Illuminating Engineering Society
20. Industrial Designers Society of America
21. Institute of Food Technologists
22. Manufacturers Council on Color and Appearance
23. National Association of Printing Ink Manufacturers
24. National Paint and Coatings Association, Inc.
25. Optical Society of America

26. Society of Motion Picture and Television Engineers
27. Society of Photographic Scientists and Engineers
28. Society of Plastics Engineers, Color and Appearance Division
29. Technical Association of the Graphic Arts
30. Technical Association of the Pulp and Paper Industry

NEWS FROM MEMBER-BODIES

NEW ISCC MEMBER-BODY

Artists Equity Association, Inc., a national organization of professionals from every visual arts field, has recently joined the ISCC. While AEA is interested in the work going on in several ISCC subcommittees, the association has been instrumental in the formation of the new Problems Subcommittee #37, Artists' Materials.

Artists Equity was born in New York City in 1948 when Yasuo Kuniyoshi was elected first president. From the first, the organization has taken a nonpartisan view esthetically and politically. Its purpose is not to advance the careers of individual members, but instead to concentrate on a vigorous program of services and advocacy, thus advancing the profession as a whole. AEA policy is made by a national board elected every two years and carried out from a national office located in Washington, D.C.

Originally, membership in AEA was restricted to painters, sculptors, and printmakers, and the majority of members belonged to chapters in or near the big art centers of New York and Chicago. Today, the fuzzy line between art and craft has disappeared, and AEA welcomes as members all professionals in the visual arts. There are chapters throughout the country, from Maine to Florida, from East Coast to West. Artists who do not live near an existing chapter are welcome to join as Members-at-Large or to work toward the formation of new chapters.

Artists Equity believes the ISCC offers a unique opportunity for the scientist, the technician, and the artist to cooperate in the development and dissemination of knowledge of benefit to all. The AEA voting delegates to the ISCC will be John Blair Mitchell, AEA National President; Frank Bunts, President, AEA Washington Chapter; and Joy Turner Luke, Chairman, Problems Subcommittee #37.

Correspondence should be directed to Gail Rasmussen, Executive Director, Artists Equity Association, Inc., 3726 Albemarle Street, N.W., Washington, D.C. 20016. Telephone: 202-244-0209.

OPTICAL SOCIETY OF AMERICA

New Journal

I want to introduce you to our new journal, *Optics Letters*, which will commence publication this July. The establishment of this Optical Society letters journal survived a long series of deliberations conducted by various committees. The penultimate recommendation was made by the Committee on Society Objectives and Policy, and a unanimous endorsement by the Board of Directors at its meeting in Tucson last fall has officially launched this endeavor.

It is very fortunate indeed that we have been able to persuade my very good friend and colleague Bob Terhune to accept the editorship. His outstanding professional accomplishments together with his considerable managerial experience provide an extraordinarily suitable background for this new challenge. Bob's extensive research interests have spanned spectroscopy, nonlinear optics, image reconstruction, and the optical properties of aerosols.

Optics Letters will provide the optics community with its only letters journal of wide circulation. It is the full commitment of the Optical Society to support this new publication in order that it can provide a rapid dissemination of the impactful contributions to all branches of optics.

Manuscripts will be accepted beginning in March, and publication will commence with the July issue. On behalf of the Board of Directors I join Bob Terhune in soliciting your help in providing short papers of major importance to establish this new journal as a publication of premier quality. With your support, the success of this adventure is assured.

Peter Franken
President

Annual Meeting, October 10-14, 1977

Short Courses. A new feature will be introduced to OSA National Meetings at Toronto. Several short courses will be offered on the Monday afternoon preceding the opening of the meeting. Short courses in integrated optics, charge-coupled device detector arrays, dye laser technology, and the eye as a component in system design will be offered. Course duration will be two or four hours. Tuition for the courses will be separate from the meeting registration fee and will be $15 for two-hour courses and $30 for four-hour courses. Preregistration for the course is necessary. If minimum enrollment is not reached, courses will be canceled. A preliminary description of one of the courses follows.

The Eye As a Component in System Design (2 hours). The human eye, or more accurately the human visual system, plays an essential part in the performance of many data- and information-gathering systems. This performance can be severely limited if the system designer fails adequately to take the eye into account during his design. This course outlines the optical, physiological, and psychophysical aspects of the visual system on which such design considerations must be based.

The instructor of this course will be F. Dow Smith. Smith has specialized in optics as applied to aerospace photography and in the development of optical test and image-evaluation methods as applied to precision optics. In recent years his activity has centered in the field of ophthalmic optics. His doctorate work in optics at the University of Rochester was in the field of thin films. From 1953 to 1958 he was Chairman of the Department of Physics at Boston University and from 1958 to 1974 he

was at Itek Corporation where he played a central role in development of Itek's capabilities in optics.

GRAVURE TECHNICAL ASSOCIATION (GTA)

GTA plans to update its color swatch book. This book is the gravure industry standard for the color inks and color separation negatives and positives used in our industry to reproduce advertising and editorial material in all gravure printed supplements and magazines in our country.

There are over 10,000 different color swatches in this book which is used by all engravers and gravure printers in our industry. The new version will have tints and overprints never used before and should be of value to all art directors and advertising agency production managers and personnel.

One other step forward in our industry is the formation of a copy preparation committee to analyze and develop new techniques and dye formulations to be used in the preparation of color art work for publication reproduction. Also to prepare art that will permit it to be more effectively color separated by the new influx of computerized color scanners that have become so popular in the past couple of years. This is a great leap forward for all of us involved in color reproduction regardless of process used but especially so in the gravure printing industry.

Oscar Smiel

AMERICAN SOCIETY OF INTERIOR DESIGNERS (ASID)

Advice To Young Designers

There is a time one feels confident of giving advice. This is one. I have been a designer for many years, met up with many different type clients, in many type situations, and do not mind answering to the name "old designer."

To quote from Richard Jones' editorial in November/December *Residential Interiors*, "Assuming that the designer has done his or her homework in assessing the needs and backgrounds of the client, there is still a vast void of understanding to be bridged." I found that a way to bridge that gap and find understanding is to play a game of color with my about to be friends. They do not realize they are being psyched as we chat.

I ask questions and show them color squares that they place next to each other while we discuss the total situation. Color blending gives the meaning and necessary understanding.

I had learnt about the importance of color acceptance while auditing a class given by Albers at Yale University. A fortunate experience that led me to read his book and several others on color. They explained the ambiguity of color tones to people. That dislike of certain shades may change our acceptance of pattern and design, thus preventing us from seeing correctly, simply feeling dislike.

As children, we all responded to the basic elements of colors, lines and shapes; but age and sophistication tend to dull that uninhibited perception. Young members of the family group have been an aid in my family color analysis. I always found their answers prompt, direct and honest, actually an assist in my understanding of the adult members.

I hope that as designers we may feel, when we complete a job as Matisse did when he wrote of his painting "What I dream of is an art of balance, of purity and serenity devoid of troubling or depressing subject matter, an appeasing influence, a mental soother, something like a good armchair in which to rest from physical fatigue."

Hazel Priest Korper

F.Y.I.

LIMITED EDITIONS is the title of a 16mm color film on textile printing produced by Arthur H. Lee & Jofa, Inc., 979 Third Avenue, New York NY 10022, which is available through their showrooms. The 35 minute film covers textile printing in its entirety from the treatment of raw material through rotary screen printing.

The two preceding items are reprinted from the ASID Report, March 1977.

AMERICAN INSTITUTE OF ARCHITECTS

On February 15, 1977 Waldron Faulkner gave a lecture at the Smithsonian Institution on "Architecture and Color." A notice of the lecture is reprinted below.

Although color is usually associated with painting, form with sculpture, and line with architecture, color has lent decorative enhancement to architecture throughout history. The early Egyptians, the Persians, the Babylonians, the Greeks, and the designers of the Middle Ages believed that architecture without color was like "a plant without a flower" and subsequently polychromed their buildings in brilliant hues. Color played an important part in our own Colonial architecture, too, as in Williamsburg, and later in the Victorian era when aniline dyes were invented.

Architect Waldron Faulkner, a member of the American Institute of Architects since 1929, conveys historical and current information on the science of color and its practical applications to architecture. Mr. Faulkner's belief that architects have not used color to its best advantage is well illustrated in his slide lecture that demonstrates how color has and can be used most creatively.

Waldron Faulkner is the author of *Architecture and Color*, 1972, and has written numerous articles on "Architecture and Color" for the Inter Society Color Council. He has received over 20 awards, including an Honor Award from the Middle Atlantic Region of the AIA, 1969 for his remodeling of the Old Patent Office in Washington, D. C., now the Smithsonian's National Collection of Fine Arts and Portrait Gallery, as well as a national Honor Award from the American Institute of Architects, 1970.

GRAPHICS ARTS TECHNICAL FOUNDATION (GATF)

Augustine Library Donated To GATF

The rare and valuable library of Lee Augustine, late president-treasurer of the Printing Machinery Company of Cincinnati, was recently donated to GATF by his wife, Rhea.

Among the collection's priceless pieces is one of only two known copies of *The Printer's Manual* published in 1817. The book is reputed to be the first printing manual published in the United States and offers interesting and sometimes humorous insight into the practical instruction given compositors, pressmen, and proofreaders during the early American period. The only other known copy of the manual in existance is kept in the Yale University library.

Primarily historical in nature, the 500–volume library contains many titles published in the 19th century and earlier.

GATF plans to display part of the collection and incorporate the remainder of it into the Foundation's working collection. A special bookplate has been designed for mounting on each book of the collection.

Other valuable books in the collection include: Gamble's *Colour Printing and the Colour Printer* (1910), a 1740 edition of *Histoire de L'Origine et des Premiers Progress de L'Imprimerie* by Prosper Marchand; Stower's *Printers Grammar* (1808); Hansard's *Typographia* (1825); 18 editions of MacKellar's *American Printer* (1866-1893); and several type specimen books from the 19th century.

Lee Augustine was a long-time member of GATF's Society of Fellows; the Technical Association of the Graphic Arts; the Gutenberg Society, Mainz, Germany; and the Printing Historical Society, London, England.

Reprinted from *GATF Capsule Report*, December-January 1977.

Library Donated Books

GATF's Wadewitz Library recently received a donation of two books from James Lazarus Terbovitz, Pittsburgh, Pa.

The two books are: *Three Colour Photography* (1904) by Arthur F. Von Hubl; and *Half-tone & Photomechanical Processes* (1913), by Stephen H. Horgan.

Reprinted from *GATF Capsule Report*, February 1977.

DRY COLOR MANUFACTURERS' ASSOCIATION (DCMA)

Color Makers Exhibition In Switzerland Set For October

Intercolor, the international exhibition for color technology, will take place in Basel, Switzerland, October 11-15, 1977. Exhibits are expected to include displays from the specialized sectors of the chemicals and chemical engineering industries providing raw materials and intermediates, the process plant and machinery, and instrumentation and inspection equipment. In conjunction with the exhibition, is a three-day technical conference on such subjects as advanced production techniques, current developments and progress in color technology. For information, write Mack-Brooks Exhibitions, Ltd., 62/64 Victoria Street, St. Albans, Herts., AL1, 3XT, England.

Reprinted from the DCMA *Newsletter* March 14, 1977.

SOCIETY OF PHOTOGRAPHIC SCIENTISTS AND ENGINEERS (SPSE)

Image Evaluation Technical Section Symposium:

Recent Advances In The Psychophysical And Visual Aspects of Image Evaluation – October 24-25, 1977 – Holiday Inn Downtown, 120 East Main Street, Rochester, NY 14604

The Society of Photographic Scientists and Engineers announces a topical seminar to be held by the Image Evaluation Technical Section. You are invited to submit papers in the general area of psychophysics applied to image evaluation for the seminar which will be held October 24-25, 1977 in Rochester, N.Y.

Growing interest in considering the observer when evaluating images has been apparent in recent literature, with significant advances and success reported. Psychophysics provides a link between the perception of observers and the physical image parameters over which image science has control.

The symposium is planned as an intense, two day look at the state of the art in this field. While many of the papers are expected to be tutorial and application-oriented, they will emphasize recent successes, forward-looking applications, and tantalizing problems.

To insure technical excellence in a broad range of topics, a number of authors have been invited to present papers in their areas of specialty. A partial list of these authors and their topics are:

Dr. Roger W. Cohen, RCA Laboratories: "Non-linear modeling of display-observer channel capacity"

Curtis R. Carlson, RCA Laboratories: "J.N.D.'s for Sharpness"

Dr. John K. Stevens, University of Pennsylvania: "Spatial-temporal response to retinal ganglion cells"

Drs. C.N. Nelson and George Higgins, Eastman Kodak: "Image Sharpness"

Dr. R.F. Quick, Carnegie-Mellon University: "Image Noise Thresholds"

Dr. J. E. Jackson, Eastman Kodak: "Multidimensional scaling"

Dr. John J. McCann, Polaroid Corporation: "Visibility of gradients and low spatial frequency sinusoids"

Dr. E.M. Granger, Eastman Kodak: "An Objective measure of color image quality"

Dr. John Lott Brown, University of Rochester: GUEST LUNCHEON SPEAKER

Dr. Robert T. Kintz, Eastman Kodak: "Multidimension Scaling Techniques in the Assessment of Image Qualtiy"

Dr. Patrick Baudelaire, Xerox Corporation: "Application of perception modeling to picture processing"

Dr. John M. Kennedy, University of Toronto: "Picture Perception"

Dr. Ralph N. Haber, University of Rochester: "Object Perception"

Robert H. Wood, Executive Director, Society of Photographic Scientists & Engineers, 1411 K Street, NW, Washington, D.C. 20005. (202) 347-1140.

ROBERT WARD BURNHAM, 1913-1977

As briefly noted in the last *Newsletter*, Dr. Robert W. Burnham died suddenly at his home, 4 Beacon Hill, Fairport, New York February 9, 1977. He was 63 years old. He had retired from Eastman Kodak Company Research Laboratories in September 1975.

After receiving a graduate degree from Rutgers University, Dr. Burnham served in the U.S. Army overseas during World War II. Following the war he worked briefly in the Personnel department of a General Motors Division in Rochester. Later, while an instructor at Hobart College, Dr. Sidney M. Newhall, an early member of the Inter-Society Color Council and now an honorary member, asked Dr. Burnham to join his group to work on problems in visual psychology in Ralph Evans' Color Control department at Eastman Kodak Company.

Burnham's association with the Council started in 1954 when Ralph Evans asked him to become chairman of the subcommittee for problem #20 "Basic Elements of Color Education," a subject that was of great interest to Evans. The working committee for this problem finally narrowed down to three individuals: Burnham, Randall M. Hanes and C. James Bartleson. Burnham, as chairman of the subcommittee was a major contributer in the preparation of the final manuscript for the book – "Color: A Guide to Basic Facts and Concepts" which was published in 1963 by John Wiley & Sons, Inc with authors Burnham, Hanes, and Bartleson. This was not only a significant accomplishment of an ISCC problems committee but also an unexpected best seller for the publisher and the reason for a modest entry for many years in the ISCC treasurer's report under 'Royalties Received.' During these years Burnham published a number of articles on the subject of color vision in the Journal of the Optical Society. Ralph Evans and Sidney Newhall were co-authors in several.

Because of a change in company policy, the Visual Psychology group in Evans' Division was terminated and Dr. Burnham transferred to another part of the company, so for a time he left both work in color and membership in the council.

However, when Dr. Randall Hanes became President of the Council in 1970 he wished to relinquish his position as Chairman of the Committee on Publications and *Newsletter* Editor. He persuaded Bob Burnham, who by that time had moved to the Kodak Research Laboratories, to become involved in Council activities again and to succeed him as Chairman of the Committee on Publications and *Newsletter* Editor. Dr. Burnham took over the editorship of the *Newsletter* with issue No. 204, January - February 1970. He continued in this capacity until the March - April 1974 issue when the present editor, Dr. William Benson, assumed these responsibilities.

As editor, Dr. Burnham decided that the *Newsletter* should have a new cover design and enlisted the assistance of Donald Genaro and Valerie Pettis in the one that was adopted and is still used. He thought also that the Council membership would enjoy an occasional high quality color insert with the *Newsletter*. He instituted this practice which continues to the present time.

The Council expresses its sympathy to his wife Wilma, his two daughters and his son.

George B. Gardner

No doubt many Council members felt, as I did, a deep sense of personal loss at the unexpected death of Bob Burnham, for he was not only a first-rate scientist but also a man of sensitivity and substance. Bob was one of those rare individuals who can truly be characterized as both a gentleman and a scholar.

I first came to know Bob well when he was chairman of the Subcommittee for Problem 20, *Basic Elements of Color Education*. His guidance of that work to a successful conclusion required skill and patience, both of which he possessed in abundance. He, Jim Bartleson, and I worked in close association on that project and emerged better friends than we were when we started, in spite of the years of skirmishes. That we did so is a tribute to Bob's character and ability.

As editor of the *Newsletter* from 1970 to 1974, Bob engineered the major changes in format that brought the publication from an austere condition to the strikingly colorful state that we see today. In paying tribute to those who contributed to the new design, he stated: "It has gone a long way, I believe, toward cementing the relationship between the artistic and scientific elements of our color community." He did something positive about this perennial problem, which tends to get mostly lip-service.

Bob earned a B.S. at St. Lawrence, an M.S. at Rochester, and a Ph.D. at Rutgers (1941). His scholarly ability is evidenced by his election to both Phi Beta Kappa and Sigma Xi. During World War II, he served as an officer in the U.S. Army, attaining the rank of Major. Except for a short period as a personnel counselor at General Motors and an equally short time as an instructor at Hobart College, Bob's professional life was spent at Eastman Kodak in Rochester, where he started as a visual research psychologist in 1947, changed to systems analysis in 1959, and became a senior research technologist in 1965. His researches in color are documented and well-known, so they need not be reported here. Suffice it to say that his work is cited by such secondary sources as Judd and LeGrand, among others.

Changes in the nature of his professional activity at Kodak required that Bob discontinue his ISCC activities during a significant period of his career, but when he did serve the Council, he served well indeed. It was a genuine

pleasure to know and work with Bob Burnham; I feel privileged to have been numbered among his friends.

R. M. Hanes

We first met Bob Burnham in mid-1947 when Ralph Evans brought us to his (then) Color Control Division of Eastman Kodak in Rochester. The new building in which our labs were to be located was still under construction, and we were "sent to school" at the Main Office Building on State Street where a dozen or so assorted people, psychologists, representatives of foreign affiliated processing labs, film distributors, *etc.*, learned about densitometry, sensitometry, colorimetry, and how to make (and how *not* to make) color separations and dye-transfer prints, with final exams and all. The situation provided many occasions for humor and irony to which Bob responded much as we did. We quickly became friends, not only with Bob but with Wilma and their three children to whom he was always deeply attached and of whom he was always very proud.

Once under way in our different laboratories, Bob's love of color and its puzzles was obvious in his own experimental work and his interest in ours. Not only did this interest result in many prolonged and stimulating discussions (which refused to stay within the bounds of Kodak's official 10-minute coffee-break), but some of our published data bear the initials RWB as well as the initials DJ and LMH. To volunteer "observing" time beyond his heavy schedule of experiments with Ralph Evans and Sidney Newhall is evidence of Bob's generous character as well as of his interest and commitment. His willingness to undertake, along with Hanes and Bartleson, the difficult and time-consuming task of preparing and documenting a detailed outline of the basic facts of color won the gratitude of all of us, whether members of ISCC or not, who have that well-thumbed volume at-the-ready on our bookshelves.

His own experimental work was concerned with color appearance measures, color memory, color adaptation, phenomena such as the 'Bezold spreading effect," and also the design of convenient and inexpensive color appratus and tests.

Although Bob later used his talents in other areas, which must also have been rewarding to him, we were glad to hear in recent years that he had returned to color, because that, we thought, was his first love.

Dorothea Jameson
Leo M. Hurvich

I clearly remember walking down the hallway of a new building, where I had recently joined the Eastman Kodak Company after a brief sojourn with one of its competitors, and hearing a cheerful voice behind me say: "Hello there – I'm Bob Burnham." That typically friendly, outgoing greeting was my introduction to the person who was to become a close friend and associate for the next 26 years.

Bob had, himself, joined Kodak fairly recently, having transferred from the ivy-covered halls of Hobart College (where he had replaced Forrest Dimmick) to the bustle of industry. After World War II, Major Burnham returned from France and Germany – his second stint in the Army, the first being in 1932 during the Depression and after his graduation from St. Lawrence, when jobs were difficult to find so that Private Burnham ended up at Schofield Barracks in Hawaii – and he sought a career in academia. He was well qualified for such a career, having obtained his Ph.D. in experimental psychology at Rutgers University before the war (after returning from Hawaii) and having an outgoing personality combined with a keen interest in young people. But he was attracted to industry by the rather unusual situation that existed in his home town of Rochester, New York at that time.

That unusual situation involved an active group of vision scientists that was being assembled by the late Ralph Evans in what was then the Color Control Department of the Eastman Kodak Company. By the time I arrived on that scene the people involved included Sidney Newhall, Leo Hurvich and Dorothea Jameson-Hurvich, Josephine Brennan, Judith Wheeler Onley, Joyce Clark, Jeanette Klute, and later Bonnie Swenholt, in addition to Bob Burnham and, of course, Ralph Evans. It was a virtually unprecedented array of talent for vision research in an industrial situation. I recently had the pleasure of dining in London with another associate of those days, who described the early 1950's in the Department as "the golden years." That description is a good one, for they were golden years of experimentation and friendship.

Many of Bob's major contributions to visual science were made during those years. Always suspicious of complex instrumentation, he invented an elegant, simple colorimeter that is universally known today as "the Burnham colorimeter," and there must be thousands of them now in use around the world. His work on the perception of color with variations in luminance and size of stimuli, the relation between luminance and gradients and Mach Bands, etc., are now classic additions to the literature. The adaptation studies he carried out in collaboration with Sid Newhall and Ralph Evans still remain the most cited of chromatic adaptation experiments some 20 to 25 years later.

Throughout this highly productive period, Bob still had the time and interest to take fledgling scientists "under his wing" and extend his help and guidance to me as his "protege." We worked well together so that it seemed only natural that, together with Randy Hanes, we should collaborate on writing the book on color that was the final report of ISCC Subcommittee on Problem 20, Color Education. From 1954 on, then, we were all three heavily involved in ISCC matters (Bob's first meeting of the ISCC was about 1938 when he, as a graduate student, attended in the company of the late Percy W. Bridgman – my own first meeting was not until 1952 when Bob suggested I go to "this interesting group on color"). Bob was to remain active in the ISCC right up to the time of his death.

Early in February (just days before he died) I received a letter from him that was full of enthusiasm and news about the ways in which he was enjoying his retirement. He was involved in a new consulting organization, was going back on the ISCC Publications Committee and was

generally looking forward to a host of projects. That was typical of Bob. Although his later years were not as kind to him as "the golden years," he always maintained a keen interest in color and vision that was honed by youthful enthusiasm.

It is difficult to accept the fact that we will no longer be able to enjoy that enthusiasm. Nor can we look forward to more of his simple, straightforward, but basic experimental studies of color vision. But the legacy that has been left by Robert Ward Burnham – a legacy of scientific achievement and warm personal memories – is something of lasting value that helps to soften the stark reality of life. We will miss him, we can be glad to have walked with him for a time.

C. James Bartleson

Shortly after the first of the year, Bob stopped by to discuss his taking a more active part in the *Newsletter* again. I was delighted because I can use all of the help I can get, particularly such outstandingly able help. As you know, a few occasional reviews written by Bob have appeared in the *Newsletter* over the past year or so, but we agreed that Bob would now become an associate editor in charge of book reviews. He was to have searched out and solicited books for review, and, in addition to reviewing a substantial number of the books himself, he was to have found particularly suitable reviewers for the wide range of books that interest our readers, a task for which his long experience with the ISCC had prepared him well. Our agreement was ratified by the Board of Directors at its meeting of January 16, 1977. The three reviews he sent to me in his new capacity follow. Some of us lost a good friend, but all of us lost a good Associate Editor.

Ed.

Einführung in die Farbmetrik. Manfred Richter. Walter De Gruyter, Berlin: New York, 1976. Sammlung Goschen Band 2608. 274 pages. 98 illustrations. 3 color plates. 19.80 Dm.

Richter is well known to many members of the Color Council for his major contributions to color science, especially to the official German DIN color standards. This very excellent and well conceived paperback publication is an introduction, in depth, to color measurement. Color metrics, as a significant branch of science, has developed into an autonomous area of knowledge, according to the author, embracing principles of physiology, physics, and mathematics – with little to say about the significant contributions from the psychology of the visual mechanism.

Contents include the concept of color, additive color mixture as the basis for color specification, functioning of the eye in color vision, the physical color stimulus, color measuring instruments, color blindness, the concept of the psychophysics of color, color systems and associated color solids, transformations to more visually uniform color scales, advanced, colorimetric principles, and a useful set of colorimetric tables.

There is a bibliography of 197 titles, broadly representative, and many of them are in English. There are, however, some significant omissions from the American literature, which is, perhaps, understandable.

For those members of the Color Council fluent in (color) German, it would be a welcome updated addition to their libraries. Others may find the bibliography, the tables, and many of the figures useful.

Perception – Essays in Honor of James J. Gibson, Robert B. MacLeod and Herbert L. Pick, Jr. Cornell University Press, Ithaca, N.Y., 1974. 317 pages. $14.50.

Since the function of the ISCC has apparently expanded (and wisely so) to include appearance – beyond color – in a very broad sense, the horizons of individual members should be appropriately expanded to make them aware of significant contributions to that broader field of perception in the general sense of recognizing that color is not all that we perceive.

This publication is a dedicated recognition of the productive thinking of James J. Gibson. The book is a collection of essays by American and European scholars who have come under his influence either as colleagues or students. They have their individual interpretations of his role in the philosophy and history of the study of perception, largely visual, and include basic theoretical and epistemological analyses in the study of (visual) perception and art.

The topics range widely from a mathematical analysis of stimulus information to the evolution of sense modalities, from perception of events to the perception of pictures.

The book will be of interest to psychologists, philosophers, artists, and art teachers interested in the problems of perception.

Regrettably, Professor Robert B. MacLeod, senior editor of the publication, died in the midst of preparing the manuscript for the book. His own contributions in the area of visual perception are so well known as to have equal or greater impact on perceptual theory.

Color is, of course, an abstraction from a total visual experience, and those who would choose to place color in its proper context should benefit greatly from the broader concepts delineated in this well-prepared volume dedicated to Dr. James J. Gibson.

Authors of the essays are: Julian Hochberg, Mary Henle, Wolfgang Metzger, Kai von Fieandt, E. H. Gombrich, Fabia Metelli, Gunnar Johansson, T.G.R. Bower, Herbert L. Pick, Jr., Jacob Beck, Howard R. Flock, John M. Kennedy, Yu. B. Gippenreiter and W. Ya. Romanov, David N. Lee, John C. Hay, and Robert Shaw, Michael McIntyre, and William Mall.

Food Colorimetry Theory and Applications, F. J. Francis and F. M. Clydesdale. AVI Publishing Co. Inc., Westport, Conn. 1975, 477 pages. $35.

Dr. Clydesdale is a voting delegate from the Institute of Food Technologists to the ISCC, and Dr. Francis is a delegate from the same organization. Their participation in the activities of the Council exemplify the breadth and depth of the Council's activities, for its activities have broadened

(as originally intended) to achieve the goal of bringing together people with common problems in the area of color.

The publication they have prepared so carefully is slanted toward problems involved in the process preparing and controlling the dissemination of foods for public consumption. The book was the outcome of a basic course in colorimetry and appearance.

Nearly half of the book is concerned with information on color, covering the nature of light, color solids, the anatomy and psychology of vision, additive color mixture and associated measuring devices, the development of the CIE system for color measurement, visual colorimetry, spectrophotometry, color scales, differences, and tolerances, and the Kubelka-Munk layer concept.

Very interestingly, the remainder of the book is specifically concerned with food-product problems, which include tomatoes, oranges, green vegetables, cranberry products, citrus products, potatoes, cereals, meats, tuna, salmon, sugar, beer, wine, tea and coffee, caramel coloring, egg yolks, fats and oils, dairy products, cocoa, chocolate, and peanut butter. There is a final section concerned with apples, peaches, cherries, strawberries, honey, maple syrup, sugar syrups, and molasses – and *continuous* color measurement for products that vary considerably as they appear for the consumer market.

As an old-timer I am reminded of something Deane Judd once said about illuminating beautiful steak with green light, whereupon almost everyone had to leave the table because of the unsavoury appearance of absolutely magnificent food.

A last section details Fortran IV programs for use on a CDC 3600 computer. As a practical matter and with experience in depth, I question the transferability to any particular application without considerable reprogramming.

R. W. Burnham

LETTERS TO THE EDITOR

Letters from several prominent color researchers appeared in the first issue of *Color Research and Application.* The letters expressed enthusiasm and high hopes for the new publication. Dr. Richard S. Hunter, one of those who wrote, recently wrote to tell our readers how he feels about *Color Research and Application* after its first year of publication.

Dear Editor

The first year of publication for *Color Research and Application* has fulfilled many of my expectations for this new journal. In particular, my hopes of a year ago included that of being able to cover "the whole broad subject ranging from art to science, and from applications in design to applications in automated machinery." In looking over the four issues of the first year, with these goals in mind, I feel satisfied.

Very truly yours,

Richard S. Hunter, President
Hunter Associates Laboratory, Inc.
9529 Lee Highway
Fairfax, Va. 22030

Dear Editor:

I am writing about a remarkable collection of books on colour which is now in the possession of Mr. Landry, a London dealer. In order to prevent the collection being broken up, or being sold out of the country, the Royal College of Art is endeavouring to purchase the collection for their library. In doing so, they have called upon the Colour Group for such support as we can give. The collection is described in the accompanying note by Mr. Hans Brill, the Librarian of the Royal College of Art.

The Royal College of Art hope to place the collection in a special section of their library so that it may be permanently available to anyone who wishes to use it. To do this, they need to raise a sum of the order of £20,000. They have so far raised about £13,500. and have asked us for support to help close the gap.

The Committee have considered this request and we have decided that the Group should offer such assistance that it can. Obviously we are not in a position to make any large donation from our funds, and I am writing to seek your support. Firstly, if you care to make any direct financial contribution to this appeal, however small, it will be very gratefully received. Secondly, if there is any possibility that you can obtain support from any organisation with which you are connected, that will be equally gratefully received. A number of members of the Group have already pledged their support, or have persuaded organisations to support the Appeal. Professor Wright has offered to bequeath his own collection of books to this collection and we expect that we shall have similar offers from other members. The collection at the moment covers mainly books published before the 20th century. It is hoped that eventually it will be possible to build the collection up so that there is a complete representation of 20th century books. If we are successful in raising funds beyond the purchase price, they will be used for this purpose.

If you require any further information, please do not hesitate to contact me. Unfortunately it is not possible to circulate every member of the Group with a detailed list of the books but I have a few copies of the list available. Cheques should be made payable to the Colour Group (Book Collection Fund). We shall be very glad indeed of your support.

Yours sincerely,

A.W.S. Tarrant
Chairman
The Colour Group of Great Britain

Department of Home Economics
University of Surrey
GUILDFORD
Surrey

A NOTE ON THE COLLECTION OF BOOKS ON COLOUR

History: The Collection was formed over a period of 20 years by Donald Pavey, ARCA, in preparation for a proposed comprehensive bibliography of colour and a study of the history of colour systems. Mr. Pavey has made colour his speciality, he established a successful firm of colour consultants and is the author of the Methuen Handbook on Colour and of several papers on the subject. He is now a Senior Lecturer at Kingston Polytechnic. It is basically a working collection and not one put together by a dealer. The collection was sold to Ben Weinreb. Mr. Weinreb engaged Stuart Durant MA RCA, a specialist in the history of design, then writing a thesis on the 19th c designer Dresser and currently consultant to the Victoria and Albert on the forthcoming Decorative Art exhibition, to improve it. Durant enlarged its scope and compiled a catalogue. It was then sold to Alistair MacAlpine for the library of his proposed Gallery of Modern British Art. The collection was recently sold by MacAlpine to Harold Landry, a dealer in periodicals, who also purchased a collection of pamphlets on the Constructivist Art movement which has now been acquired by the British Library. As a result of the latter transaction we have several weeks' grace in which to accumulate funds for the purchase of the Colour Collection.

Contents: The Collection consists of 842 items divided into sections on Theory, Light, Spectroscopy, Photography, Vision, Natural History, Technology, Applied Arts, Interior Decoration, Polychromy, Publicity, Painting, Music, Symbolism and Education. The rare early books include Alhazen Opticae Thesarus, Basel 1572, Goethe's Farbenlehre, 1810, Newton's Opticks 1704, Kunckel's Ars vitraria experimentalis and Portal's Symbolic Colours 1844. The development of light and colour theory has had important contributions from Britain and the collection documents this. Famous scientists whose work is represented include Newton, Brewster, Field, William and John Herschel, J. Clerk Maxwell, Cavendish, Faraday and Rayleigh.

There are many gaps, for instance on the early history of aniline dies and on theorists of symbolic colour such as Runge and Carus. Many of the books are available at the British Library, but at least 25% are not available in any location known to me and nowhere is such a collection available on open shelves where the reader can browse.

Future Arrangements: It is intended to merge the collection with the RCA's holdings and certain other resources, to form a colour library within but separate from the main College library. An advisory committee will help the RCA Librarian in the arrangements for use, security and future acquisitions. Funds not used for the purchase from Landry together with other funds from gifts, the sale of duplicate copies and some of the RCA library budget will be used to improve it.

Purpose: The collection spans Art, Science and Technology, which in practice is most unusual. Colour cuts across many interests yet there is no institute in Britain with primary responsibility for the study of colour. It is to be hoped that the collection will serve as a core for future developments.

One practical result would be the stimulation of interest in colour and hence improvement in design. Needless to say the addition of value to our products through improved design is a thoroughly practical proposition.

In addition it will serve artists and researchers in a variety of fields eg psychology, marketing, art education, conservation, history of ideas, cultural, design and art history.

H. Brill – Librarian, R.C.A.

1977 ANNUAL CORM MEETING

The Council for Optical Radiation Measurements (CORM) is holding its annual meeting at NBS (Gaithersburg, Maryland) on Tuesday, June 7, 1977. The program includes a report on NBS program developments and an opportunity to visit NBS personnel in their laboratories. The opportunity to visit the laboratories has received many favorable comments at past CORM meetings. The afternoon program includes talks on photometric units in the SI base system and on the MAP concept and program. A talk on Optical Radiation Hazards, a vital topic at this time, will be a feature of the program.

On June 8 and 9, 1977, NBS, CORM, EPA, NASA and NOAA will jointly sponsor a symposium on UV measurements.

SYMPOSIUM ON ULTRAVIOLET RADIATION MEASUREMENTS AS RELATED TO ENVIRONMENTAL MODIFICATION AND SAFETY ASPECTS

There is growing federal and public concern that chemical pollutants in the upper atmosphere may be increasing the amount of injurious ultraviolet radiation at the earth's surface through a depletion of the protective atmosphere ozone layer. There is also the possibility of a natural variability in the spectral distribution of solar radiation that might affect the amount of UV radiation striking the earth's surface. Such variability could have deleterious effects on humans, animals, crop plants, and aquatic and terrestrial ecosystems. The questions of whether the amount of incident ultraviolet radiation is changing, and whether it is man-induced or natural in origin, can be answered only by a long-term effort of highly-accurate UV monitoring, both at the earth's surface and in space above the atmosphere. Unfortunately, the measurement capability to make field measurements with the required accuracy is not yet available.

In addition, UV radiation is being increasingly used in such applications as industrial processing and radiation therapy, exposing the labor force and patients to possible hazardous exposure and increasing the likelihood of future regulation in the area of these users. As a result of these broad new applications, a growing demand has been felt for improved instrument calibrations and transfer standards for ultraviolet measurements.

In order to survey these questions and to review current concerns and technical progress in this important measurement area, a symposium on problems of ultraviolet radiation measurements in the industrial, medical, and solar areas will be conducted at the NBS facilities in Gaithersburg, Maryland on June 8-9, 1977. This two-day session will follow the June 7 Spring Meeting of CORM (Council for Optical Radiation Measurements). The Symposium will be jointly sponsored by NBS, CORM, EPA, NASA, and NOAA.

As a prelude to the technical program, selected invited speakers will discuss certain policy-level questions associated with ultraviolet radiation, including the regulatory and health aspects. The remainder of the program will have a technical focus. Talks are solicited on such topics as: (a) new directions in the use of UV radiation in research, medicine, and industry; (b) the differing measurement problems and needs in the various application areas; (c) recent developments and trends in UV measurement technology or methodology that increase the accuracy of such measurements; (d) recent advances in the development of UV sources and UV detectors and their uses in various applications; (e) requirements and developments in various field instruments; and (f) status of instrument calibrations and transfer standards for accurate UV measurements.

Those who wish to attend this symposium, who wish to deliver a talk on their current work in this area, or who have specific questions concerning the symposium should contact: Dr. Jack L. Tech, Room B-306 Metrology Radiometric Physics Section, National Bureau of Standards, Washington, D.C. 20234. (301) 921-3864.

Those readers working in, or interested in, the area of UV measurements are invited to participate in this symposium. If you want to be on the mailing list for further announcements as planning for the symposium progresses, please submit your name and address to the above coordinator.

BIOLOGICALLY-RELATED SI UNITS

The last issue of the *Newsletter* (January-February 1977, No. 246) printed a letter from Dr. Karl G. Kessler, Chief of the Optical Physics Division of the National Bureau of Standards. The letter referred to a report that was not given in the *Newsletter*, but it now follows.

On Quantities Containing A Biological Factor, On Their Definitions And On Their Units

Sur Les Grandeurs Comportant Un Facteur Biologique, Leurs Definitions Et Leurs Unites in French, Sep 76 pp 1-8

[Report by J. Terrien, director of the International Bureau of Weights and Measures]

1. **Introduction.** The CCU [Consultative Committee on Units] has requested the BIPM to prepare a report on "definitions of quantities involving a biological factor, these being definitions which affect every discussion of the units appropriate to such quantities."*

A well-known example of such quantities is that of light quantity (luminous intensity, flux, brightness, etc.) each of which has its corresponding unit: candle (basic SI [International Standard?] unit), lumen, lux, etc., in accordance with current conventions. Are these conventions the best or would some others be preferable? That is the question which will be discussed in the following.

First a preliminary remark. The choice of the quantities, of their definitions and of their units is not decided by experiment. The criterion is convenience. The choice is a matter of convention and the best choice is the one which is most convenient.

The SI has been adopted and has been universally accepted because it is convenient and particularly because it is simple. One reason for the simplicity of the SI is the fact that each quantity has one SI unit and one only. Still better, several quantities can have the same SI unit if they have been derived from basic units all in the same way; for example, the 'second' raised to the power '−1' is the SI unit for the quantities 'frequency,' 'activity' (ionizing radiation), etc.; the joule is the unit for the quantities 'heat,' 'chemical energy,' 'kinetic energy,' 'electrical energy,' etc. Hence "the quantity in question should always be specified, because the unit does not suffice to determine the nature of the quantity." It is essential that this rule be followed if the simplicity of the SI is to be preserved. Observance of this obligatory rule of always specifying the quantity has not yet become well established; for example, in official texts one can find references to 50 MW_{el} centers of electrical energy production; the CCU has explicitly condemned the use of W_{el}, because the correct expression is: 50 MW of electrical power. When the quantity is specified, here electrical power, it is unnecessary to invent a new unit like W_{el} and the SI unit, the watt, is sufficient. In specifying the quantity one may add explanatory details to any extent which may seem useful; for example, the information that a temperature has been measured in the EIPT [expansion unknown], or with such-and-such a thermometer, calibrated or not; the result of the measurement will be expressed simply with the Kelvin unit (or degree Celsius).

2. **Definitions of Luminous Flux.** If one designates the quantity by its name, this name must have a conventionally recognized and allowed definition. This is the case, for example, with luminous flux, ϕ_v; there is an international convention that luminous flux shall be defined by the relation

$$\phi_v = K_m \int \frac{d\phi_e}{d\lambda} V(\lambda)\, d\lambda \qquad (1)$$

in which $\frac{d\phi_e}{d\lambda} d\lambda$ is the energy flux (SI unit, the watt) corresponding to radiations between λ and $\lambda + d\lambda$, and $V(\lambda)$ is the relative spectral luminous efficiency (for

*The passages in quotation marks have been taken from the draft of the CCU report, session 1976.

photoptical vision) of which the values, as a function of λ, are accepted by international convention. $V(\lambda)$ is a dimensionless ratio. This relation is enough to permit an experimenter to measure the ratio of the luminous flux of two radiations (monochromatic or complex). The unit, the lumen, is fixed by another international convention which defines the candle, a unit of luminous intensity, by means of a physically specified radiator (a black body at the freezing point of platinum), from which the lumen is derived as 1m = cd. sr. The value of K_m is obtained experimentally: for example, in the case of the black body defining the candle one can produce a flux ϕ_v having a value which is a consequence of the definition of the candle; one can also find the energy flux $\phi_e(\lambda)$ and K_m is calculated with equation (1). The unit could be defined by other conventions; for example, one could adopt a conventional value of K_m, that is to say a value of luminous flux of a monochromatic radiation having a wavelength of 555 nm and a power of 1 watt; this is a proposal suggested by the CCPR [expansion unknown], using a value which may be selected in the neighborgood of K_m = 680 1m/W.

In the two cases the experimenter can produce a luminous flux of which the value is fixed by convention (with a black body or with a radiation of λ = 555 nm) and measure the luminous flux of any radiation whatever since he is able to measure the ratio between the fluxes of the two radiations, according to the definition of luminous flux.

All the preceding describes the existing situation. Is this situation satisfactory? No, it is not entirely satisfactory. I would like to discuss two inconveniences.

3. **Inconveniences in the Present Definition.** The first inconvenience. Luminous quantities are defined on the basis of physical quantities (measurable in watts) of radiation, by a summation (or integration) of the power of their monochromatic components, each having a weighting factor $K_m V(\lambda)$, chosen in such a way that the result expresses an evaluation of the effect of the radiation upon the human organ of vision.

Radiation also has an effect upon other organs, for example, upon the skin (production of erythema, antirachitic effect, etc.) and many other effects upon living things, humans, animals or vegetables. For each of these effects one can set up an efficiency function analogous to $K_m V(\lambda)$, and define as many new quantities. One would then be led to adopt as many new basic SI units analogous to the candle. The SI would become too complicated and therefore unsatisfactory.

The second inconvenience. The ICRU has authority with regard to quantities and units of ionizing radiation. Among the quantities which it has considered, two have between them relations analogous to the relations between energy flux (or power, of which the SI unit is the watt) and luminous flux (SI unit, the lumen): these are the *absorbed dose*, a purely physical quantity of which the unit is the joule per kilogram and the *equivalent dose* which is defined on the basis of the absorbed dose by multiplying by an efficiency factor having a value which is an agreed-upon function having the nature of a radiation and also a function of the conditions of irradiation (I simplify deliberately; I hope that specialists will excuse me for it. For more details, see "Supplement to ICRU Report 19: Equivalent Dose," issued 1 September 1973). Now, according to the opinion of the ICRU these two quantities should be considered as having the same dimension, because according to the ICRU the efficiency factors are dimensionless – that is to say, are simple numerical factors. The existence of this opinion proves that different experts can consider that the factors of biological efficiency (such as $K_m V(\lambda)$ or the factors involved in the equivalent dose) have a dimension or are without dimension. Certainly, scientists have the right to adopt conventions which seem to them to be convenient in each specialized domain. But it would be desirable for the conventions not to contradict themselves from one domain to the other.

4. **Other Definitions.** In the case of luminous quantities and many other quantities intended for the evaluation of the effect of radiation (ultraviolet, visible or infrared) on the organs of living beings other than the organ of human photoptic vision I think that one must try to treat $K_m V(\lambda)$, or analogous weighting functions, as dimensionless numerical factors. Thus one would avoid proliferation of basic SI units, of which each would be attributed to one of these quantities. Thus all these quantities would have the same unit, which would be the watt, or a unit of some other purely physical magnitude derived from energy. If the biological quantity concerned is well specified and well defined there is no inconvenience created if its unit is the same as that of other quantities.

Suppose, for example, that the definition of the luminous flux quantity, given in its present form on a preceding page, were to be replaced by an analogous definition with the convention, however, that $K_m V(\lambda)$ shall be a dimensionless numerical factor, with K_m = 680, and $V(\lambda)$ being unchanged relative to values presently allowed. Then one would say that the photoptic luminous flux of a lamp is, for example, 1,000 watts; the electric power consumed by this lamp could be 90 watts. The convention adopted in this example leaves unchanged the numerical value (1,000 in the present case), but now one uses the expression "1,000 watts," although present conventions would say "1,000 lumens." (This equality in value is only approximate because of the uncertainty in the experimental measurement of K_m in lumens per watt.)

A plane directly facing this lamp at a distance of 2 meters would receive a luminous brightness of about 20 lux, according to current nomenclature; with the convention of a dimensionless $K_m V(\lambda)$ one would say that this brightness is 20 W/m^2. (In simplified terms, the brightness on a surface is the flux received divided by the area of that surface.)

The present units of candle, lumen, lux could be abandoned. One could also preserve them temporarily as special names to be applied to the SI units W/sr, W and W/m^2 to be used only for luminous quantities, with the numerical values remaining unchanged.

Another possibility would be to change more radically the definition of the luminous flux quantity and, by a pro-

cedure which might seem to be more logical, one could give to K_m the numerical value 1 (in place of 680). The luminous flux would then still be expressed in watts but the numerical values would be 680 times four than in the expression in lumens. This change in the numerical values would be disturbing to persons accustomed to using them. But on the other hand setting $K_m = 1$ would have one advantage: for example, the lamp mentioned above consumes an electric power of 90 watts, its luminous flux would be 1,000/680 = 1.47 watts; it seems natural that the numerical value of the luminous flux would be more than the numerical value of the power, since the energy consumed by the lamp is only partially converted into radiation useful for vision. On the contrary, with K_m = 680, the numerical value of the flux is greater than that of the power – which might appear startling.

Hence the choice between $K_m = 680$ and $K_m = 1$ should be discussed.

5. Luminous Scotoptic Quantities. In what has been said above, everything concerning luminous quantities is relative to quantities for photoptic vision. Now the CIE has also defined quantities for scotoptic vision, or stated more precisely, for the eye of a young subject completely adapted to darkness, with a $V'(\lambda)$ function different from $V(\lambda)$ and with K'_m equal to about 1,746 1m/W. (This numerical value of K'_m is obtained experimentally, using present conventions which attribute to the black body at the freezing point of platinum a luminance – photoptic or scotoptic – equal to 60 cd/cm^2; the measured values of K'_m are in the neighborhood of 1,746 1m/W.)

If one adopts $K_m = 680$ (dimensionless) for the definition of photoptic luminous quantities one could adopt $K_m = 1{,}746$ (dimensionless) for the definition of scotoptic quantities, in order to preserve the current numerical values of scotoptic quantities. One could also adopt K'_m = 1,692: this value is the one which results from defining the luminous flux, photoptic or scotoptic, by the convention that monochromatic radiation (λ = 555 nm in normal air) at a power of 1/680 watts has a flux equal to 1, and [also by the convention] that the other monochromatic radiations of the same power have a photoptic flux proportional to $V(\lambda)$ and a scotoptic flux proportional to $V'(\lambda)$.

One could then adopt $K'_m = 1$. Here again the choice needs to be discussed.

In the intermediate state of adaptation of the eye, that is to say, in mesoptic vision, the complexity of the problem still does not permit agreement with regard to a definition of luminous quantities.

6. Conclusion Regarding Luminous Quantities. In view of these complications, my provision conclusion would be in favor of $K_m = K'_m = 1$, which amounts to suppressing K_m in the definition of luminous flux. In this case the luminous flux would be defined by

$$\phi_v = \int \frac{d\phi_e}{d\lambda} V(\lambda)\, d\lambda \qquad \text{(photoptic)}$$

$$\phi'_v = \int \frac{d\phi_e}{d\lambda} V'(\lambda)\, d\lambda \qquad \text{(scotoptic)}$$

Further on it will be seen that this conclusion is applicable also to other quantities containing a biological factor.

7. Other Photobiological Quantities. Besides luminous quantities, one can consider other quantities intended for evaluating various photobiological radiation effects. For example, in a document being prepared in the German Federal Republic (Deutsche Normen, Vorlage November 1975, DIN 5031, Strahlungsphysik im optischen Bereich und Lichttechnik, Photobiologische Wirkungsfunktionen [German Standards, presented November 1975, DIN 5031, Radiation Physics in the Optic Domain and Light Engineering, Photobiological Characteristic Functions]), there appear spectral curves of relative efficiency with regard to 10 radiation effects, listed here below (in the German language):

Photosynthese [photosynthesis]
Chlorophyllsynthese [chlorophyll synthesis]
Photomorphogenese (Photochrome M 660 und M 730) [photomorphogenesis]
Phototropismus [phototropism]
Bakterientoetung [bactericide]
UV-Erythem [UV erythema]
direkt Pigmentierung [direct pigmentation]
Bilirubin-Dissoziation [bilirubin dissociation]
Konjunktivitis [conjunctivitis]
Photokeratitis [photokeratitis]

Each of these 10 curves, in analogy to the curves $V(\lambda)$ and $V'(\lambda)$, gives as a function of λ the relative efficiency with respect to the maximum efficiency; the ordinate of the maximum therefore has the value 1.

According to a study by Dr. B. Steck (Ueber photobiologische und psychophysische Gesichtspunkte fuer Beleuchtungsanlagen und Solarien, Dissertation D 83, 1975, Tabelle 9, p. 53 [On Photobiological and Psychophysiological Considerations Affecting Irradiation Facilities and Solariums, Dissertation D 83, 1975, Table 9, p. 53]), certain units are being used to evaluate the effect No 6 in the above list (UV erythema):

In the USSR, the unit 1 "er" corresponds to the action of a radiation of power 1 watt and wavelength 296.7 nm; at this wavelength λ_m the relative efficiency is a maximum;

In the United States, the unit 1 "E-viton" corresponds to the effect of radiation having a power of 10^{-5} watts and a wavelength λ_m;

In RFA [expansion unknown] and in Scandinavia, the unit of 1 "finsen" corresponds to the action of radiation producing a brightness energy of 0.1 W/m^2 and of wavelength λ_m.

It does not appear that special units are being used for the nine other effects.

8. Definition of Photobiological Quantities. In order to define the quantities giving quantitative expression to each of these 10 effects of radiation, one can proceed as in the case of luminous quantities. That is to say that each quantity G would be defined by the intergral, extended over the effective wavelengths, of the product of $d\phi_e/d\lambda$ times the relative efficiency $f(\lambda)$ for the effect considered

$$G = C \int_\lambda (d\phi_e/d\lambda)\, f(\lambda)\, d\lambda \qquad (2)$$

with a factor C which is assigned by convention.

This factor C plays the same role as the K_m luminous quantities.

K_m, by current photometric convention, has one dimension and its value is imposed by adopting the scale which serves to define the candle. For these 10 quantities considered now there exists no reference scale. Therefore one is free to select the most convenient convention for the value and dimension of C. The simplest and the most convenient is to set C = 1, dimensionlessly, which is equivalent to suppressing the letter C in the definition of such quantities as G.

Then it would be logical to also suppress K_m in the definition of luminous flux.

Analogous conventions would undoubtedly be appropriate in other domains: the action of ionizing radiation, of acoustic vibrations, of high-frequency electromagnetic fields, etc., on living organisms.

8. The Special Character of Photobiological Quantities. One may consider the special character of luminous quantities and of other analogous quantities. They can be defined in such a way that it becomes easy to measure them with precision; for example, the definition of luminous quantities and of their units (whether by means of a black body as at present or by a conventional value of K_m) permits precise measurement or, if the precision is considered poor, it is because of experimental difficulties and not because of too much vagueness in the definition. In this respect luminous quantities do not differ from purely physical quantities.

What distinguishes luminous quantities from purely physical quantities is their practical significance, which is to say the degree of practical utility provided by their quantitative value in evaluating a means of illumination. These quantities have been set up in order that they might provide a quantitative evaluation of the efficiency of an illumination for the purpose of accomplishing human visual tasks and in order that this evaluation shall be expressed by a single number of units, regardless of the spectral composition and color of the luminous radiation. If all human visual organs were identical and if an observer could unhesitatingly judge the equality of the brightness of two luminous bodies of different color, the luminous quantities would undoubtedly have a sufficiently precise significance [sic]: one would be certain, for example, that one source of illumination would make objects brighter than would another if the measured luminous quantities have a greater value (by 5 percent, for example) regardless of the observer and regardless of the light sources employed even if they produce radiation differing in color from those of the two installations. It is well known that this is not the case. The precision of a measurement of luminous quantity, in general, has only a limited practical significance, for fundamental reasons.

Moreover, the ratio of two photometric quantities is measurable but its value does not correspond to anything genuinely measurable in the sensations of a visual observer: in fact it is known that visual judgment of equality of brightness, especially monochromatic brightness, is possible but the visual evaluation of a ratio of brightness is almost impossible.

From this I conclude that luminous quantities possess an arbitrariness and an imprecision in their practical significance which does not pertain to purely physical quantities. An analogous conclusion holds for other quantities set up for the evaluation of the effect of radiation upon living matter.

Other effects (the lack of additivity, zero effect beneath a specific threshold, etc.) demand a certain competence in the practical use of these quantities.

The SI is designed for purely physical quantities; among them, only the candle is a quantity which is not purely physical; this is a circumstance which has given rise to criticisms motivated undoubtedly by the characteristics which have just been described.

Under these conditions it appears to me to be wise to eliminate the candle from the list of base units of the SI, to avoid introducing units for quantities containing a biological factor and to define these quantities in such a manner that their units shall be such as apply to their purely physical aspect.

CLINICAL APPLICATIONS OF PSYCHOPHYSICAL AND PHYSIOLOGICAL OPTICS TECHNIQUES RESEARCH GRANT APPLICATIONS SOUGHT BY THE NATIONAL EYE INSTITUTE

Under authority of Section 451 of the Public Health Service Act as amended (42 U.S.C., ch. 6A, subch. III) the National Eye Institute supports a wide variety of laboratory and clinical investigations that bear on disorders of visual information transmission, perceptual synthesis, and oculomotor control. Research employing anatomical, neurophysiological, biochemical, psychophysical, and behavioral methods is being supported, when addressed to the etiology, diagnosis or treatment of such disorders as optic nerve degenerations, amblyopia, strabismus, retinitis pigmentosa, diseases of the macula and retinal vascular disorders.

The purpose of this announcement is to restate NEI's interest in the development of concepts and techniques in psychophysics and physiological optics that contribute to improved ophthalmic diagnosis and encompasses research in measurement of resolution and acuity, visual fields, color testing, adaptometry, biocular vision and motility, infant testing procedures as well as enectrophysiological correlates of visual perception.

Support will be through the NEI research project grant. Inquiries and preliminary drafts should be addressed to Chief, Scientific Programs Branch, National Institutes of Health, Bethesda, Maryland 20014, telephone (301) 496-5301.

Applicants must use the regular research grant application (form NIH or PHS 398) which is available at institutional central application control offices. The completed application should be mailed to the Division of Research Grants, National Institutes of Health, Bethesda, Maryland 20014, where it will then be assigned according to the

NIH referral guidelines for research grants. All applications will be reviewed through the Division of Research Grants Study Section mechanism and where assigned to the NEI by the National Advisory Eye Council. Applications recommended for approval will compete for available funds with all other approved applications assigned the NEI.

The receipt date for applications are March 1, July 1, and November 1. The earliest possible award dates will be approximately nine months after receipt dates. Applications received too late for one cycle of review will be held for the next.

The support through an NEI research project grant is subject to applicable laws, regulations, and the policies to be found in the *PHS Grants Policy Statement*, dated October 1, 1976, DHEW Publication No. (OS) 77-50,000.

PRODUCTS AND SERVICES

THE INSTITUTE OF OPTICS UNIVERSITY OF ROCHESTER

Colorimetry – June 20-24, 1977

This short course is intended for managers and technologists concerned with specification, measurement, or control of color in any industry. Applications of colorimetry to color matching with dyes, pigments, or other colorants and to color television or color photography will be discussed. Participants will be encouraged to indicate their interests and concerns for appropriate consideration and discussion. The course will be concerned with the basic ideas and techniques for use of colorimetric results. Instrument selection and operation will not be discussed, although a splendidly equipped industrial spectrophotometric laboratory will be visited. Computer-facilitated exercises by all participants will exemplify the principles of color matching with practical media. The 1976 recommendations by the International Commission on Illumination, for evaluation of color differences, will be explained and used.

Prof. David L. MacAdam of The Institute of Optics will lecture and supervise the exercises in the five-day course. Formerly head of the Image Structure Laboratory of the Eastman Kodak Research Laboratories and, until this year, the U.S. Expert on Colorimetry of the International Commission on Illumination (CIE), Prof. MacAdam is known throughout the world as an authority on color vision, color measurement, and color reproduction. The third (1975) edition of *Color in Business, Science and Industry*, by Judd and Wyszecki, will be used as the textbook and source of data basic to colorimetry.

CIBA-GEIGY Corporation Offers Course in Color Technology

A comprehensive two-and-one-half-day seminar on "Colorimetry and Optics of Pigmented Systems" will be offered quarterly during 1977 by the Colorimetry Laboratory, Pigments Department, CIBA-GEIGY Corporation.

The seminar will provide theoretical and practical background in applying colorimetry to solve colorant formulation problems in pigmented systems such as mass color fibers, plastics and coatings. Specific "how to" instruction will be given on formulation and colorant selection techniques that can decrease costs and reduce formulation time.

Course tuition is $150.00, including instruction materials and luncheons. Ruth Johnston-Feller, a part-time consultant to CIBA-GEIGY, and Dennis Osmer, manager, Colorimetry Laboratory, CIBA-GEIGY, are course instructors.

Course location and dates are as follows:

Ardsley, N.Y.	March 7, 8, 9
Toledo, Ohio	June 7, 8, 9
Chicago, Ill.	September 27, 28, 29
Los Angeles, Calif.	November 15, 16, 17

For further information on the course, notify Dennis Osmer, Colorimetry Laboratory, Pigments Department, CIBA-GEIGY Corporation, Ardsley, N.Y. 10502. Telephone (914) 478-3131.

Paints and Coatings French/English, English/French Vocabulary

The "Paints and Coatings Vocabulary," prepared and published by the Quebec Paint Industries Association is now available for purchase.

The pocket size French/English, English/French vocabulary contains over 4000 words and terms specific to the industry. It is the result of many hours of work by a committee of professionals chemists and translators whose services were volunteered by members companies of QPIA. It is an essential tool for coatings, chemists and executives dealing with French speaking market around the world.

Single copies may be ordered at a cost of $12.00 each, including shipping. All orders should be sent to: Michel P. Montet, Quebec Paint Industries Association, 1080 Beaver Hall Hill, Suite 900, Montreal, P.Q. H2Z 1T5. Telephone: (514) 866-6945.

RIT To Be Distributor of ITPAIS.

The Graphic Arts Research Center, RIT, will distribute ITPAIS, a new information retrieval tool in the field of image technology. The Image Technology Patent Information System, developed and maintained through the efforts of Eastman Kodak Company, Agfa-Gevaert (Antwerp/Leverkusen), and Fuji Photo Company, Ltd., will be available from RIT in May, 1977.

ITPAIS encompasses selected patents and literature references related principally to the chemical aspects of image technology. The present file includes nearly 17,000 patents and over 800 literature references. Indexing of issued photographic chemistry patents will be completed in three to four years. Thereafter, currently issuing patents in the field will be added to the file.

In conjunction with this distributorship, the Graphic Arts Research Center has scheduled a symposium April 21 to provide potential users with an opportunity to examine

ITPAIS firsthand and to hear a detailed description of its scope and capabilities by its originators.

Interested individuals may contact Brent Archer, Graphic Arts Research Center, Rochester Institute of Technology, One Lomb Memorial Drive, Rochester, New York 14623 (716) 464-2735, for more detailed information about ITPAIS and the proposed symposium.

Hunterlab

The appointment of Arthur J. Cook to the position of Manager of Marketing for Hunter Associates Laboratory, Inc. has been announced by Philip S. Hunter. Hunterlab's Executive Vice President.

Mr. Cook came to Hunterlab in 1972 as On-Line Product Manager, and has since served as Manager of Appearance Science and most recently, as Manager of Domestic Marketing. He holds a BSME from Case Western Reserve University and is a Registered Professional Engineer.

In his new position, he will direct the activities of the International Marketing Group, selling in foreign markets through Hunterlab Overseas (A DISC Corporation) as well as those of Domestic Marketing and the Field Support Department.

Four new motion pictures utilizing tape-to-film technology

Image Transform Inc. says the maturing marriage of videotape and film is evident in four current projects nearing completion at their North Hollywood facility. The firm's exclusive tape-to-film process is being utilized for segments of MGM's "Demon Seed," Columbia Pictures' "The Greatest," 20th Century Fox's "Star Wars," and AIP's "Cracking Up," according to the announcement.

In "Demon Seed," a vivid 5-minute segment of computer-generated graphics was recorded on videotape and has been transferred to 35mm film, the announcement continues. In "The Greatest," sizeable portions of Mohammad Ali's major fights are being transferred from tape; in "Star Wars," 3 minutes of electronically-created special background effects have been transferred to 35mm film. The majority of "Cracking Up" was produced on tape, utilizing the Image-655 system for transfer by Image Transform to theatrical film.

"George Schlatter started something with 'Norman . . . Is That You?,' which was shot 80% on videotape," says Pete Comandini, director of technical sales for Image Transform. "We did the transfer, and Arthur Knight wrote in the Hollywood Reporter that there was no possible way to tell that electronic technology has been employed."

The image processing technology employed by Image Transform takes an incoming signal totally apart and then puts it back together electronically before recording in another medium.

NEW PRODUCT

Imero Fiorentino Associates, Inc., 10 W. 66 St., N.Y.C. 10023, now represents the Gisen Scanachrome Process – an innovative method for creating large scale full-color visual reproductions. This system has been successfully utilized to produce outstanding scenic elements in television, theatre, trade exhibitions, museum displays, interiors, and promotions.

The Gisen process simply requires a properly scaled color positive transparency. The subject for the reproduction can be chosen from artwork, graphic layouts, color prints, negatives, or any object or scene that can be photographed. The computer directed process will quickly and accurately enlarge and reproduce the full color image of the transparency directly onto almost any flexible material – including papers, fabrics and carpeting – by means of the nation's only scanning micro air-brush system.

Minimum order is 30 sq. ft. Average retail price ranges from $9 to $15 per sq. ft.

For further information contact: Harriette Silverberg, Director of Marketing & Sales, Imero Fiorentino Associates, (212) 787-3050.

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

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Dr. Roland Derby, Jr.

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

2. The Council re-affirms its community of interest and cooperation with the Munsell Color Foundation, an independent private foundation devoted solely to the advancement of color knowledge in science, art, and industry. It serves as Foundation Associate of the Inter-Society Color Council. The Council recommends and encourages contributions for the advancement of these purposes to the Munsell Color Foundation. For information, write to S. L. Davidson, NL Industries, P.O. Box 700, Hightstown, N.J. 08520.

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