



Inter-Society  
Color Council  
Newsletter

**ANNUAL REPORT ISSUE**

**NUMBER 248**

**MAY-JUNE**

**1977**

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## ANNUAL REPORT ISSUE

By order of the Board of Directors, the Annual Report Issue is not being delayed to accommodate reports received after the normal deadline.

Ed.

### REPORT OF THE PRESIDENT CHARLES W. JEROME

At this midpoint of my term of office I am happy to report that the past year has been a very rewarding one for me as well as an easy one. This latter is due to the hard work and efficient operations of my fellow Officers and the Board of Directors, which has left me with little to do but try to coordinate their several activities. The Standing Committees also have continued their excellent contributions to make this a profitable period.

The transition to the expanded Board of Directors approved last year has been made smoothly. We now have nine Board members with three being replaced each year. I firmly believe that the wisdom of providing for continuity in the Board will become increasingly apparent from now on when an experienced Board will always be in operation.

The financial condition of the Council remains healthy. The details you will read in our Treasurer's report. As a non-profit organization it is necessary that we follow very closely the narrow line between excess gains on the one hand and running in the red on the other. The accomplishment of this balancing act is very difficult, but one done most ably by our Treasurer and his Finance Committee.

It has been a busy year with preparations for two upcoming Williamsburg Conferences and for COLOR 77. These events will be covered more fully in the Secretary's report. The Secretary will also report on the continued growth of the Council with the incorporation of two new Member-Bodies.

As a result of the survey of the membership made last year it has been decided to move the Annual Meeting out of New York City on alternate years. You will hear more of this in the President-Elect's report.

Finally, I would like to report that the symbol of the Council has been redesigned. This will appear on the membership list when it is reprinted next year.

### REPORT OF THE PRESIDENT-ELECT FRANC GRUM

This has been a year of fruitful activity within the ISCC. As a function of this office, a sincere appeal has been made to strengthen the interchange of dialogue between Member-Bodies, the Delegations, and the Board of Directors. Some progress has been noted, and, in particular, the Delegation Chairmen's Meeting held at the Annual Meeting was very encouraging.

A recommendation was made by the Ad Hoc Committee on Relocation of the Annual Meeting, based on the results of a questionnaire sent to each member of the ISCC last fall. As a result of this recommendation, the Annual Meeting will be held in a city other than New York every other year, and some changes will be made in the format of the Annual Meeting.

Also in response to this questionnaire, a Study Group has been formed to look at many aspects of the ISCC in depth. This group will make recommendations regarding more effective participation and interaction of the Member-Bodies, and the emphasis of the Problems Committee activity and problem selection. A very encouraging note for increasing effectiveness of interaction came with the resolution creating a voting delegation of the ISCC for IMG members at the January Board of Directors' Meeting.

The 1977 Annual Meeting was highly successful and incorporated some changes based on comments from the questionnaires. We are already planning and looking forward to another fruitful meeting in Washington in 1978.

### REPORT OF THE SECRETARY FRED W. BILLMEYER, JR.

In January, 1977, the Council elected as Director for the 1977-1978 term Therese Commerford, AATCC, Karl Fink, CAUS, and Alan R. Robertson, OSA. Ferguson Clydesdale, IFT, Director for the 1976-1978 term, submitted his resignation to the Board in January, as the result of the pressure of other activities, but he agreed to remain in office until his successor was appointed at the next Board meeting in April. At that time Alexander F. Styne, IES, IDSA, retiring as Director for the 1976-1977 term, was appointed to complete Dr. Clydesdale's term. Thus only two of the three Directors for the 1976-1977 term retired in April: William D. Schaeffer, GATF (who had also served in 1974-1976), and Seymour Commanday, AChS.

A major advance during the year was the creation of a Voting Delegation representing the Individual Member Group. Eligible for membership on the Delegation are Chairmen of Standing Committees and Problems Committee Coordinators and Subcommittee Chairmen who are IMG's and do not hold voting Delegate status for a Member-Body. Present membership of the IMG Voting Delegation is Bonnie K. Swenholt, Chairman; William Benson, Ralph Besnoy, Ellen Campbell Carter, Thomas E. Cullen, Robert F. Hoban, Rolf G. Kuehni, Anthony J. Pentz, Alan Rodrigues, George Sonn, and Charles Sweeny.

The Council welcomed two new Member-Bodies during the year, bringing the total now enrolled to 30. They are the Gemological Institute of America, whose Delegation has not yet been appointed, and the Artists Equity Association, whose Delegation is chaired by Mrs. Joy Turner Luke.

The membership is reminded that, in response to their preference as indicated in a poll in 1976, the 1978 Annual

Meeting will not be held in New York, but in the new Loew's L'Enfant Plaza Hotel in Washington, D.C. The dates are April 10-11, 1978. The format of the meeting, whose general chairman is Alexander F. Styne, has not been decided.

As previously announced, the 1978 ISCC Williamsburg Conference "Second Conference on Objectives of Pictorial Reproduction of Color" will be held on February 5-8, 1978, with Calvin S. McCamy as General Chairman and Edwin Breneman as Program Chairman. Rolf G. Kuehni has accepted the General Chairmanship of the 1979 Williamsburg Conference (February 11-14, 1979) on the topic of color metrics.

By the time this report issues, the Third Congress of the International Colour Association, COLOR 77, will have been held in Troy, New York. All signs point to a scientific, artistic, and socially successful meeting, but it is not certain at this writing whether attendance will be large enough to insure financial success. This is of direct concern to the Council, which assumes financial responsibility as the sponsoring AIC member society.

The journal *COLOR Research and Application*, endorsed by the Council, continues to grow in both circulation and stature, as described in a letter report to the Council circulated with the January-February, 1977 *Newsletter*.

It is with deep regret that I close this report by noting the loss through death of Robert W. Burnham, former *Newsletter* Editor; William F. Little, IES, HON, oldest (known) member of the Council; Isadore Nimeroff, IMG for many years prior to his retirement from the NBS; and William T. Wintringham, former Director and SMPTE Delegation Chairman. They will be missed for many years to come.

### REPORT OF THE TREASURER S. LEONARD DAVIDSON

It is my pleasure to report that the finances of the Inter-Society Color Council are satisfactory.

The excess of income over expenses for the year was \$2,935.86 (after allowing for the 1975 Audit) in the General Fund and an increase of \$883.51 in the savings accounts.

However, we will need a new supply of covers for the *Newsletter* which will be purchased this year and amortized over the next few years.

Other than this extraordinary expense, we have a budget that indicates a deficit of \$20.00 for the year of 1977. Accordingly, we have not asked for a dues increase.

A new membership classification — Retired Individual Member — has been created, with reduced dues of \$7.00 a year if requested in writing.

I want to thank everyone in the Council for his cooperation this past year and for the honor of my re-election.

### INTER-SOCIETY COLOR COUNCIL ASSETS AND LIABILITIES DECEMBER 31, 1976

#### ASSETS

Cash in Bank — Regular Checking Account	\$ 5,757.49	
Cash in Bank — Regular Savings Account	3,960.70	\$ 9,718.19
Certificates of Deposit		10,436.58
Prepaid Insurance		36.89
Unpaid prior Dues — Billed 1977		975.00
<b>TOTAL ASSETS</b>		<b>\$21,166.66</b>

#### LIABILITIES

I.H. Godlove Award Fund (in Checking Account)	\$ 93.40	
1976 Audit	300.00	
<b>TOTAL LIABILITIES</b>	<b>\$ 393.40</b>	

**DIFFERENCE** \$20,773.26

**BALANCE I.H. GODLOVE FUND** \$ 830.25

**TOTAL ASSETS** 1975<sup>1</sup> 1976<sup>2</sup> \$21,603.51

**TOTAL ASSETS** 1975<sup>1</sup> 1976<sup>2</sup> \$19,060.53 \$21,603.51

<sup>1</sup>Includes \$1,724.75 in unpaid IMG Dues

<sup>2</sup>Includes \$ 975.00 in unpaid IMG and Member Body Dues

### INTER-SOCIETY COLOR COUNCIL 1976 GENERAL FUND

#### INCOME:

Dues — IMG and Member-Bodies		\$10,734.50 <sup>1</sup>
Publication Sales		
Newsletter	\$ 431.60	
Royalties	330.96	762.56
Use of Mailing List		70.00
Annual Meeting		
Registrations & Banquet	5,520.00	
Meeting & Banquet Expenses	3,392.96	2,127.04
1976 Williamsburg Conference		
Registrations received		
1975	\$ 4,510.00	
Registrations received		
1976	3,059.00	7,569.00
Meeting & Luncheon Expenses	4,789.22	2,780.78

**TOTAL INCOME;** \$16,474.88

**EXPENSES:**

President's Office	\$ 30.84
Secretary's Office	2,400.00
Treasurer's Office	183.15
Board of Directors	240.87
Newsletter	8,008.21
Printing Membership List	1,435.31
Printing By-Laws	792.60
Problems Committee	98.52
AIC Dues	38.57
Bank Charges	10.95

**TOTAL EXPENSES:** \$13,239.02

**EXCESS OF INCOME OVER EXPENSES 1976** \$ 3,235.86

**INTEREST**

Savings Account	\$ 196.27	
Certificates of Deposit	687.24	883.51

**TOTAL INCOME TO BE ADDED TO ASSETS** \$ 4,119.37

<sup>1</sup>Actually received

**INTER-SOCIETY COLOR COUNCIL  
I. H. GODLOVE AWARD FUND**

**INCOME:**

Interest — Savings Account	\$ 47.09
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**TOTAL INCOME:** \$ 47.09

**EXPENSES:** \$ 0.00

**TOTAL EXPENSES:** \$ 0.00

**EXCESS OF INCOME OVER EXPENSES** \$ 47.09

**FUND BALANCE**

Balance December 31, 1975	\$ 783.16
Excess of Income over Expense	47.09

**FUND BALANCE December 31, 1976** \$ 830.25

**ASSETS**

Savings Account	\$ 736.85
Due from General Fund	93.40

**TOTAL ASSETS December 31, 1976** \$ 830.25

**INTER-SOCIETY COLOR COUNCIL  
1976 DUES ACCOUNT**

	<i>Billed</i>	<i>Received</i>
Member-Bodies	\$ 2,100.00	\$ 2,025.00
IMG (Net)	11,284.50	8,709.50
<b>Total</b>	<b>\$13,384.50</b>	<b>\$10,734.50</b>
Written Off — Resignations & Non Payment	( 1,675.00)	
<b>Total Billed &amp; Current</b>	<b>11,709.50</b>	
Received 1/1/76 - 12/31/76	( 10,734.50)	
<b>Carried Forward to 1977</b>	<b>\$ 975.00</b>	

**REPORT OF THE FINANCE COMMITTEE  
S. LEONARD DAVIDSON, CHAIRMAN**

The 1977 budget was approved by the Finance Committee and subsequently approved by the Board of Directors at their January meeting. A copy of the budget is attached. It proposes a deficit of \$20.00 compared to a projected surplus of \$5.00 for 1976. The actual surplus was \$2,935.82 after deducting the estimated auditor's bill, which has not been received to date.

Included in this 1977 budget are small increases for the Secretary's and Treasurer's offices and a new account for Problems Committee expenses.

The estimated surplus income from COLOR 77, amounting to \$375.00, is based on a low estimate of attendees and high expenses.

As chairman, I would like to express my thanks to Miss Midge Wilson, Messrs. George Gardner, Robert Hoban, and Warren Reese, who serve as the other members of the committee.

**INTER-SOCIETY COLOR COUNCIL  
BUDGET 1977**

	<i>1977 Budget</i>	<i>1976 Budget</i>	<i>Actual</i>
<b>INCOME:</b>			
Member-Body Dues			
Dues	\$ 2,025	\$ 2,025	\$ 2,025.00
IMG Dues	8,700	8,500	8,698.55
Annual Meeting (Net)	1,200	1,000	2,127.04
Royalties	300	225	330.96
COLOR 77 (Net)	350		
1976 Williamsburg Conference (Net)		2,400	2,780.78
Other	500	500	501.60
<b>TOTAL INCOME:</b>	<b>\$13,075</b>	<b>\$14,650</b>	<b>\$16,463.93</b>

**EXPENSES:**

President's Office	\$ 200	\$ 200	\$ 30.84
Secretary's Office	2,700	2,400	2,400.00
Treasurer's Office	400	350	183.15
Newsletter	9,000	9,000	8,008.21
Audit	350	300	(1)
AIC Dues	45	45	38.57
Bd. of Director's Meetings	150	250	240.87
Problems Committee	150		98.52
Printing By-Laws		1,100	792.60
Printing Mailing List		1,000	1,435.31
<b>TOTAL EXPENSES:</b>	<b>\$13,095</b>	<b>\$14,645</b>	<b>\$13,228.07</b>

**EXCESS OF INCOME  
OVER EXPENSES**

**EXPENSES (\$ 20) \$ 5 \$ 3,235.82**

(1) Bill not received to date.

### REPORT OF MEMBERSHIP COMMITTEE ROBERT F. HOBAN, CHAIRMAN

Two new Member-Bodies have joined the ISCC: The Gemological Institute of America and the Artists Equity Association. This brings to 30 the number of Member-Bodies in the Council. A list of them was printed in the previous *Newsletter*. The number of members currently on the mailing list is 856.

### REPORT OF THE PUBLICATIONS COMMITTEE WILLIAM BENSON, CHAIRMAN

Since the supply of covers for the *Newsletter* is nearly exhausted, it was agreed at the recent meeting of the Board of Directors that the format of the *Newsletter* should be reconsidered. Some months from now, you will see that the appearance of your *Newsletter* has changed. Just what the changes will be is not clear at the moment, but, as you might reasonably expect, we have a committee working on it, and I hope you will find the new format pleasing and attractive.

The content of the *Newsletter*, as before, depends on you. Hence, I shall issue my annual plea for contributions from the members. Every contribution is appreciated. Let other members of the ISCC know what color means in your life!

### REPORT OF THE 1977 ANNUAL MEETING

The 46th Annual Meeting of the ISCC was held in the Statler-Hilton Hotel, New York City, on April 18-19, 1977. Monday, April 18, was Problems Committee Day as has been the tradition for many years. This year Subcommittee meetings were held during five consecutive 1½ hour time periods, but four simultaneous meetings were still required to accommodate all of the groups.

The arrangements on Tuesday, April 19, constituted a change from the tradition of recent years. The meeting began in the Statler-Hilton's Gold Ballroom with a symposium arranged by the OSA Delegation to the ISCC, chaired by Franc Grum. The title, program, and abstract are as follows:

#### *System of OSA Committee on Uniform Color Scales*

Introduction	David L. MacAdam
Cube-Root	Charles D. Reilly
Sampling Plan	Carl E. Foss
Production of Colors	Hugh R. Davidson
Comparison with Munsell System	Dorothy Nickerson

#### *Abstract*

This Optical Society of America (OSA) has recently issued a set of over 550 glossy acrylic color cards, by use of which may be assembled several hundred different color series, each of which exhibits 5 to 15 progressively different colors, with equally perceptible color differences between all of the pairs of successive colors. These are examples of uniform color scales determined by the OSA Committee on Uniform Color Scales. The arrangement, in color space, of the points that represent the color cards, and of the various color scales, will be exhibited, as well as a model that shows their arrangement and manifold interrelationships.

This excellent Symposium was followed by a program arranged by the Problems Committee, (then) under the chairmanship of Ruth M. Johnston-Feller. Since Mrs. Johnston-Feller was unable to be present due to illness, the present Chairman, Robert F. Hoban, presided. The program consisted of the following talks:

<i>Color Systems in</i>	Charles Parkhurst
<i>Relationship to the</i>	The National Gallery of Art
<i>History of Painting</i>	Washington, D. C.

#### *Abstract*

An illustrated review will be given of those color systems used in Western Arts which have survived in graphic form since the year 1500, and of the artists and scientists who invented, used, or promulgated them, with special emphasis on the origin of modern pigment-mixing practices in the 16th and 17th centuries.

<i>Strength as Seen</i>	Charles D. Sweeney
<i>by the Chemist, the</i>	Chairman, Subcommittee
<i>Physicist, and the</i>	for Problem 25D.
<i>Dyer</i>	

#### *Abstract*

When you discuss the strength of a colorant you know what you mean. To a large extent this meaning depends on your prior training. In this talk, we illustrate the visual differences of strength as defined by physicists, chemists, and dyers. Some of the reasons for these dif-

ferences are discussed. A definition of strength is proposed that meets the requirements of perception.

The meeting then moved to the Grand Ballroom (re-scheduled from the Hotel's Georgian Room, which had been destroyed by a fire a week earlier) for a formal luncheon, with Mr. C.W. Jerome, President, presiding. The luncheon was held in lieu of the traditional evening reception and banquet. After the luncheon, the 1977 Godlove Award was presented to Hugh R. Davidson. The Award Citation found elsewhere in this issue was read for Mrs. Johnston-Feller, Chairman of the Godlove Award Committee, by Mr. Max Saltzman. Mr. Davidson responded briefly.

Mr. Alexander E.O. Munsell, Honorary member of the Council, then made a few informal remarks in reminiscence of his childhood days with his father, Albert H. Munsell, and his family during the period in which the Munsell System was first developed.

The after-luncheon speaker was then introduced by Dr. Robert Feller:

<i>Fund-Raising for Scientific Research in the Arts</i>	Norbert S. Baer, Coordinator Conservation Center New York City
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*Abstract*

Though scientific research devoted to the examination and conservation of artistic and historic works is of critical importance to the understanding and preservation of our cultural patrimony, finding for such efforts is, in general, haphazard. Patterns of funding are examined and prospects for future expansion are suggested.

At the conclusion of Dr. Baer's talk, Mr. Jerome convened the Annual Business Meeting, the Minutes of which follow. The 45th Annual Meeting of the ISCC closed at 3:45 p.m., at the end of the Business Meeting.

Fred W. Billmeyer, Jr.

**MINUTES OF THE ANNUAL BUSINESS MEETING**

The 1977 Annual Business Meeting of the Inter-Society Color Council was called to order by the President, Charles W. Jerome, at 3:00 p.m. on Tuesday, April 19, 1977, in the Grand Ballroom of the Statler-Hilton Hotel, New York City. Mr. Jerome presented his report (reproduced elsewhere in this Annual Report issue of the *Newsletter*). He then read a letter, appended to these Minutes, affirming support by the Council of The Munsell Color Foundation Inc. in its current fund-raising drive. The voting Delegates present approved the content of this letter unanimously. The letter will be made a part of a fund-raising brochure by the Foundation.

The President-Elect, Mr. Franc Grum; the Secretary, Dr. Fred W. Billmeyer, Jr., and the Treasurer, Mr. S. Leonard Davidson, then presented their annual reports to the Council.

Mr. Davidson then gave the report of the Finance Committee, of which he is Chairman. These reports are reproduced in this issue. As required by the By-Laws, the reports of the Treasurer and the Finance Committee were approved, in each case, unanimously, by the Voting Delegates present.

Mr. Jerome then called upon Dr. William Benson, who gave a brief report for the Publications Committee, and Mr. Robert F. Hoban, who reported for the Problems Committee. Mr. Raymond Spilman, Director, then spoke briefly to announce plans for a project on "Color in Use", which is expected to be implemented next year, to provide meetings and workshop sessions of interest to the arts community to be held on the Problems Committee Day of the Annual Meeting.

Mr. Franc Grum, President-Elect, then took the floor as Liaison Officer for Member-Bodies, to remark on the status of this aspect of the Council and ask for verbal reports. Mr. Richard S. Hunter reported for Mr. Harry K. Hammond, III, Chairman of the Delegation from the ASTM, and Mr. Daan Zwick reported for Mr. Roland J. Zavada, Chairman of the Delegation from the SMPTE.

Mr. S.L. Davidson, as Special Trustee of the Munsell Color Foundation nominated by the Council, reminded Delegation Chairman of a meeting of the Foundation's Fund-Raising Committee to which they had been invited, to take place immediately upon the close of the Annual Business Meeting.

There being no further business, Mr. Jerome adjourned the meeting at 3:45 p.m.

Respectfully submitted

Fred W. Billmeyer, Jr.  
Secretary

For many years the Inter-Society Color Council and The Munsell Color Foundation have worked together toward the same purposes. This close relationship is reflected in the similarity of the aims and objectives of the two organizations. All of the Trustees of The Foundation are members of the Council, and three of them are Council Officers.

The Foundation is legally entitled to receive funds in support of grants and research with full tax-exempt status which the Council is not authorized to do. As a result of the similarity of their objectives, The Munsell Color Foundation is designated as the Council's Foundation Associate.

The financial needs of The Foundation are understood by the Council, and it is with the wholehearted support of the Council that The Foundation has undertaken this campaign for funds.

Business, industry, and individuals are encouraged to give their generous support to this campaign. The end result will increase the total funds available for use in color research and educational projects.

We hope that you will carefully review this brochure in order to learn about the past activities of The Foundation and its future needs.

We feel that the objectives of The Foundation are

worthy of support and look forward to your help in making this a successful campaign.

Sincerely yours,

Charles W. Jerome  
President

## REPORT FOR THE BOARD OF DIRECTORS

At its meeting on September 16, 1976, the Board of Directors approved an Executive Committee resolution to the effect that, in view of the expanded size of the Board, attendance at its meetings be limited to Board members (5 officers and 9 directors), Chairmen of Standing Committees, and a minimum number of others on invitation from the President. Mr. Jerome therefore authorized the preparation of official statements of action at Board Meetings for publication in the *Newsletter*. The report for the Fall Board meeting appeared in *Newsletter* No. 244, page 2, and that for the Winter meeting in No. 246, page 1. This report presents only the highlights from these two meetings, but reports in more detail on events taking place at the Spring meeting, on April 17, 1977.

In the view of the Board of Directors, the most important event of the year was the adoption of a new Standing Rule creating a Voting Delegation of Individual Members. This was described in a *Newsletter* article in No. 246, page 1, and the present constitution of the ten-member IMG/V Delegation is given in the Secretary's Report in this issue.

Also of great interest to Council members was Board action, as a result of a questionnaire to all members, setting the location of the Annual Meeting in cities other than New York in alternate years, the first such meeting to be in Washington in 1978. The Board also approved for trial the new format for the present 1977 annual meeting, but has not yet set the format for 1978. The theme of "Application of Color in Illumination" was adopted, and Alexander F. Styne was appointed General Chairman, and Dr. William A. Thornton, Program Chairman, for the 1978 meeting.

The Board invariably spends a part of every meeting reviewing certain topics that are of continuing concern to the Council but often do not make headlines. One of these, which it hopes is now resolved, has for years been the question of voting representation for the individual member group. Another, being pursued vigorously this year by Franc Grum, President-Elect, is liaison with the Member-Bodies. Since the By-Laws state that "the ultimate general authority and responsibility for the policies and affairs of the Council shall be vested in the Member-Bodies. . ." the continued health of the Council depends upon active and concerned Member-Bodies. The Board notes with satisfaction recent up-surges in interest in certain delegations (AChS, ASID, AEA, among others), and commends their chairmen and members. It continues to seek routes to closer cooperation with other groups not now as active.

One means of increasing interest of a member body in Council affairs is through a joint meeting. At the Spring meeting, the Board approved a request from the Federa-

tion of Societies for Coatings Technology to hold a national meeting in cooperation with the Council in 1978. The ISCC will assist in providing program content and speakers.

At every Board meeting the activities of each of the Council's Standing and Special Committees is reviewed to insure that council affairs are running smoothly. At the spring meeting, each of these committees came under scrutiny:

Within the Problems Committee, a number of changes in leadership were approved. Robert F. Hoban was appointed Chairman following the resignation, due to ill health, of Ruth M. Johnston-Feller. Bonnie K. Swenholt was appointed Coordinator for Colorants Problems in Mr. Hoban's place. Rolf G. Kuehni was appointed Coordinator for Color Science Problems following the earlier resignation of Franc Grum, President-Elect. The scope for the Subcommittee for Problem 37, with Joy Turner Luke as Chairman, was approved at the Winter meeting. In the spring, George Sonn was approved as Chairman of Sub. 25F *vice* Richard Bache, and Thomas E. Cullen as Chairman of Sub. 18 *vice* Fred Simon. The resignations of Rolf Kuehni as Chairman of Sub. 34, Milo Folley as Chairman of Sub. 30, and (earlier) Robert Serenka as Chairman of Sub. 6 were reluctantly accepted. Plans to locate Chairmen for these Subcommittees were discussed. In addition to these matters, progress in each of the active Subcommittees is reviewed at every Board meeting.

At the spring meeting, Dr. W. Benson reported for the Publications Committee that the blue *Newsletter* covers are nearly exhausted and suggested that a change in format be considered. Discussion, especially among the designer members of the Board, was extensive, and continued in an Executive Committee meeting at the close of the Board meeting. Agreements reached there will be announced later.

At every Board meeting the finances of the Council are reviewed in reports of the Treasurer and the Finance Committee. The projected financial picture for 1977 provides an essentially balanced budget provided that the 3rd AIC Congress COLOR 77, arranged by the Council, meets its budget. This is by no means certain, and a substantial loss may have to be borne by the Council should attendance at the Congress have been low.

Requests are often directed to the By-Laws Committee at Board meetings. At the spring meeting, an inquiry was raised about corporate memberships, which are not clearly distinguished from individual memberships in the By-Laws. Considerable discussion of the membership and dues structure of the Council ensued, and the By-Laws Committee was asked to review these matters and present recommendations to the Board at an early meeting.

Routine inquiries were made to the Chairmen of the Nominating, Membership, and Awards Committees, and all were found to be functioning well.

The Board always considers its relationships with affiliated organizations and enterprises at its meetings. These are: (1) The Munsell Color Foundation, the Foundation Affiliate of the Council, which is now undertaking a major fund-raising drive with the Council's assistance; (2) the International Colour Association (AIC), for which the Council is now sponsoring the third AIC Congress, COLOR



77; and (3) the independent journal *COLOR Research and Application*, endorsed by the Council. The details of these relationships and the present status of each of the organizations and enterprises is discussed in other reports in this issue of the *Newsletter*.

Two matters of new business were taken up by the Board during the year which, while still in the formative stages, are expected to be making Council news during the coming year. They are mentioned here so that any who are particularly interested may contact the Director named. They are: the professional education and possible certification of colorists (Dr. Henry Hemmendinger); and workshops or meetings on the theme "Color in Use", to be held during the Annual Meeting Problems Day for the interest of those in the less scientific aspects of color (Mr. Raymond Spilman).

Finally, the Board created during the year an ad-hoc Study Group under the chairmanship of Franc Grum to consider, at longer range, the future activities of the Council. The scope of this Study Group, accepted by the Board at its spring meeting, reads:

"To investigate present ISCC activities in light of its aims and purposes expressed in the Constitution, with the intent of exploring more effective participation of and interaction with the member bodies.

"To emphasize the importance of the Problems Committee activity and the selection of problems which are of significant importance.

"This Study Group is planned to be small, yet represent a broad cross section of the ISCC."

Mr. Grum would be pleased to hear from those having contributions to make in this area.

(This report was prepared by the Secretary.)

### REPORT OF THE GODLOVE AWARD COMMITTEE RUTH M. JOHNSTON-FELLER, CHAIRMAN

The 1977 Godlove Award of the Inter-Society Color Council was presented to Hugh R. Davidson in recognition of his many contributions to the many aspects of color — visual, technical, and educational. His imprint has been left particularly in the area of color differences and color-order spacings, in instrumental developments for industrial color control in the preparation of practical digital computer programs for color matching and in creating the first short courses for educating workers in the area of color science and its application. Perhaps most of all, he is appreciated for the generous sharing of his knowledge and for his unassuming and friendly manner in helping all who ask. It is particularly fitting that Mr. Davidson be honored with the presentation because he began his career in color by working with Dr. Godlove. The Inter-Society Color Council is proud to present the Godlove Award to Hugh R. Davidson on the occasion of its Annual Meeting, April 19, 1977.

Mr. Davidson is a graduate of Lehigh University, where he received a degree in engineering physics in 1941. During World War II he worked for the National Research Council, for the Army, and for the Operations Research Group of

the Navy. For six years after the war he worked as a physicist for General Aniline and Film Corporation, where he was associated with Dr. I. H. Godlove. In 1952, with Dr. Henry Hemmendinger, he established the firm of D&H to do color consulting and color measurement. When D&H merged with Kollmorgen Corporation in late 1967, he became vice-president of the Color Systems Division. In 1973 he left Kollmorgen to form Davidson Colleagues, presently engaged in color consulting, computer programming, and color standards preparation. (Mr. Davidson prepared the samples illustrating the Optical Society's Uniform Color Spacing, formally introduced at the present ISCC Annual Meeting.) He continues to present the elementary one-week color course, begun in 1958, which started many of the current workers on their careers in color technology.

Oriented more towards problem-solving than to theoretical considerations alone, two of his inventions have significantly altered the course of the application of basic principles of colorimetry into practice. The first of these was the design and patent of the first commercial tristimulus integrator for the General Electric Recording Spectrophotometer, developed jointly with I. W. Imm of the Librascope Corporation in the late 1940's. For the first time in the history of the science of colorimetry, tristimulus integration could be carried out automatically at the same time that the spectrophotometric curve of a colored sample was being recorded. Not only did this invention open doors for the wide-scale application of tristimulus colorimetry, but the resulting accuracy and reliability enabled instrument manufacturers to develop new instruments for color measurement that were accurate and less expensive and that led ultimately to the design of the sophisticated equipment for color measurement that is available today.

Lest we lose sight of the goal for accurate tristimulus integration in the automated digital computer era of today, we should remind ourselves that the continuous integration provided by the mechanical, continuous method as employed in the Librascope Integrator still represents the most accurate method developed so far. For the skeptic, the measurement of dark maroon colors and near-white colors made with the sharply absorbing rutile titanium dioxide can serve as examples.

The second significant invention was that of the analog computer, COMIC I, for which a patent was applied for by Hugh Davidson in the late 1950's. COMIC is an acronym for Colorant Mixture Computer. The design of the COMIC followed his publication of a series of papers in the *Journal of the Optical Society of America (JOSA)* in which he showed that single-constant Kubelka-Munk theory could be used to predict the color of subtractive colorant mixture of dyestuffs on textiles. Manufactured and sold by the firm of D&H, its use in industrial laboratories ushered in the use of computer color matching for industrial application. A digital computer, COMIC II, followed in which two-constant Kubelka-Munk theory was introduced, forming the basis for many of the two-constant colorant mixture computer programs in industrial use today. His work with practical, flexible colorant mixture programs continues today, with much more complex equations and special modifications.

His interest in the visual aspects of color has been just as significant in its impact. In 1951 he published a paper in the *JOSA* describing "Calculation of Color Differences from Visual Sensitivity Ellipsoids" (those determined by Dr. David L. MacAdam) and also published a paper on the "Accuracy of Visual Judgments of Color Differences on Wool Flannel" in the same journal. His interest in the problem of evaluating color acceptability and tolerances culminated in a milestone paper describing the large body of work done with Elaine Friede on "The Size of Acceptable Color Differences" (*JOSA*, 1953). The large number of visual evaluations reported in that paper remains today as one of the reference bodies of such data and is used all over the world in the evaluation of the accuracy of color difference equations. As a result of that work, he developed, with J. J. Hanlon, the graphical technique for determining color differences based on MacAdam's perceptibility ellipses modified for lightness, which became known as the MacAdam Color Difference Equation (*JOSA*, 1955). This work formed the basis for the charts subsequently prepared by Fred Simon and Bill Goodwin ("the Simon Goodwin Charts") made available by the Union-Carbide Corporation and used for many years for the calculation of small color differences.

His interest in color order systems dates back to his days of working with Dr. Godlove. With H. Littringham he described the preparation of "A Munsell Color Book in Textiles" (*JOSA*, 1951), which unfortunately was not produced commercially. He was responsible for the preparation of the Glossy Edition of the *Munsell Book of Color* based on the Munsell Renotation and aided the Munsell Color Corporation in gradually converting the older Matte Edition to the Renotation Spacing. For many years, the firm of D&H prepared many of the color chips for the Munsell Color Company, an activity in which Mrs. I. H. Godlove (Margaret) played an active role.

Since 1953 he has played a significant part in the work of the Optical Society of America's Committee on Uniform Color Scales (See *Optics News*, Winter 1977, p. 8, article by Dorothy Nickerson, "History of the OSA Committee on Uniform Color Scales.") The final illustration of the spacing arrived at by the Committee was prepared by Mr. Davidson. His eyes glow as he describes the beauty of the various arrangements possible with these samples. No artist, designer, or scientist could enjoy them more.

Although he is best known for his technical work, his esthetic appreciations and talents endear him to the world of the arts — his interest in music, both playing and composition — his interest in the harmony of colors — his interest in artists' techniques. It is hoped by this writer that his experiments on color harmony begun many years ago may eventually be completed. His interests in both the technical and artistic aspects of color have made this choice of Hugh R. Davidson as the 1977 recipient of the Godlove Award particularly appropriate for the Inter-Society Color Council, an organization devoted to the study of all facets of color.

Ruth M. Johnston-Feller  
Chairman, Godlove Award Committee

## REPORT OF THE PROBLEMS COMMITTEE ROBERT F. HOBAN, CHAIRMAN

Two new Coordinators were approved by the Board of Directors:

Bonnie Swenholt as Coordinator for Colorant Problems  
Rolf Kuehni as Coordinator for Color Science Problems.

A status report form has been designed that gives at a glance past and present chairmen and coordinators and the goals and progress of each committee. A copy is appended to this report.

Three new problems have been proposed. Reports of the individual Problem Subcommittees follow:

7. Survey of Color Specifications — R. Hoban, Chairman. 1974 Report, "Survey of American Color Specifications," was reprinted after revisions made in March 1977.

10. Color Aptitude Test — Bonnie Swenholt, Chairman. Efforts have been made to have the chips made by the Federation of Societies for Coatings Technology made into a new edition of the CAT by the Munsell Co.

18. Colorimetry of Fluorescent Materials — Tom Cullen, Chairman. Two papers have been produced from the work of this committee under the Chairmanship of Fred Simon. Having completed the projects by these papers, Fred Simon has resigned and Tom Cullen appointed as new chairman.

22. Procedures & Material Standards for Accurate Color Measurement — Ellen Carter, Chairman. Draft of a document on standards has been distributed to members. Sections of it were discussed at the Annual Meeting.

25D. Strength of Colorants — Dyes Section — Charles Sweeny, Chairman. The round robin on the determination of strength by reflectance measurement has been completed. Draft of the data was distributed. A new proposal was submitted to the committee to determine standard depth. A seminar on measurement of dye strength will be presented this fall at the American Association of Textile Chemists and Colorists Headquarters. The work of the committee was presented at the Annual Meeting by Charles Sweeny in a talk entitled "Dye Strength as Seen by the Chemist, the Physicist and The Dyer."

25P. Strength of Colorants — Pigments Section — Joyce Davenport, Chairman. A round-robin of fourteen participants was completed comparing the strength of two pairs of pigments by both visual and spectrophotometric methods. An organic (phthalocyanine green) and an inorganic (cadmium lithopone red) were used in the investigation. Results of the evaluations were discussed during the Annual Meeting.

25F. Strength of Colorants — Mass Colored Fibers Section — George Sohn, Chairman. The committee has selected a single fiber — polypropylene — to begin their work on. Six participants will evaluate the strength of color of the fiber made with Phthalocyanine Green after properly being wound for uniform presentation.

27. Indices of Metamerism — Ralph Besnoy & Allan Rodrigues, Co-chairmen. The committee has prepared three series of metameric samples, designed an experiment, and constructed a light booth for scaling metameric samples. The experiment was discussed at the Annual Meeting, volunteers enlisted, and the booth demonstrated.

INTER-SOCIETY COLOR COUNCIL  
PROBLEMS COMMITTEE – STATUS REPORT

Chairman:	Present	Appointed	Previous
	R. Hoban	Jan. 1977	R. Johnston-Feller (73)
Coordinators:			
Art & Science	R. Spilman	?	-----
Colorants	B. Swenholt	Mar. 1977	R. Hoban (73)
Color Science	R. Kuehni	Mar. 1977	F. Grum (73)
Pictorial Reproduction	C. McCamy	??	J. Smith (73)

#	Org.	Name	Present/Last	Status				Project	Coordinator	Last Completed Project
				A	S	C	D			
6	39	Survey of Color Terms	----- C. Bartleson (71)				72	Survey of Color Terms	B. Swenholt	49
7	47	Survey of Color Spec'ns	R. Hoban (65) F. Scofield (62)				73	Survey of Am. Color Spec'ns	B. Swenholt	74 Rev 77
10	42	Color Aptitude Test	B. Swenholt (75) Graham/Little ( )				74	Color Aptitude Test	B. Swenholt	64
18	52	Colorimetry of Fluor. Matls.	T. Cullen (77) F. Simon (75)				52	Publications	R. Kuehni	
22	57	Procedures & Material Stds. for Accurate Color Meas'm't	E. Carter ( ) J. Atkins ( )				57	Publications	R. Kuehni	65
25	66	Det'n of Strength of Colorants: Dyes	C. Sweeny (75) C. Garland ( )				66	Publications	B. Swenholt	76
	66	Pigments	J. Davenport (75) R. Harold (66?)				66	Publications		74
	75	Mass Colored Fibers	G. Sonn (77) R. Bache (75)				75	Publications		
27	67	Indices of Metamerism	A. Rodrigues & R. Besnoy (76)				67		R. Kuehni	
30	66	Color in the Building Ind.	----- M. Folley (66)						R. Spilman	
32	72	Color Problems in Photography & Printing	C. McCamy (72) J. Yule ( )				72		C. McCamy	
33	73	Human Response to Color	A. Styne (73)				73		R. Spilman	
34	73	Color Difference Problems	R. Kuehni (73)				73		R. Kuehni	
35	73	Color & Appearance Matching of Living Tissue	R. Sproull (73)				73		R. Kuehni	
36	76	Color Acceptability Stds.	A. Pentz (76)				76	Color Acceptability Stds.	B. Swenholt	
37	77	Artists Materials	J. Luke (77)				77		B. Swenholt	

Status Code: A—Active; S—Standby; C—Completed; D—Disbanded

30. Color in the Building Industry — Milo Folley has resigned as chairman. A task group was formed for study and evaluation of materials. Sample brochures for architectural and designer office and drafting room use were prepared by Waldron Faulkner. Anna Campbell Bliss made a presentation to the Committee at the Annual Meeting.

32. Color Problems in Photography & Printing — Cal McCamy, Chairman. The Committee has plans rolling for a conference in Williamsburg in 1978 on the Objectives of

Pictorial Color Reproduction. A paper on "Neutral" is in the mill for ISCC Approval.

33. Human Response to Color — A. Styne, Chairman. Professor John Flynn made a presentation to the Committee from his report "The Effect of Light on Human Judgement & Behavior."

34. Color Difference Problems — Rolf Kuehni has resigned as Chairman. Color difference evaluations have been compared to three visual evaluations experiments, and

the results have been submitted for publication. The 1979 Williamsburg Conference will be on color metrics.

35. **Color & Appearance Matching of Living Tissues** — Robert Sproull, Chairman. A Symposium using eight committee members as faculty was presented on "Dental Porcelain — the State of the Art, 1977." The Munsell system was used to delineate the colors in an article "Color of Gingival Tissues of Blacks & Whites."

36. **Color Acceptability Stands** — Anthony Pentz, Chairman. The Design Task Group circulated a set of blue pairs to several groups of observers, and the results were tabulated and interpreted.

37. **Artists Materials** — Joy Turner Luke, Chairman. An organizational meeting was held at the Annual Meeting and both artists & manufacturers were represented. Several Task Groups have been set up.

#### **REPORT OF THE SUBCOMMITTEE FOR PROBLEM 6, SURVEY OF COLOR TERMS**

Mr. Robert Serenka resigned during the year, with no progress made during his tenure as chairman. The committee files have been returned to the Secretary pending location of a new chairman.

#### **REPORT OF THE SUBCOMMITTEE FOR PROBLEM 7, SURVEY OF AMERICAN COLOR SPECIFICATIONS ROBERT F. HOBAN, CHAIRMAN**

Available copies of the 1974 report were sold out. Minor revisions were made and additional copies produced in March 1977 to fill outstanding orders.

#### **REPORT OF THE SUBCOMMITTEE FOR PROBLEM 10, COLOR APTITUDE TEST BONNIE K. SWENHOLT, CHAIRMAN**

No report has been received.

#### **REPORT OF THE SUBCOMMITTEE FOR PROBLEM 22, PROCEDURES AND MATERIAL STANDARDS FOR ACCURATE COLOR MEASUREMENT ELLEN C. CARTER, CHAIRMAN**

No report has been received.

#### **REPORT OF THE SUBCOMMITTEE FOR PROBLEM 25D, DETERMINATION OF THE STRENGTH OF COLORANTS — DYES CHARLES D. SWEENEY, CHAIRMAN**

[The following report was received in March. No report of activities at the Annual Meeting has been received.]

The data from the direct dye round-robin have been

collected. These results along with those previously obtained for dispersed and acid dyes will be discussed at the Annual Meeting.

Dr. Celikiz has been active in organizing a joint seminar with the American Association of Textile Chemists and Colorists on the determination of dye strength. The various papers for the seminar have been prepared by committee members. It is anticipated that this seminar will be held in late fall.

A proposal developed by Mr. Harris for the determination of standard depth will be discussed at the annual meeting.

#### **REPORT OF THE SUBCOMMITTEE FOR PROBLEM 25F, DETERMINATION OF THE STRENGTH OF COLORANTS — MASS-COLORED FIBERS. GEORGE F. SONN, CHAIRMAN**

No report has been received.

#### **REPORT OF THE SUBCOMMITTEE FOR PROBLEM 25P, STRENGTH OF COLORANTS — PIGMENTS JOYCE S. DAVENPORT, CHAIRMAN**

A review of the round-robin pigment testing program results was discussed. It was thought that more information would be needed to reach a meaningful conclusion.

Max Saltzman suggested that tolerances could differ considerably depending whether the pigments were used in paint compared to a plastic or ink, etc. He felt it was an almost impossible task to relate the results in one industry to another. It would be better to establish a pigment tolerance in the system of each participant area. Mr. Saltzman then suggested a pigment sample should be tested by the same person using the same resin or base, repeating the test in the morning and again in the afternoon for two separate days, then compare the results of the four tests. Unless a very careful reproducing method were used it would not be unusual to have a plus or minus five percent difference between each test. Eleven members agreed to participate.

#### **REPORT OF THE SUBCOMMITTEE FOR PROBLEM 27, INDICES OF METAMERISM RALPH BESNOY AND ALLAN B. RODRIGUES, CO-CHAIRMEN**

During this past year, the subcommittee has finalized details for the round-robin observation test. The experiment was designed by Dr. Ruth Rich of Rensselaer Polytechnic Institute. Three sets of color chips, each having ten metamers, are being prepared by Dr. Jim Davidson of Kollmorgen, Chuck Sherman of Sherwin Williams, and Dr. Allan Rodrigues of DuPont. A light booth providing six light

sources is being built by Kollmorgen. Details of the experiment will be explained at the April meeting and a schedule set up for the observation tests. Organizations able to participate in these tests are urged to send representatives to this meeting.

### REPORT OF THE SUBCOMMITTEE FOR PROBLEM 30, COLOR IN THE BUILDING INDUSTRY

No report has been received, and no chairman has been appointed to succeed Mr. Milo D. Folley, whose resignation has been accepted.

### REPORT OF THE SUBCOMMITTEE FOR PROBLEM 32, COLOR PROBLEMS IN PHOTOGRAPHY AND PRINTING CALVIN S. McCAMY, CHAIRMAN

No report has been received.

### REPORT OF THE SUBCOMMITTEE FOR PROBLEM 33, HUMAN RESPONSE TO COLOR ALEXANDER F. STYNE, CHAIRMAN

Three outstanding events highlight the activities of the committee during this year.

The Munsell Color Foundation is considering the research proposal submitted by Professor John E. Flynn of the Pennsylvania State University for the study of surface color in context with lighting conditions as behavioral factors. The title of the proposal is "The Effects of Room Color on User Impression and Satisfaction." Collaborating with Professor Flynn will be Dr. Terry Spencer of Kent State University, Ohio, Professor Osyp Martyniuk, Kent State University, Ohio, Dr. Hugh Blasdel, General Heuristics, Washington, DC, Professor Alexander F. Styne, University of Miami, Florida, and Mr. Robert F. Spiegel, Naval Ship Engineering Center, Hyattsville, Maryland.

Asked by WAMU/FM, the Radio station of the American University in Washington whether he would be interested to arrange for a radio discussion on color, Kenneth L. Kelly, Physicist at the National Bureau of Standards obtained the collaboration of Mr. Richard S. Hunter, President of Hunter Associates Laboratories and past president of the Inter-Society Color Council, and Professor Alexander F. Styne of the University of Miami. Mr. John Olivieri, a painter and instructor at American University, joined the group on July 21 at the station. Mrs. Irma Andahl was the moderator and discussion was led by Mrs. Alyeene Boren of the station staff. The discussion ranged from the physics of light to the structure of pigments and to psychological effects of color. There were so many questions from callers that the 90 minutes allowed for the program passed only too quickly. It must be mentioned that the questions came from an obviously well-educated audience who listen regularly to the educational

programs of this station.

The last event came about in a manner that proves how well the Council functions as a meeting place of minds and a stimulus for ideas: Mr. Corwin Strong attended for the first time the meeting of this committee at the 1976 April meeting. The Chairman met Mr. Strong at this occasion and, on his invitation, visited him during the summer months in Washington. At that meeting Mr. Strong suggested the idea of a workshop on color in the health care facilities. The Chairman suggested this idea to the chief of the Sensory Environment Section at the National Bureau of Standards, Dr. Arthur Rubin, who welcomed the suggestion and mentioned the possibility of making the arrangements at NBS as one of their regularly scheduled workshops, specifically aimed towards professional groups and government officials interested in the particular subject. Mr. Brian Pierman, Safety Research Coordinator of the Office of Housing and Building Technology, Center for Building Technology of NBS, was given the assignment to organize the workshop with the help of Kenneth L. Kelly, and, between them and Professor Styne, an outstanding roster of speakers was assembled. They were Dr. William C. Beck, President of the Donald Guthrie Medical Research Foundation, Professor John E. Flynn, of The Pennsylvania State University, Mrs. Marcella Graham, Institutional Design Consultant, Kenneth L. Kelly, National Bureau of Standards, Professor Thomas Sisson, MD, of Temple University, Mr. Robert Spiegel, Naval Ship Engineering Center, Mr. Corwin Strong, National Institutes of Health, and Professor Styne.

More than 150 government officials, professional architects, and designers attended the meeting, and a next round on the same subject in collaboration with the National Institutes of Health is already being discussed for summer of 1977.

Correspondence during the year on subject matters of concern to this committee has ranged widely and it is hoped that the annual meetings will continue to provide an open platform for researchers and practicing designers for a continued interchange and eventual progress in the problems under discussion: To provide substantiated guidelines for the use of color in man-made environments for the benefit and well-functioning of people.

[The above report was submitted in February. No report of activities up to and including the Annual Meeting has been received.]

### REPORT OF THE SUBCOMMITTEE FOR PROBLEM 34, COLOR DIFFERENCE PROBLEMS

Visual evaluation of all six sample sets has been completed. On the basis of the observational data visual scales have been established by Dr. Bob Marcus. Excellent correlation between the two established perceptibility scales and good correlation between perceptibility scales and acceptability scale were obtained.

Correlation calculation between the visual scales and color difference metrics as well as calculation of optimized ellipsoids remain to be done for four sample sets.

The experiment and its results will be described in a paper to be written by R. Kuehni and R. Marcus. This successfully concludes the initial phase of the work of this committee. The chairman resigned from his position at the end of the committee meeting. Until a new chairman is found, he will act as a caretaker for the committee.

During the well-attended committee meeting, a lively discussion developed regarding the need for an improved small color difference formula. It became apparent that of the two current CIE recommendations, neither shows a significant advantage in correlation with small color difference data nor with large color difference data. Representative small color difference data from which an improved formula could be developed are, therefore, very desirable. However, they should be determined by more efficient means that those affordable in a committee such as this.

[This report was submitted by Rolf G. Kuehni, whose resignation as chairman has been accepted.]

#### **REPORT OF THE SUBCOMMITTEE FOR PROBLEM 35, COLOR AND APPEARANCE MATCHING OF LIVING TISSUE ROBERT C. SPROUL, CHAIRMAN**

A symposium, "Dental Porcelain — The State of the Art, 1977," was held in Los Angeles on February 24th, 25th and 26th. Steve Bergen, Bruce Burk, Laurence Gettleman, Ronald Goldstein, Richard McPhee, Jack Preston, Robert Sproull, and Ken Turner, all members of subcommittee 35, were part of the international faculty of about 50. Color and color matching problems were given a prominent role in the symposium.

Several new members have joined Subcommittee 35. Dr. Ronald B. Blackman, US Air Force, diplomate of the American Board of Prosthodontics; Dr. Toshio Hayashi, Tokyo, Japan, an early pioneer in color matching in dentistry; and Dr. Henri Sahel, Paris, France, an early worker in measuring dental materials with the spectrophotometer.

Jack Preston, the whirling dervish from Los Angeles, has, in addition to giving his outstanding color lectures, been studying light and lighting in the color matching environment. It should prove invaluable to dentists as the approach has been from the viewpoint of the dental office and dental laboratory.

An article in the February Journal of Dental Research titled "Color of Gingival Tissues of Blacks and Whites" used Munsell notations to delineate the colors. The authors of this well-written article have been contacted to see if they plan further studies.

The March *Newsletter* of the American College of Prosthodontists carried an announcement of the coming ISCC meeting in New York, information as to how ACP members may apply for membership, and the aims and goals of the ISCC.

#### **REPORT OF THE SUBCOMMITTEE PROBLEM 36, COLOR ACCEPTABILITY STANDARDS ANTHONY J. PENTZ, CHAIRMAN**

The second meeting of the ISCC Problems Subcommittee 36, Color Acceptability Standards, was held in New York City on April 18, 1977. Attendance was up, with 33 people attending this year compared to 17 last year. Only 5 of the 33 had also attended last year's meeting. Copies of the Problem Scope, Problem History, minutes of last year's meeting, and the report of the Design Task Group were distributed to those attending.

Dr. F. Billmeyer reported on the work of the Design Task Group. They have collected data points from 39 people in 2 diverse groups of observers of a set of 23 pairs of colorimetrically different blue panels. These panels were available at Rensselaer from another study. The participants were asked to separate the pairs of colors into 5 categories from "smaller than tight" to "larger than normal" color difference. Preliminary data analysis suggests these 2 groups of observers largely agreed on the category scaling of the different colored pairs in this set of panels. A conclusion that can be drawn from this small sampling is that the concept of providing examples of color differences representing typical commercial tolerances is probably feasible.

The book of "Visual Examples of Measured Color Difference" produced by the National Coil Coaters Association was suggested by one of the attendees as a possible method of satisfying the Scope of the Problem. This same suggestion was made during the "New Problems" meeting in April, 1975, before the official formation of Problems Subcommittee 36. The 2 objections raised in that meeting were the cost and inappropriateness of materials. This book contains 16 pages illustrating 1 Hunter Unit and 5 Hunter Units of color difference in 3 directions about a centroid for 8 different hues. I believe most people would agree that 5 Hunter Units exceeds the "commercial" tolerance level defined in the Scope. I am not certain how a diverse group would judge the tolerance level of the 1 Hunter Unit steps. The arrangement proposed by Jim Davidson places both the "tight" and "commercial" samples on a single page. The NCCA book places the 1 and 5 unit steps on following pages. It is uncertain whether the NCCA booklet is still available.

The Design Task Group of Problems Subcommittee 36 is staffed and active under the leadership of Ruth Rich of RPI. The other 2 task groups have not been organized. They have the responsibility for preparing samples for the Design Group and for collecting samples of commercial tolerance matches from industry. There has been little interest in these task groups to date.

#### **REPORT OF THE SUBCOMMITTEE FOR PROBLEM 37, ARTISTS' MATERIALS JOY TURNER LUKE, CHAIRMAN**

The Subcommittee for Problem 37, Artists' Materials, held its organizing meeting during the ISCC Annual Meet-

ing in New York on April 18. Thirty-three people attended the session including representatives of several artists' groups, namely The American Artists Professional League (AAPL), Artists Equity Association (AEA), Artists Equity of New York, Artists Technical Research Institute (ATRI), The Boston Visual Artists Union (BVAU), and The Foundation for the Community of Artists (FCA); and several manufacturers of artists' paints, i.e., M. Grumbacher, Inc., Permanent Pigments, Inc. and F. Weber Co.

The first project, sponsored by AEA, will be on artists' paints in cooperation with the National Bureau of Standards' proposed revision of Voluntary Commercial Standard CS 98-62, Artists' Paints. The proposed NBS Voluntary Product Standard TS 205 has been sponsored by AAPL and is based on lightfastness tests conducted by Mr. Henry W. Levison at Colorlab. AEA is sponsoring Subcommittee 37 to disseminate the information in TS 205 and to add information about artists' paints on the market.

Mrs. Louise Galyon was appointed Secretary to Subcommittee 37. Five Task Groups were formed to work between the annual meetings and report to the full Subcommittee. Dr. Treva Pamer was appointed Chairman of Task Group I: Type and Size of Publication; Mr. Henry Levison is Chairman of Task Group II: Technical Considerations; Ms. Catherine Jenkins is Chairman of Task Group III; Toxicity, Hazards, Truth in Labeling. The Chairmen will be appointed later for Task Group IV: Publication Format, Supplementary Publication; and Task Group V, Funding, Membership, Operational Rules. Interested individuals are welcome in any Task Group.

Dr. Henry Hemmendinger spoke to the group about the contribution that colorimetry can make to the artist's understanding of his paints and to the effects he can create with them. Dr. Hemmendinger displayed diagrams to illustrate what can be learned from the spectral reflectance, absorption, and scattering of light by paints.

Mr. Carl Foss remembered many groups have attempted similar work. He warned that this Subcommittee is beginning a difficult project and should be prepared to take a small step at a time.

### AMERICAN ARTISTS PROFESSIONAL LEAGUE DELEGATES FRANK C. WRIGHT, CHAIRMAN

The past year has seen renewed interest in standards for artists' pigments.

Dr. Robert L. Feller, Chairman of the AAPL Technical Committee, has been working with Henry Levison of Colorlab, and the National Bureau of Standards to revise the agreed standards for nomenclature, chemical content, and light fastness. Many new pigments and vastly improved testing methods have come up since 1962, the most recent agreed standards issued by the National Bureau of Standards. Acrylics and powerful new organic colors have been developed with remarkable properties of light fastness.

We are glad to see the new Committee of ISCC get into this important work and we welcome the renewed interest with hearty enthusiasm.

AAPL pioneered the work on standards for artists' pigments back in 1932, with the work of Dr. Martin Fisher of the University of Cincinnati.

Revising the work will be a major contribution in an important area, one that is long overdue.

### REPORT FROM THE AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS DELEGATES ROLAND E. DERBY, JR., CHAIRMAN

No report has been received.

### REPORT FROM THE AMERICAN CERAMIC SOCIETY DELEGATES F. JOSEPH VON TURRY, CHAIRMAN

At the 79th Annual Meeting and exposition of the American Ceramic Society held in Chicago, April 23rd - 28th, 1977, the Design Division, with the ACS delegation to the ISCC, sponsored a society conference on color, coordinated by F. J. Von Turry. Numerous speakers from industry participated in this successful program. Color trends and problems were presented by the member delegates.

Guest speaker was Joyce S. Davenport, Supervisor of Color Development and Color Research from DeSoto, Inc. Research Center, Des Plaines, Illinois.

The presentation "Color Compromise Between Architect and Supplier" discussed the usage of inorganic pigmentation necessary to achieve a high quality, long-term coil coated siding versus pigments and dyes in commercially used color swatches. The presentation was an in-depth, step by step analysis of the development of a particular color for a specific end-use.

The audience included designers, colorists, researchers, educators, executives, students, production specialists, sales representatives, technical directors, glass technologists, and scientists.

Dr. Stephen D. Stoddard, leader of the Ceramic Section at Los Alamos Scientific Lab., and president of the ACS, in his keynote address to the Design Division, concluded that "neither art nor history can be understood without paying attention to the role of technology; nor can technology be understood without history, art and design." He urged continued cooperation between researchers, engineers and designers, which cannot but lead to improved products throughout industry.

Following are the reports of some of the delegate members: Dr. Clarence A. Seabright, The Harshaw Chemical Company, Division of Kewanee Oil Co.:

"Things do not change too much from year to year. However, a recent trend has been noticed and shows up in our business. This is the increased use of dark browns and blacks. This seems to be occurring in sanitary ware and in the wall tile field. There is also interest in use of bright yellows, oranges, and reds. These are unfortunately difficult colors in ceramics. Use of earthtone colors continues important. No other changes of note are apparent."

Laurence D. Gill, Glidden-Durkee, Division of SCM Corp. Ceramics Group:

"The advent of reactive glazes will have considerable impact on color. We find ourselves in 1977, no longer color matching a color, but color matching an effect. An effect consisting of two or more colors where surface texture and degree of gloss play an important role in the total visual impact on the viewer.

It has always been difficult to color match matte glaze surfaces to glossy color standards. Now the situation is compounded by the introduction of color variation, swirls, controlled randomness, if you will, in the new 'reactive glazes.'

When a solid color is matched, any increment represents the sum, and it is only necessary to obtain a standard large enough to view adequately (or measure on an instrument). When dealing with the subtle variations of a reactive color, one must be sure to obtain an overall view and attempt to match the effect and not just a specific portion or color.

Much like a patterned wall paper, the individual color components may appear satisfactory as color matches, but the final approval rests in the total pattern after each color is put in place. The precise geometrical color pattern of printed wall paper, if properly keyed can be read by machine and measured in a reproducible fashion. The randomness of the reactive colors and glazes makes it difficult if not impossible to measure so that the human eye becomes the sole judge. But, of course, the same randomness and activity of the color allows for broader color tolerances and lends a certain degree of appeal to any color variation that is present.

The aim is to achieve a handmade look and certainly color variation is acceptable within that framework. Yet, the goal is to match a particular color, and, without color measurements or instrumentation, the sole judge is the customer or artist or designer. We at Pemco expect to see more of these types of problems in the future."

Paul D. Henry, The O. Hommel Company:

"The trend of color continues the same this year as last year. All companies buying colors are making a very honest effort to reduce their inventory of colors. As few colors as possible are used to produce matches, and all shades are tried, within limits, to be matched with the inventory of colors kept in stock. This is not always possible so that a new color must sometimes be used.

Zirconium based colors are still used in large quantities, especially in the tile and sanitary ware industries. Zirconium vanadium yellows, zirconium praseodymium yellows, zirconium iron pinks, zirconium vanadium turquoise, and zirconium grays are extensively used.

Research is constantly being carried on to produce other zirconium base colors which will have the eye appeal of the standard zirconium colors which are in large demand today.

Instrumentation is being used more and more to match colors and as a check on the quality control of the product. There are very few plants that make colored products that do not use some color instrument. Computers are used to some extent today and have a bright future for making quick color matches and assure excellent quality control.

Buyers of colors are becoming very critical as to the quality of the product. It is necessary to use color instruments as a check to the human eye."

F. Joseph Von Tury, Vontury, Inc.:

"In order to report on design and color in the china, glass and ceramic accessory market, I visited the China & Glass Show in January.

As one enters the great halls of the Convention Center in Atlantic City you find approximately 800 American and foreign exhibitors showing their products for the coming market. After two days of wandering through the labyrinth, I must say that I was impressed not only by the achievements of the exhibitors, but also by the ways in which their products were presented.

In the china dinnerware section, one was struck immediately by the beautiful and sophisticated table settings in coordinated design and color. Dinnerware has become an artistic expression. It seems to me that the focus of interest is around the table, and it has again become the heart of the home. The tabletop is a place for self-expression and how to serve is as important as what you serve.

Tableware trends generally are following trends in home furnishings in design and color. It seems that the consumer taste is for more colorful and multi-color patterns. There are gold and red tones in combination with white. New colors on faience ware are deep red, green and brown. Black is used as accent and in some cases as rim trim.

Earthenware is more refined in quality and appearance. Stoneware must be in demand. Besides the mass-produced, you find stoneware created and made by individual craftsmen-potters. Muted brownish and earthtone colors dominate in this category, with some green shadings.

Glassware manufacturers have played a big part in making glassware a fashion category. There was a great deal of stylish glassware in a clean contemporary look. You also find studio-produced "art glass," individually crafted and decorated, in vibrant colors.

Accessories are brighter — orange and olive-green predominate. In general, bright and strong colors dominate the market.

In conclusion, I found that there is greater diversification in production, and a more successful product coordination for the market. Economic factors have created larger production for wider markets, which has resulted in a style for world-wide acceptance.

This trend has brought with it also an international color palette. You will see that color manufacturers will find an easier way to fit into the world market and, at the same time, foreigners into the American market.

I left the China & Glass Show with the impression that the future is very promising for the creative forces — the designer, the colorist, and the artist-craftsman.

Ceramics for use in architecture.

The tile industry has opened new markets through creative design and through exploitation of the versatility of tiles. Research is going on constantly for new colors, new finishes and textures, and new shapes and sizes. Traditional uses of structural clay products are being studied in at-



tempts to develop new uses and new forms for architectural consideration. Colorful ceramic materials have helped to humanize buildings and homes. The rapid adoption of color in the sanitaryware industry and in the appliance field is remarkable.

I am working on a project to further the successful fusion of architecture with the fine arts and crafts and to re-establish their traditional relationship to each other. The participants in the building arts should be brought together for better communication to clarify issues and to determine how to move ahead into new areas of production, consumption and the integration of art."

Interest in color activities is growing. More meetings within the ACS with increased participation by ISCC members are planned. More articles on color will be published in the *Ceramic Bulletin*. New delegates representing new areas will be appointed to replace non-active members. The ACS delegation will cooperate with the Munsell Color Foundation in its fund-raising drive.

### REPORT FROM THE AMERICAN CHEMICAL SOCIETY DELEGATES LAWRENCE R. LERNER, CHAIRMAN

The American Chemical Society delegation is in the process of being reorganized after a period of inactivity. Many chemists work on various aspects of color, and we hope that we can help serve their interests. Chemist council members are urged to contact us with any suggestions and, if so inclined, to join with us on the delegation.

I believe we are getting off to a good start, and I am pleased to report that Sister Mary Virginia Orna, OSU, is the newest addition to our delegation. She has been teaching a chemistry course for art students at the College of New Rochelle, and the published discussion of this course in the *J. Chem. ED.* 53, 638 (1976) should be of great interest to a number of council members. To date other members of the delegation include F. W. Billmeyer, Jr., S. L. Davidson, R. L. Feller, C. E. Garland, C. E. Matkovich, M. Saltzman, and F. Scofield.

I expect to be able to report on much more activity a year from now with the enthusiastic help of the above-mentioned delegates.

### REPORT FROM THE AMERICAN COLLEGE OF PROSTHODONTISTS DELEGATES ROBERT C. SPROULL, CHAIRMAN

The Newsletter of the American College of Prosthodontists has been most receptive to inserting items relating to the ISCC and the Subcommittee for Problem 35.

The Color and Color Matching Committee of the ACP has been removed from ad hoc status and is now a standing committee. Standing committees are limited to seven members and the present members are Don Smith, Larry Gettleman, Dick McPhee, Ken Turner, Steve Bergen, and Bob Sproull, Chairman. Next year Jack Preston will become Chairman.

A clarification of the aims and goals for this committee resulted in the following:

#### Charge to the Color and Color Matching Committee

The duties of the Color and Color Matching Committee as specified in the by-laws are to "interface with the Inter-Society Color Council and to monitor and conduct research in this area of responsibility." These responsibilities shall be carried out using the following guidelines:

1. Continue close liaison with Subcommittee 35 — *Color and Appearance Matching of Living Tissue* of the Inter-Society Color Council.
2. Establish liaison with other groups with an interest or commitment to color matching problems.
3. Monitor and evaluate current literature concerned with color and/or color matching.
4. Evaluate commercial developments and commercial claims relating to color matching in dentistry.
5. Establish guidelines for dental office and dental laboratory illumination.
6. Establish liaison with and offer assistance to researchers concerned with color matching in dentistry.
7. Constantly evaluate the need for additional areas of attention.

The three areas to receive emphasis in 1977 have been listed as follows:

1. Continue close liaison with Subcommittee 35.
2. Establish guidelines for dental office and dental laboratory illumination.
3. Evaluate commercial developments relating to color matching in dentistry.

Item 1 is sure to be successfully carried out since the members of the Color and Color Matching Committee are members of the ACP delegation to the ISCC. Concerning item 2, Jack Preston has been doing excellent pioneering work on dental lighting and it is hoped that his work can be published soon. Item 3 is apropos with the flurry of interest in instrumental color matching and other developments relating to color in the field of dentistry.

### REPORT FROM THE AMERICAN INSTITUTE OF ARCHITECTS DELEGATES WALDRON FAULKNER, CHAIRMAN

The Chief activity involving the AIA consists of the work of the Task Force on "The Presentation of Colored Building Products." Its objective is to improve the presentation of colored building materials as shown in producers' literature so that architects will be able to make the preliminary selection of building products more easily and intelligently than they have in the past.

On February 15, Waldron Faulkner gave a lecture at the Smithsonian Institution on "Architecture and Color."

### REPORT FROM THE AMERICAN PSYCHOLOGICAL ASSOCIATION DELEGATES SIDNEY STECHER, CHAIRMAN

No report has been received.

**REPORT FROM THE AMERICAN  
SOCIETY OF INTERIOR DESIGNERS  
DELEGATES  
ANNA CAMPBELL BLISS, CHAIRMAN**

The ASID committee for the ISCC this year initiated a Color Study Group. Members responded enthusiastically to a notice in the Society's *Newsletter*. A mailing was sent to each to obtain background material and identify problems for study. It revealed a great range of experience and interest in color.

For the present we will share information and develop greater understanding of color before defining areas for research. Interested members will be encouraged to work with the specialized sub-committees of the ISCC. Ultimately we hope the Study Group will work in consultation with the education and research committees of ASID to prepare papers and helpful criteria for the general membership.

ASID nationally will give great emphasis this year to professional development and naturally color should be part of this program. The North California chapter will launch its fall schedule with a weekend seminar on Color.

**REPORT FROM THE AMERICAN  
SOCIETY OF PHOTOGRAMMETRY  
DELEGATES  
ANTHONY E. SALERNO, CHAIRMAN**

No report has been received.

**REPORT FROM THE AMERICAN  
SOCIETY FOR TESTING AND  
MATERIALS DELEGATES  
HARRY K. HAMMOND, III, CHAIRMAN**

ASTM Committee E-12 on Appearance of Materials elected Richard S. Hunter, an ISCC Past President, chairman for the next two years. The committee is actively reviewing and revising several test methods and recommended practices as well as developing new ones where needed. A task group under the leadership of Calvin McCamy is drafting a Comprehensive revision of the Definitions of Appearance Terms (ASTM E284). Norbert Johnson is the new chairman of the subcommittee dealing with Geometric Properties. He is actively working on the development of absolute as well as comparative test methods for retroreflective materials as well as standardization of the vocabulary used in this field.

A cooperative test is in progress of a proposed high-gloss method utilizing a Swedish glossmeter known as the CEJ.

Committee D-1 on Paints has an active subcommittee on Optical Properties now headed by Parker Mitton, the former secretary. The Subcommittee is actively reviewing and revising where necessary test methods on gloss and on instrumental color-difference measurement. A cooperative test was recently conducted to obtain a realistic evaluation of among-laboratory precision. Information of this type

can be deduced from the NBS-MCCA Collaborative Reference Program, but these data usually indicate poorer precision among instruments than can be obtained when instruments are carefully adjusted and specimens are carefully measured. The inescapable conclusion is that in the usual laboratory measurement situation, instruments are not well adjusted, standards are not carefully cleaned, and specimens are not carefully presented for measurement, so the among-laboratory precision is found to be considerably below what really could be obtained. This kind of discrepancy is also found in the among-laboratory precision of color measurement.

The ASTM Paint Committee D-1 is working closely with the International Organization for Standardization (ISO) Paint Committee in the development of international standards for gloss and color. Slow but steady progress is being achieved and both groups are profiting from cooperative efforts. The ISO Paint Committee met in Philadelphia the same week as the ISCC Annual Meeting.

ASTM D-20 on Plastics is responsible for widely used methods of test for transmission haze, yellowness, and other optical properties.

It is the view of the members of the ASTM delegation that the work of the ISCC is very beneficial to all concerned; we therefore recommend again that ASTM continue to support actively the work of ISCC in every way.

**REPORT FROM THE ARTISTS EQUITY  
ASSOCIATION DELEGATES  
JOY TURNER LUKE, CHAIRMAN**

No report has been received.

**REPORT FROM THE COLOR ASSOCIATION  
OF THE UNITED STATES DELEGATES  
MIDGE WILSON, CHAIRMAN**

Three areas have strongly influenced recent color developments: economic pressures, where variety is sacrificed for volume in basic items; the rapid expansion and universal participation in all types of active sports; and developments in men's wear.

Over-emphasis on basic bread-and-butter items restricts the color picture and gives us a safe world of navy, brown, black, white, natural, camel, and gray; to be modified by the introduction of seasonal colors for the balance of the line. This concentration on basic items has resulted in the growth of small specialty shops and boutiques, which feature limited quantities, vast variety and highly colorful stocks. Here, an abundance of intriguing color is a major ingredient.

Exploding interest in a wide range of active sports, each with its especially styled gear, is responsible for the great wave of bright accent colors, against white and natural tones.

While the headlines and press feature items on women's lib and the shifting responsibilities of women, it is the realm of men and their activities that currently provide the most significant influences on fashion colors. The muted

tones of recent seasons were masculine in temperament. The denim rage was rooted in men's work clothes, to be followed by khaki, with an equally male source. The growing divorce rate, with its accompanying pattern of more single-men households, has prompted home furnishings designers, especially in the bed-and-bath area, to feature masculine patterns and colorings, particularly in the natural-to-brown range.

As men dress with more elegance and aplomb, women eagerly follow suit and welcome the opportunity for change-of-mood dressing and more romantic styling, which is reflected in the delicate demi-tints which are increasing in appeal.

Both function and fantasy influence color developments; but it is the imaginative use of fresh tones and interesting combinations that build bonus sales.

### REPORT FROM THE COLOR MARKETING GROUP DELEGATES LOUIS A. GRAHAM, CHAIRMAN JOYCE S. DAVENPORT, VICE-CHAIRMAN

An annual edition of the Color Marketing Group's "Color Direction Palette" was issued to cover the sales year of 1978. This annual set of colors has become a very important asset to our members, all of whom contribute to its success. The members receive these prior to them being available for public release. Sets can be purchased at the CMG office (1000 Vermont Avenue, N.W. Washington, DC).

Two semi-annual meetings were held by CMG during 1976, the Spring meeting in Boston and San Francisco during the fall. Detailed reports were submitted to the ISCC *Newsletter* covering these events.

During 1976 official regional meetings have been established, with regional appointed chairmen to officiate. We have found it to be a lucrative addition to our bi-annual meetings, regarding color directions and communication between our chairholders. We feel it is most beneficial to our organization to keep in close communication throughout the year and the regional meetings are proving to be a worthwhile event. Open invitations and specials between members to visit each others place of business or installations helps to widen each individual's scope of knowledge.

Although CMG is one of the younger member bodies of ISCC, we have established a dynamic organization of which we are most proud. Because of our growing membership, it has become necessary to revise our by-laws to allow new applicants to join CMG as a member status with full benefits of the chairholder, whose number is limited to two hundred.

CMG board of directors now consist of the following chairholders. Yale Forman, Yale Forman Designs, President: Harriet E. Jennings, Champion Building Products, Vice-President: Kenneth X. Charbonneau, Benjamin Moore, Secretary: Lois B. Zolliker, Lois Zolliker Associates, Treasurer: Patricia Barnes, Color Marketing Consultant: Paul W. Britt, E.I. duPont deNemours & Co. Inc.; Everett R. Call, National Paint & Coatings Assoc.; Joyce S. Davenport, DeSoto Inc.; Nadine Gross, Design Consultant; Richard Hoffman, Reed Decorative Products Ltd.;

Ian McMeekin, Lees Carpets Inc.; Robert Miracle, Inter-space Corp.; Joyce Nacker, Cotton Inc.; Harry A. Shortway, Congoleum Industries Inc.; Murray Smith, Micarta Div. Westinghouse Electric Corp.

### 1977 Biannual Meeting of the Color Marketing Group

Place Minneapolis high on our list of favorite cities. That was the consensus of opinions at Color Marketing Group's 1977 Spring meeting in this fair city. The meeting turned out to be CMG's second largest attendance and, like all their conventions, highly successful.

The meeting was held at the Sheraton Ritz Hotel, April 24th - 27th, 1977. The theme of this assembly was, "The Magic of Color" and it was magical the way the program flowed so smoothly, holding the complete interest and concentration of all.

The program co-chairman did a superb job of organizing and presenting this conference. A hearty "thank you" is deserved to:

Patricia Barnes — Color Marketing Consultant  
Richard A. Cobb — Colwell Color Card Companies  
Richard Hoffman — Reed Decorative Products Ltd.

The official opening began with the usual gusto of chairholder workshops, the hard work and data generated prior to the meeting payed off in fast, efficient preparation for the following workshops.

At the past president's reception, a presentation was given by William Sarnoff (Hollytex Carpet Mills); "Making Color Magic" described his unique marketing techniques.

Monday, April 25th, began the program with:

"The Big See — Inspirations for Color Design," Joyce Nacker, Cotton Inc.

"Making Management Say Yes," William Marley, GAF Corp., Floor Products Div.

"A New Approach to Selling the Consumer," Morris Gall, Glidden Durkee Div.

"The Magic of Visual Color," Frederick T. Simon, Textile Dept., Clemson Univ.

"The New Naturals Color Program," Richard Montmeat, General Electric Corp.

This morning session was attended by fifty art and design students from the University of Minnesota and the Dakota Vocational School, who were guests. CMG stimulates interest and recognition wherever they go.

The evening activities were quite memorable. The Walker Art Center opened its doors for a private tour, followed by a champagne supper on the premises, topped off by the opening night performance of "Bully," by James Whitmore at the adjoining Guthrie Theatre.

Another great day of presentations on Tuesday, April 26th included, "Let TM Make Magic for You," Graham Barnes, Southeast Institute; "An Astrologer's View of CMG," Nadine Gross; and "Colorology, Psychology and Symbolism of Colors," Patricia Barnes.

The president's reception slide presentation was given by Ron Barnum of Gabberts, "Successful and Innovative Approaches to Store Marketing;" a most enlightening view of an old established company updating its store merchandising approaches.

CMG members who arrived early to Minneapolis were able to take a sight-seeing tour of this beautiful city, interwoven in a setting of woods and lakes. The city has many points of architectural interests, perhaps most prominent of which were the Federal Reserve Bank Building and the Northwestern National Life Insurance Building.

**REPORT FROM THE DRY COLOR  
MANUFACTURERS ASSOCIATION  
DELEGATES  
AL M. KEAY, CHAIRMAN**

No report has been received.

**REPORT FROM THE FEDERATION OF  
SOCIETIES FOR COATINGS TECHNOLOGY  
DELEGATES  
RUTH M. JOHNSTON-FELLER, CHAIRMAN**

The delegation of the Federation of Societies for Coatings Technology (FSCT) to the ISCC makes up the ISCC Committee of the Federation, and so serves a very active role in both organizations' activities.

The Annual Meeting of the Federation was held October 27-29, 1976, in Washington, D.C. The ISCC Committee was responsible for three sessions at this bicentennial meeting. The first was devoted to technology and consisted of two papers, "Computer Color Matching Systems" by Hugh R. Davidson of Davidson Colleagues and "Exposure Evaluation: Quantification of Changes in Appearance of Pigmented Materials" by Ruth Johnston-Feller and Dennis Osmer of the Pigments Department of CIBA-GEIGY Corporation. The second session was the Bicentennial Program tracing the history of colors in America from the 17th to the 20th centuries. This session featured presentations by Morgen Phillips, Architectural Conservator of the Society for the Preservation of New England Antiquities on "History of Colors as Associated with Architectural and Furniture Styles from the 17th through the 19th Century" and Bonnie Bender, PPG Industries, Inc. color stylist dealing with colors in the 20th century, "Color Trends Mirror Changing Lifestyles." The third session was devoted to a review of the role and scope of the Problems Committee of the ISCC and featured brief descriptions of the organization and activities of the ISCC Subcommittees by Ruth Johnston-Feller, then Chairman of the ISCC Problems Committee, Coordinators, Mr. Robert Hoban, of Sandoz, Mr. Ray Spillman, Designer of Darien, Connecticut, Mr. Calvin S. McCamy of Kollmorgen Corporation, and Ruth-Johnston-Feller on the part of Franc Grum, Eastman Kodak. All of the sessions were well attended and generated enthusiastic discussions. The session presented by the ISCC Problems Committee was particularly gratifying in its response, questions generated and subsequent inquiries received. Hopefully, other member-bodies will elect to present such programs to their societies in order to improve communication and joint participation in Council activities.

Projects of the Federations' ISCC Committee include

the planning of a "Symposium on Color Instrumentation" to be presented in March 1978 sponsored jointly by the FSCT, MCCA (Manufacturer's Council on Color and Appearance, a fellow member-body of ISCC) and the ISCC. The format has been approved and includes two and a half days divided between rotating "hands on" workshops and specialized presentations on (1) gloss and other appearance attributes, (2) colorimetry, color difference and quality control (3) spectrophotometry, (4) colorant formulation and (5) total systems and education. As details are worked out, *Newsletter* readers will be informed.

A second project of the ISCC Committee has been the preparation of a glossary of color and optics terms for inclusion in the Federations' Paint/Coatings Dictionary. About 450 terms have been included as well as an abbreviated bibliography. Correction of the first galley proofs has been completed — publication of the Dictionary is projected for the end of 1977. The definitions submitted were written to be readable and easily understood without the sacrifice of technical accuracy. Under consideration by the Federation and the ISCC Committee is a small separate publication of the Color and Optics terms.

The ISCC Committee voted not to recommend to the FSCT Board of Directors that the FSCT become a sustaining member of the CIE at this time. This action does not rule out participation in the future.

A review of "COLOR 77" will be prepared by Dr. Robert Marcus of PPG Industries, a voting delegate of the ISCC Committee, for publication in the *Journal of Coatings Technology* (JCT), the technical monthly publication of the FSCT.

Papers of possible interest to ISCC members published during 1976 in the JCT include the following:

1. Color and Appearance of Metallized Paint Films — F.W. Billmeyer and E.C. Carter, Feb., p. 53.
2. Crystallography of Chrome Orange — S. Pollack and R.L. Feller, Jul., p. 68.
3. Pigmented Microvoid Coatings II, Luminance and Color of the Concentric Sphere Model — M. Kerker and D.D. Cooke, Oct., p. 35.
4. Predicting Reflectance and Color of Paint Films by Kubelka-Munk Color Analysis — IV. Kubelka-Munk Scattering Coefficient — D.G. Phillips and F.W. Billmeyer, Jr., May, p. 30.
5. Use of Instrumental Color Readings on Wet Films to Expedite Color Shadings — Cleveland Society for Coatings Technology, Aug., p. 58.
6. Yellowing and Other Film Properties of Linseed — Derived Paints Influenced by Linolenate Content — H. Rakoff, F.L. Thomas, and L.E. Gast, Aug., p. 55.

**REPORT FROM THE GEMOLOGICAL  
INSTITUTE OF AMERICA DELEGATES**

No chairman or delegation has been appointed by the GIA; therefore no report has been received.

## REPORT FROM THE GRAPHIC ARTS TECHNICAL FOUNDATION DELEGATES WILLIAM D. SCHAEFFER, CHAIRMAN

Color and color reproduction activities at GATF during 1976 are summarized in this report. Included are in-house research projects and reports, committee activity with other graphic arts industry associations, technical publications, and educational programs.

### Research Projects

"Improved Black and White Halftones" is the title of a research project report by George Jorgensen. The report suggests how the printer can best compress his halftone scale so as to achieve the most satisfactory reproduction of a black and white photograph satisfactory to the ultimate viewer. Included in the report are sections on: the selection of criteria for evaluating tone reproduction; the need for more than one kind of tone reproduction curve; the main interest area in a photograph; multiple interest areas; the tone reproduction curves for the halftone negative; tolerances in halftones; and applications of tone reproduction curve analysis to non-photographic originals.

Establishing the optimum color balance in the trichromatic system of color reproduction is the theme of a study developed by Frank Cox of the GATF Technical Services Department. The proposed method is based on the premise that the relative importance of the secondary overprint hues can be ranked in the order red, green and blue. As a consequence, the control of the printed ink films is ordered in the sequence magenta, yellow, and cyan. This approach utilizes a color hexagon for presentation of densitometric analyses and illustrates graphically the comparison between pre-publication proofs with actual production press results.

### Web Offset Proving Standards

GATF staff continues to work with other endorsing groups in updating the "Recommended Standards for Advertising Material for Web Offset Publications." This Standard, first published in 1975, has been revised and should be republished during 1977.

### Educational Programs

Some eight different programs dealing with various phases of color reproduction have been presented during the year by GATF staff members. Subjects include: "Art and Copy," "Color Image Assembly," "Advanced Color Separation," "Color Scanner Operation," "Color Reproduction," and "Color Printing Standards and Control." These programs have been presented in Canada, Mexico, and the United States.

A conference on Color Proofing is being organized for May 23-25 at the Sheraton Airport Inn, Philadelphia, Pennsylvania. The purpose of the conference is to improve communications among the several parties who have distinct roles in contributing to the quality of color reproductions. Included will be presentations on the functions

of the proof, proofing for various reproduction processes, review and acceptance of pertinent standards, color language for communication, the proof in quality assurance systems, specifications — original through press, and an economic analysis of the value of a color proof.

## REPORT FROM THE GRAVURE TECHNICAL ASSOCIATION DELEGATES OSCAR SMIEL, CHAIRMAN

The Gravure Technical Association plans to revise 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 work 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.

## REPORT FROM THE ILLUMINATING ENGINEERING SOCIETY DELEGATES W. A. THORNTON, CHAIRMAN

The work of the IES Color Committee during the past year may be summarized as follows. Work on identifiability of safety-colors under commercial lamps continued. The color-rendering of some commercial lamps is poor enough that, for example, a red safety-color cannot be reliably identified as red; hence its warning significance may be lost, and danger to the observer ensue. A "short statement" has been written by the committee. Changes in "visual clarity" with change in spectral power distribution of the illuminant were observed by the Color Committee; identification and assessment of the role of "visual clarity" is a continuing project. Consideration of various indices of color-rendering, in order to better classify the capability and applicability of illuminants, is underway. Contact between the RQQ Committee and the Color Committee on the role of color in visual performance has begun. All IES committees are contributing to a revision of the IES Lighting Handbook due in January 1979. The Color Committee is planning to prepare a publication on color, including actual color chips of familiar objects; and also to add more color plates to the IES Lighting Handbook. All proposals to the Illuminating Engineering Research Institute

are referred to appropriate IES committees; all color work goes to the IES Color Committee for consultation, and later results for applicability. The IES delegation to ISCC is planning a symposium "color and illumination" for the 1978 ISCC Annual Meeting.

**REPORT FROM THE INDIVIDUAL  
MEMBER GROUP VOTING DELEGATES  
BONNIE K. SWENHOLT, CHAIRMAN**

No report has been received.

**REPORT FROM THE INDUSTRIAL  
DESIGNERS SOCIETY OF AMERICA  
DELEGATES  
RAYMOND SPILMAN, CHAIRMAN**

IDSA activities in ISCC continue to be the activities of individual delegation members.

Alex Styne, continues his personal chairmanship of the ISCC Problem Committee 33, "The Human Response to Color," in addition to his lecturing and instigating forums. One of the most interesting and important took place last November 16, at the Bureau of Standards in Washington, DC. The subject, "Color in Health Care Facilities" was timely and the panel was first rate. For those interested, write Prof. Alex Styne, 15206 North east 8th Ave., Miami, Florida, 33162, for additional information.

Professor Styne has also been a member of the ISCC Board of Directors during the past year.

Don Genaro, has continued his watchful interest in achieving a final satisfying design for the cover of the ISCC *Newsletter* he designed a couple of years ago.

Raymond Spilman, continues his ISCC activities as one of four ISCC Problems Coordinators. His responsibility is for those Problem Committees active in the Visual and Psychological Areas of Color Use. (Arts, design, etc.) Also responsible for shaping up a new area, "Color In Use," primarily aimed to the interests of all persons who *USE* color in their work. Any suggestions for subject studies, more ideas, or how the subject should be handled are welcome. We have a good, new, color area for designers and artists and kindred souls, so let's flesh out the idea.

Tom Gould, a new IDSA member, (Designer and Educator) has re-designed the ISCC logo. It has been adopted by the ISCC Board of Directors and will be put into use, Spring, 1977.

During the 1976-77 ISCC year, our IDSA, delegation has been enriched by two new members, Gerald Proctor and Dan November.

Gerald Proctor – Design Administrator, Westinghouse Virginia, has, since his ISCC appointment, designed and submitted two speaker award certificates that will be submitted to the ISCC Board, in April, for the selection of one design.

Dan November, Design Manager of the Buchler Division of Searle, was active in setting up a major New York Chapter Meeting on Color in May. The All Star Cast was headed by Faber Birren, World renowned and author of 25 books on

color, with Nadine Burtin, Color Director for House and Garden magazine, and Dr. Fred Billmeyer Jr., Past President of ISCC and current Secretary. Dr. Billmeyer is also world renowned for his technical and scientific contributions to the chemistry of color. He is also Arrangements Chairman for the 3rd Congress of the International Colour Association, COLOR 77, to be held at RPI, July 10-15, 1977. Dr. Billmeyer has, like Faber Birren, published many articles and books on color.

Carrol Gantz currently IDSA Exec. VP, as well as a delegate to ISCC, has also set up a color meeting the following day, May 11, for the Mid-Atlantic Designers Section of IDSA that will feature Faber Birren. Much of the aroused interest about color in IDSA has been the result of Gantz's own interest in color and his belief in its importance as a subject for designers.

**REPORT FROM THE INSTITUTE OF FOOD  
TECHNOLOGISTS DELEGATES  
ANGELA C. LITTLE, CHAIRMAN**

A meeting of the IFT Delegation to the ISCC was held on June 6, 1976 following a Symposium on Colorimetry of Foods presented at the 36th Annual Meeting of IFT at Anaheim, California. Three members of the delegation participated in the symposium: F. Clydesdale, A. Kramer, and A. Little. An invitation to attend the delegates meeting was extended to IFT members interested in the activities of the delegation.

Eight people attended of whom only two are currently members of the delegation. Discussion centered on a proposal for establishing a long-term cooperative program dealing specifically with problems in colorimetry of particular interest to the food scientist.

The idea of starting with a glossary of definitions of color terms to standardize vocabulary usage was viewed favorably. Another area of interest included problems relating to optical properties of foods, e.g. translucence, light scattering, and fluorescence.

The logical means of realizing an ongoing program is through the formation of a problems subcommittee under the aegis of ISCC. Steps toward establishing such a subcommittee are now under way.

Two of the current members, A. Kramer and F. J. Francis, have asked to be released from the delegation as their duties and responsibilities are now focused on areas other than colorimetry. With at least two replacements and planned increase in delegates to full complement, a substantial change in delegation activities can be anticipated.

**REPORT FROM THE MANUFACTURERS  
COUNCIL ON COLOR AND APPEARANCE  
DELEGATES  
JAMES G. DAVIDSON, CHAIRMAN**

The Board of Directors of the MCCA has been expanded to include an official representative from every active class member. The following companies are members of the MCCA:

Macbeth	Byk Mallinckrodt
Diano	Zeiss
Hunterlab	Tintometer
Gardner Lab	Applied Color Systems
Atlas	Hemmendinger Color Lab*
Roland Robinson & Assoc.	

A Technical Advisory Committee has been established within MCCA. This committee is chaired by Henry Hemmendinger and will act as a clearing house for collaborative testing programs.

The MCCA and the Color and Appearance Division of the Society of Plastics Engineers sponsored a RETEC, "Coloring of Plastics" at Cherry Hill, New Jersey, September 21-22, 1976. This meeting was very well attended and enthusiastically received by the participants.

Arrangements are being finalized for the forthcoming exhibit at the International Colour Association (AIC) Congress, COLOR 77, to be held in Troy, New York, July 10-15, 1977.

\*Associate Class Member

### REPORT FROM THE NATIONAL ASSOCIATION OF PRINTING INK MANUFACTURERS DELEGATES DAVID M. KIRKPATRICK, CHAIRMAN

The NAPIM Color Standards Committee continued to cooperate with the AAAA/MPA Committee in its work in establishing recommended standards for web offset publications. During 1976 the Committee participated in the editing and clarification of the descriptive booklet published last year. A revised edition will be published shortly.

The Flexographic Technical Association is planning to develop color parameters for process inks used in flexographic printing. The NAPIM Color Standards Committee will cooperate in this effort and has suggested the National Printing Ink Research Institute as a contractor to evaluate and calibrate submitted ink samples.

### REPORT FROM THE NATIONAL PAINT AND COATINGS ASSOCIATION DELEGATES EVERETT R. CALL, CHAIRMAN

In accord with its desire to support the ISCC as an observer Member-Body, the NDCA has again submitted no report.

### REPORT FROM THE OPTICAL SOCIETY OF AMERICA DELEGATES FRANC GRUM, CHAIRMAN

The Optical Society has had a very productive year and in the report of our Executive Secretary Emeritus, Mary E. Warga, the concept of having more topical meetings and workshops of the Society and only one annual meeting has been popular and highly successful. The Optical Society ISCC Delegation members have been in close communication with both societies and have actively pursued means of increasing the interaction of ideas and programs.

The Annual Meeting of the Optical Society of America for 1976 took place in Tucson, Arizona, during the week of October 18th. Three special symposia of invited papers were concerned with lateral effects in the vertebrate visual system, visual response and behavior, and optics and the eye. Denis Baylor's leadoff paper in the first of these symposia was concerned with direct recordings from photoreceptors, which show that turtle cones communicate with and are influenced by one another. This technique should eventually prove applicable to studies of the nature of such interactions between or within cones of the three specific chromatic types. In the second symposium, M.L.J. Crawford reported research by H. G. Sperling and himself, where recordings from the lateral geniculate nucleus of rhesus monkeys were obtained in awake, performing animals. A close correspondence between activity in the LGN and behavioral thresholds for spectral test flashes was noted.

In the excellent OSA tradition of the past several years, technical group meetings permitted leisurely discussion of both invited and contributed papers of visual interest. Nine contributed papers on color covered a variety of topics of basic interest, including chromatic latency differences (B. Drum), evidence of chromatic adaptation beyond the receptor stage (L. Guth), and the use of the pupillary response as an index of spectral sensitivity (R.S.L. Young). The members of the team of V. Smith and J. Pokorny each presented papers. One of these showed clear evidence that protanopes and deuteranopes make unique red-green matches with large fields, with rods being the probable third mechanism. J. J. McCann presented intriguing displays in which the distinction between luminance and lightness was clearly evident; a model was presented to account for this. Other papers were concerned with spectrophotometric efforts in measuring color differences (S.L. Kishner) and on the numerical estimation of saturation of colored samples (Guirao and Mattiello).

Of special interest in this session was the presentation by D. L. MacAdam of glossy colored samples, soon to be available for purchase, which represent the outcome of decades of work by the committee on uniform color scales.

#### Uniform Color Standards

After many years of meticulous work by many people, a set of uniform color standards was produced and is available through the Optical Society's office. Moreover, a paper on the long history of these color standards, written by Dorothy Nickerson, will appear in the Winter 1977 issue of Optics News.

The Society has also established a new letters journal to be called "Optics Letters," which will be devoted to the publication of short communications that are both timely and of high technical interest. The Editor of this new publication is R. W. Terhune, Research Laboratory, Ford Motor Company, P.O. Box 2053, Dearborn, MI 48121.

#### Awards

At the Annual Meeting, the following awards were given: William Reginald Stephen Garton received the William F. Meggers Award; John Henry McLeod received the 1976

David Richardson Medal; and Marc David Levenson received the 1976 Adolph Lomb Award.

The first Lippincott Medal, co-sponsored jointly by the Coblentz Society, the Society for Applied Spectroscopy, and the Optical Society of America, was presented to Richard Lord for his outstanding contributions to Raman Spectroscopy.

## APPENDIX

The following papers on color were published in 1976 in the Journal of the Optical Society of America.

### Color

Franklin C. Williams, "Color-film spectral sensitivities by Hadamard spectrosensitometry," *J. Opt. Soc. Am.*, 66, 1355 (1976).

Noboree Ohta and Gunther Wyszecki, "Designing illuminants that render given objects in prescribed colors," *ibid*, 66, 269 (1976).

Peter K. Kaiser, James P. Comerford, and Deborah M. Bodinger, "Saturation of spectral lights," *ibid*, 66, 819 (1976).

Mary M. Hayhoe and Donald J.A. MacLeod, "A single anomalous photopigment?" *ibid*, 66, 276 (1976).

### Colorimetry

F.J.M. Schmitt, "A method for the treatment of metamerism in Colorimetry," *ibid*, 66, 601 (1976).

### Color Measurement

R. G. Kuehni, "Color-tolerance data and the tentative CIE, 1976  $L^*a^*b$  formula," *ibid*, 66, 497 (1976).

H. Pauli, "Proposed extension of the CIE recommendation on 'Uniform color difference equations, and metric color terms'," *ibid*, 66, 866 (1976).

### Color Vision

D. H. Kelly, "Differences between red and green color-mechanism characteristics: Interaction or artifact?" *ibid*, 66, 1430 (1976).

O. Estevez and C. R. Cavonius, "Modulation sensitivity of human color mechanisms," *ibid*, 66, 1436 (1976).

David H. Sliney, Robert T. Wangeman, and James K. Franks, "Visual sensitivity of the eye to infrared laser radiation," *ibid*, 66, 339 (1976).

P. E. King-Smith and D. Carden, "Luminance and opponent-color contributions to visual detection and adaptation and to temporal and spatial integration," *ibid*, 66, 709 (1976).

L. T. Sharpe and Gunther Wyszecki, "Proximity factor in color-difference evaluations," *ibid*, 66, 40 (1976).

### Color Vision, Physiology

W. S. Jagger and P. A. Liebman, "Anomalous dispersion of rhodopsin in rod outer segments of the frog," *ibid*, 66, 56 (1976).

### Color Vision, Psychophysics

Joel Pokorny and Vivianne C. Smith, "Effects of field size on red-green color mixture equations," *ibid*, 66, 705 (1976).

## REPORT FROM THE SOCIETY OF MOTION PICTURE AND TELEVISION ENGINEERS DELEGATES

ROLAND J. ZAVADA, CHAIRMAN

Attesting to the continuing growth of color, the Society's 118th Conference program included presentation of many papers on color: an evaluation method of the critical parameters that characterize light sources as part of the color photographic system; enlargement of regular and super 16-mm color negatives to 35-mm prints for theatrical release; characteristics of new color intermediate film process-compatible with the camera negative; direct recording onto color print film by laser beam for color TV signals; a color video-to-film recording system using digital techniques and equipment such as compact color cameras using 2/3-in plumbicons, lens adapters for color TV cameras and tubes for small-sized color cameras.

The Society's Engineering Committees are continuing their investigation of the causes of variations in color TV pictures viewed in the home; particularly variability in hue, saturation, and color quality. A study was made of the characteristics, manufacturing feasibility, and applications of commercial color monitor use of corrective matrices to provide color display which essentially matches the reaffirmed NTSC phosphors. The group considered documenting the degree to which present-day color TV receivers reproduce the full range of NTSC hues and saturations and improving color uniformity from theatrical color reproduction considerations to operational techniques for transmission test and control to monitor reproduction. Study is continuing on documenting controls for use with the VIR signal for TV broadcasting; color television cameras; an alignment color bar test signal to standardize the set-up of picture monitor controls and laboratory exchange of color materials.

As 1976 recipient of the Herbert T. Kalmus Gold Medal Award, Bernard Happé, Technicolor Ltd, England, was honored by the Society in recognition of continual and significant contributions in the processing and use of color films and techniques in making motion pictures for theater and television.

Several papers on color were published in the SMPTE Journal during 1976:

Color in the motion-picture industry by R. T. Ryan



Reports on JCIC ad hoc committee activities by K. B. Benson, R. A. O'Connor and D. R. Wells

Microcam I: A new concept in the design of a portable color camera for broadcast applications by R. H. McMann, Jr. and C. W. Smith

A simplified motion-picture laboratory control method for improved color duplication by J. P. Pytlak and A. W. Fleischer

A new direct-reading three-color meter by R. A. Walker and J. K. Branch.

### REPORT FROM THE SOCIETY OF PHOTOGRAPHIC SCIENTISTS & ENGINEERS DELEGATES CALVIN S. McCAMY, CHAIRMAN

The Society of Photographic Scientists and Engineers held an International Conference on Image Analysis and Evaluation in Toronto in July of 1976. Most of the papers dealt with geometric aspects of images, rather than color aspects. Gorog described some recent results on luminance perception. The performance of the human visual system can be described by a multiparameter contrast sensitivity function that takes into account both the viewing distance and the ambient conditions surrounding the display. For natural scenes, one can use the power spectral density and the methodology of random signal analysis. The general mathematical formalism can be constructed with the aid of statistical communications theory. Berg discussed the analysis of multispectral LANDSAT pictures in terms of a four-dimensional feature space, in which each particular feature is characterized by a volume, similar to the CIE color space. The recognition and analysis of features implies the establishment of their spectral signature and a subsequent classification of as many as possible of the picture elements into appropriate groups. Rosenfeld reviewed visual texture analysis. He considered Fourier power spectrum, second-order statistics of gray level (co-)occurrences, and first-order statistics of gray level differences. He presented the results of texture classification experiments. Roetling reviewed binary approximation of continuous-tone images. He discussed the half-tone process, binary encoding of scanned images, and related image processing. He discussed improvements in processing that reduce spurious signals. The definition of optimum encoding remains a problem. McCamy discussed new approaches to densitometry. The optical theories of wedge densitometry and microdensitometry have been established. New absolute methods of density measurement are more precise and accurate. Extremely fast and stable color-densitometry has been achieved by using a pulsed-xenon source and solid-state sensor. Trabka described a random-sphere model for the dye clouds that make up colored images in photographs. He considers dye clouds distributed completely at random. The region between two parallel planes represents the inhomogeneous distribution of dye in incorporated-coupler emulsions, under the idealization that the extinction coefficient of light per unit length has one value inside the sphere and another outside. The formalism allows treatment of dye-forming and dye-bleaching systems. Kriss dis-

cussed information capacity as a measure of image structure quality of colored photographic images. The information capacity takes into account the optical MTF of each element of the photographic system, the granularity, and the system contrast. The human visual response is also considered as a part of the system for any viewing magnification. He correlated the calculated information capacity and subjectively judged image structure quality for five color films.

The Society sponsored a Symposium on Sensitometry in Binghamton, New York, September 15-17, 1976. Densitometry was reviewed by McCamy. Fukui described apparatus for calibrating visual reflection diffuse density by an inverse-square-law method. Wellman reviewed the USAF calibration program for sensitometers and densitometers. Ross described an ingenious automated densitometer system for the measurement of the spectral sensitivities of films. Voglesong and Müller each described systems of sensitometry for color photography. Müller employed conventional colorimetry more so than has been the case in conventional photographic sensitometry. There were review papers in a number of other areas of monochrome photography.

The Society of Photographic Scientists and Engineers joined in presenting a technology utilization program on Applications of Optical Instrumentation in Medicine, September 16-19, in Washington, DC. The papers were almost all on diagnostic radiology and ultrasonography.

The Annual Fall Symposium, November 9-12, in Washington, DC, featured business graphics. Of particular interest to many of the artists in ISCC might have been a mosaic designed by computer and ink-jet printing described by Brunswick. In a similar vein, R.O. Allen described a computer system to generate photographic line works for business forms. Ross described the photofabrication of shadow masks for kinescope tubes used in color television. Eugene Allen discussed the problems of color matching of printed ink films. Reeber described the Hazeltine previewer for programming color scanners used in making color separations for color printing. Grubb discussed the control of color printing presses with the Cromalin proofing system. Leyda discussed pre-press proofing with colored overlays. Castrignano gave a tutorial survey of video disc technology.

The Society sponsored a Symposium of Photographic Technology at the Institute for Defense Analyses in Washington, DC, December 9-10, 1976. It included an overview of photographic science and engineering activities, programs, and techniques being used, under development, planned, and future developments. Secret clearances were required.

The Annual Meeting of the Society was held in North Hollywood, CA, May 1-6, 1977.

### REPORT FROM THE SOCIETY OF PLASTICS ENGINEERS DELEGATES THOMAS G. WEBBER, CHAIRMAN

The Color and Appearance Division of SPE sponsored five papers at the Annual Technical Conference at Atlantic

City on April 28, 1976. Following the theme of the conference, a panel discussed, "How and Where to Gain an Education in Color." A new seminar, "Fundamentals of Coloring Plastics," included talks by T. B. Reeve of DuPont Plastics, Dan A. Popielski of Monsanto, and R. D. Swain of Chroma.

A regional Technical Conference at Cherry Hill, N.J. in September was attended by 145. Eleven papers on coloring plastics were given. A. J. Pentz and R. R. Streeper of Rohm and Haas were given the Dry Color Manufacturers' Award for their paper, "How to Select Colorants for Acrylics."

S. L. Davidson's color seminar was presented at Saddle Brook in November.

The Color and Appearance Newsletter was issued three times. Edited by T. B. Reeve, this has been judged the best SPE divisional publication. A comprehensive summary of the activities of CAD was printed in the SPE journal, "Plastics Engineering," in August 1976.

Work continues on ISCC Problem 36, Color Acceptability Standards, A. J. Pentz, chairman, and on the SPE monograph, COLORING OF PLASTICS.

A day of papers on color was presented at the Montreal ANTEC, April 25. There was a panel discussion on liquid colorants. A RETEC will be held in Boston on October 4 and 5 with the theme, "Coloring of Plastics XI: The Law and You."

### REPORT FROM THE TECHNICAL ASSOCIATION OF THE GRAPHIC ARTS DELEGATES ROBERT LOEKLE, CHAIRMAN

The Color Committee of the Technical Association for the Graphic Arts met in Chicago on May 11. A major objective of the Committee was to review the state of the art in pictorial color reproduction and to establish some priority on the remaining problems. Technological development and the introduction of more refined methods have increased both the accuracy of color reproduction and the predictability of the process steps. Communication, however between buyer and printer, at least at the subjective or judgmental level, has shown but little improvement. Many committee members, particularly those representing printing establishments, felt this was a major constraint on the effectiveness of their operation, and it incurred many unnecessary costs, which were ultimately passed along to the consumer.

The ultimate subjectiveness in accepting a color reproduction was recognized, and it was readily agreed that attempts to eliminate this entirely were unrealistic and probably not desirable. The higher level of accuracy in reproduction coupled with standardized viewing conditions for comparing original and reproduction have minimized the conflicting viewpoints which used to be commonplace in the submission of a first proof. Communication most often breaks down when an accurate reproduction of the original is *not* desired, as is often the case when the original is a photograph containing errors in tone reproduction or color balance for which some compensation must be in-

troduced. A similar situation arises when the buyer in viewing the first proof suggests changes that he believes desirable to meet an esthetic objective. The buyer may find it difficult to express himself in the lively but imprecise vocabulary of art criticism and certainly more difficult to translate his meaning into the technical jargon of the printer. The printer on the other hand may not only fail to miss his meaning but may be unable to execute the technical steps to achieve the buyer's wishes.

This is, of course, a familiar problem of long standing. Ironically, as the printer has increased his technical mastery of photo-mechanical color reproduction processes, the final problem of subjective evaluation has increased rather than diminished in importance.

Members in attendance felt that the problem could only be attacked in an "educational" environment, a mutual exchange between the buyers and producers of printing. Due to the fragmented nature of the industry, a frontal assault on the problem would appear impossible. A more likely place to start might be in small seminars, and a spokesman from the Rochester Institute of Technology disclosed that such plans were in fact being considered for a seminar as another of their educational services to the industry.

Supporting text material is widely scattered, and it was felt to be beyond the scope of the Committee to edit or publish any document purporting to be authoritative in so complex an area. However, it might be immediately useful if individual members of the Committee were to exchange references and examples to support efforts that were already being undertaken in plants to improve communications with their customers.

At the annual technical conference the following papers were presented on the subject of color reproduction:

*Design Objectives for Color Reproduction Systems*, W. B. Birkett. The objectives common to most color reproduction systems was described conceptually and mathematically using control system notation.

*Calculation of Multiple Halftone Exposure Times for Three Point Control*, H. B. Archer. A new method of calculating exposures when variable amounts of bump are required.

*Computerized Continuous-Tone Reproduction Control*, P. Kasper. Analysis of test exposures and plots with the use of a computer.

*Computation of Accurate Mask Characteristics Using a Modified Factorization of the Neugebauer Equations and "END" Data*, P. H. Chappuis. A method of using "floating coefficients" to compensate for proportionality failure when computing masking requirements.

*A Separate Exposure to Improve the Hue of Reproduced Primary Colors in Direct Screening Separations*, G. Saleh. A technique to change the hue of selected colors by exposure made through a separation negative previously screened.

*A Tri-color Light Unit for Direct Screen Separation*, G. Knippenberg. A light source using three separate lamps to

maximize the useful spectral output for each color separation.

**REPORT FROM THE TECHNICAL  
ASSOCIATION OF THE PULP AND PAPER  
INDUSTRY DELEGATES  
ROLLAND A. AUBEY, CHAIRMAN**

The Optical Methods Committee of the Testing Division of TAPPI is responsible for the development of the methods of evaluating the appearance properties of raw materials for and products of the pulp and paper industry. Membership includes representatives of manufacturers of pulp and paper products, dyestuffs, and pigments. Also included are representatives of instrument manufacturers, governmental agencies, and academic institutions.

TAPPI policy directs us to review all test methods in our jurisdiction on a five-year cycle to make certain that they represent the current state of the art. The Optical Methods Committee has 17 methods under its jurisdiction. In addition, there are three technical information sheets that have been prepared by the committee and are periodically updated.

A committee task group is currently investigating the need for a standard test method for determination of whiteness. The committee will evaluate methods that have been established by ASTM and AATCC to see if their techniques and technology can be applied to the paper industry.

A technical program consisting of four papers relating to optical test methods was developed by Robert Hoban and presented at the TAPPI annual meeting in February. A highlight of this program was a paper by Richard Hunter reviewing his 50 years of experience in optical measurement.

### EDITOR'S NOTE

This note is a reminder that *Color Research and Application* is the only journal of its kind, a unique attempt to increase the flow of communication between color practice in art, science, and industry. The Board of Directors would like the Member-Bodies to cooperate with the publisher of the journal to the extent of providing membership-lists of the Member-Bodies to the publisher. You will recall that the ISCC endorsed *Color Research and Application*.

### PRODUCTS AND SERVICES

#### CARNEGIE-MELLON UNIVERSITY

#### Undergraduate Studies in Graphic Communications Management

Vast changes are now taking place in the world of graphic communications which are certain to move the industry from a craft orientation into a science. The forces of new technology, rising labor and material costs, the age of the

computer and advanced electronics all promise to continue to move the printing industry toward being one of the most technologically advanced and sophisticated. Such changes will not occur overnight, but technological changes already underway are certain to continue.

**CMU's Role.** The role CMU intends to play is to teach the leaders of tomorrow's graphic communications industry how to cope with technological change in the management of their business. To prepare students both for entry level managerial positions and continuing professional growth, strong emphasis will be placed on understanding the scientific foundations of the printing processes and the opportunities for their future development and refinement. Their status today will be studied and explored in great detail through lectures and laboratory demonstrations. A special part of the planned curriculum includes field trips to progressive printing firms of various sizes and specialties to bring meaning and relevance to the courses under study.

**The Curriculum.** Specific courses in graphic communications technology include but are not limited to the following:

Elements of Graphic Communications — a familiarization course and comparison of the various printing processes, including the identification of techniques used.

Graphic Communications Markets — an overview of the markets served by the graphic communications industry; their problems and opportunities.

Graphic Design For Reproduction — a study of design fundamentals and the preparation of artwork for reproduction.

Quality Control for Graphic Communications — The methods and criteria used for measurement and control of reproduction quality.

Physics for Graphic Communications.

Chemistry for Graphic Communications.

Computer Science for Graphic Communications — these three courses will be specially tailored to provide a strong background in these disciplines as they pertain to the graphic communications industry.

Graphic Communications Processes I, II and III — a highly technical series of courses on the science of printing.

Graphic Communications Materials — a study of the interrelationship of paper, ink, chemicals and other raw materials used in the various printing processes.

Graphic Communications Seminars — two Senior programs to relate the meaning of the courses of study to the industry at large. Guest speakers who are experts in their fields will provide examples for student study and evaluation.

One third of the required credits will be in these graphic communications technology courses of study.

**Involvement of GATF.** Another very important adjunct to the new Graphic Communications Management Program at CMU is the close affiliation and involvement the faculty and students will have with the Graphic Arts Technical Foundation (GATF), located adjacent to the CMU campus. GATF is the leading industry-supported research and educational institution in the country, if not the world. They

have pledged to support the program through the availability of their facilities and personnel to aid in the development of course content and in the instruction of the GCM faculty and students. By keeping abreast of the work being pursued by the GATF research and technical staffs, instructors and students alike will be in a position to maintain an advanced level of knowledge and expertise. Further, information gained from GATF's new technological forecasting service will help to prepare the GCM staff and student body for future developments. It is also expected that for class projects, students will avail themselves of the use of GATF's Wadewitz Library, reputed to be one of the most extensive and best indexed collections of technical information available in the industry.

**Summer "Earn-and-Learn."** As a further important aspect of a well-rounded program, assistance will be offered to students in arranging summer employment opportunities with leading firms in the industry. Such arrangements will draw from the support of the alumni of CMU's Printing Management Program, which number over 1000, plus friends who are willing and anxious to aid in the furthering education of the industry leaders of tomorrow. Students

will be able to gain valuable work experience in either specific or diversified kinds of summer employment during their college years.

**Small Class Sizes.** A class size of twenty to thirty students is considered ideal. This small size permits each student to receive individual attention and guidance toward his chosen career objectives. Small classes with students prescreened to have a high learning capability permit challenging courses and continuous progress for each student. Optional minor courses and electives are available in graphic design, psychology, modern languages, environmental science, and systems science. These and many other selections permit the student to broaden his studies into specific areas of interest to meet personal goals. Double majors and graduate courses in the Graduate School of Industrial Administration are also available for those students wishing to further their education beyond the Bachelor of Science degree.

For additional information, write: Director of Admissions, Carnegie-Mellon University, 5000 Forbes Avenue, Pittsburgh, Pennsylvania 15213. Telephone (412) 621-2600, extension 211.

(This space available for contributions, past-due reports, etc.)

# GRAPHIC ARTS ODDITIES



**MASS PRODUCTION** was used by Cicero's publisher, Atticus. He had 100 scribes in Rome, including many well-educated Greeks.



**The** longest papyrus in the world records the exploits of Rameses III. It is written in the hieratic script developed by scribes from earliest hieroglyphic writing.



**T**he problem of suitable printing ink in Gutenberg's time was solved by the addition of boiled linseed oil to the pigment. It was discovered by German and Dutch painters, and is still used.



**Medieval** monks copied the classical authors for the study of correct Greek and Latin. But since the books were by pagan writers, the monks were not required to read them more than once.

(This space available for contributions, past-due reports, etc.)

## COMMITTEE ON PUBLICATIONS

William Benson, Chairman  
Milton L. Pearson  
Ruth M. Johnston  
Donald Genaro

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.

Send *Newsletter* Items to Editor:  
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Washington, D.C. 20002

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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.