Inter-Society Color Council *News*

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REPORT OF THE PRESIDENT
CHARLES W. JEROME

The activities of the Council will be covered in detail in the reports which follow. Therefore, I intend to use my last annual report as President as a review of what I consider the major changes made during my term in office.

The first of these is exemplified by our meeting in Washington, for the first time in many years outside of New York City. This was triggered by a poll of the membership which, although far from unanimous, indicated that such a change was in order. Its advantages can only be evaluated after we try it. The important thing, to my mind, is that it is the direct result of feed-back from you who make up the Council. This interchange of information and opinions should be encouraged, and I am sure you will continue to see more stress on this aspect of Council administration.

The Constitution and By-Laws have been revised with two major changes. First, the Individual Member Group has been given a voice in the Council and, its members, the right to hold office. For most of our history this group has furnished our most diligent workers and they have made major contributions to the accomplishments of the Council. Therefore, this recognition is most appropriate and timely.

The second major change in the By-Laws is the expansion of the Board of Directors with its members serving staggered terms. This gives continuity to the administration of the Council and contributes to the effectiveness of this important body and should make it more influential and efficient.

The Williamsburg Conferences have become an annual event. They serve a useful purpose by bringing together experts in a specific field to further research and the dissemination of information. They have also become an important factor in publicizing the activities of the Council. As such, it is gratifying to see that they are being continued.

Our prestige has also been heightened by the very successful AIC Congress *COLOR 77* which we hosted last year. Comments from all over have been most favorable, not only for the technical content but also for the efficient administration of the meeting and the pleasant surroundings which contributed to the generation and renewal of personal contacts and friendships.

Several new Member Bodies have joined the Council. This is a happy indication that we remain a viable organization. But we should not rest until every organization and individual interested in color has been assimilated and given the opportunity to contribute to the solution of the problems in this field.

I cannot take personal credit for any of these accomplishments. But it is highly gratifying to me to be able to turn the reins over to my successor with the conviction that the Council is a little bit better than when I assumed office. I can only wish for your new President the same willing cooperation and whole-hearted support of all concerned which I have enjoyed.

REPORT OF THE PRESIDENT-ELECT
FRANC GRUM

The involvement of this office has been directed into three main areas of activity; the Study Group, communication with Member Body delegates, and planning future programs.

Study Group

The Study Group, consisting of 9 members representing Art, Science, and Industry, has been functioning for a little over one year. Its scope is:

"To study, define, prepare, and recommend future goals of the Council, such that experts in the field of color will be challenged to participate in ISCC programs and in problem-solving activities."

The first phase of the Study Group Activity has been completed and submitted to the Board of Directors for approval. The recommendations submitted to the Board deal with:

1. The substance and the format of annual meetings;
2. The Problems Committee activities and their structure;
3. The role of the IMG membership and the role of Member Bodies;
4. The possibility of establishing ISCC Technical Reports as a vehicle to report the results from the Problems Committee activities and thus give more exposure of ISCC – what it is and what it does; and
5. Future meetings and conferences.

Communication with Delegates of Member-Bodies

Of no less importance has been the concern to maintain active liaison with Member-Bodies via Delegation chairmen. Through quarterly letters, the chairmen of delegations were kept informed about the activities of the Council and an opportunity was extended to them to submit possible items for the Board of Directors meetings and to present news and other information from their respective Societies. Any information received has been presented to the Board, and, whenever possible, published in the ISCC *Newsletter*.

A lot of progress has been made in the efforts of strengthening the ties between the Council and the Member Bodies, yet I must admit there still is a lot of room for further improvement here. I am confident that we will continue to improve and strengthen these ties.

Future Programs

I am sure that you will agree that the Annual Meetings symposia and conferences should be of good quality and worthy of the Council. Good meetings and conferences are the only assurance to those attending them that the time has been well spent. Good meetings should be well prepared in advance both from the point of view substance as well as in format. This we can achieve with active participation from IMG, Member-Bodies, and from the Problems Subcommittees. We should also keep in mind that ISCC is a unique organization where Art, Science, and Industry can work together in dealing with problems of mutual interest.

Here are some ideas about our future plans.

- The 1979 Annual Meeting will be again in New York.

The tentative topic for the symposium is:

"Accuracy of Color in Motion Picture and Television"

It is intended to cover both scientific as well as artistic effects involved. The program will be prepared by the SMPTE.

- 1980 Annual meeting will be in Rochester, New York and a tentative title for the symposium is:

"Art, Science and Industry in Color Imaging"

- There are presently two Williamsburg Conferences planned. In 1979 the title of the conference is:

"The Judd Memorial Conference on Color Metrics," program chairman – R. Kuehni

1980 conference will have the title:

"Chromatic Adaptation;" the program chairman, Dr. Peter Kaiser.

We encourage you to submit your ideas, advice and/or criticism on all these plans.

I would like to take this opportunity to express sincere thanks on my personal behalf and on behalf of the council to all who worked with me in the past two years. A special thanks goes to the active members of the Study Group for their many suggestions and ideas. Also, I want to express our appreciation to the delegations chairmen for their participation and support. Thanks and please keep up the good work.

REPORT OF THE SECRETARY
FRED W. BILLMEYER, JR.

This first ISCC Annual Meeting outside of New York City in seventeen years is also one of the largest in recent times, with an official attendance of 197, exceeded only by 199 in 1973, and around 125 at the luncheon. Mr. Grum has checked the records further and finds that we last met in Washington just twenty years ago under the presidency of Mr. Waldron Faulkner, present at this meeting and still active in Council affairs. But the Council itself has grown: from 27 Member-Bodies to 35, from 270 individual members to 630, and from 5 Honorary members to 37, of whom 14 are living. We have now over 225 delegates and 15 library subscriptions to the *Newsletter,* and we send it free to 28 AIC members in 18 countries. Our total mailing list is about 860, with over 100 of those going overseas.

A number of these changes have taken place during the past year: George W. Ingle was elected an Honorary member. Five new Member-Bodies joined the Council, thought to be an unprecedented increase in any single year. They are: the American Philatelic Society, with James T. DeVoss as Liaison and the Delegation Chairman not yet appointed; the Association of Professional Color Laboratories with Martin Hershenson as Chairman and Liaison; the House & Garden Color Program with Nadine Bertin as Chairman and Liaison; the Mycological Society of America with Kent H. McKnight as Chairman and Harry D. Thiers as Liaison; and the Philatelic Foundation, with Roy H. White as Chairman and Liaison. Two new appointments were made as Chairman of Standing Committees; Calvin S. McCamy, Membership, and William D. Schaeffer, Problems. In addition to those associated with the new Member-Bodies listed above, six changes in Delegation Chairmen took place: Therese Commerford succeeds the late Roland E. Derby, Jr., for the AATCC, Stephen Bergen succeeds Robert C. Sproull for the ACP; Linda Lewis Taylor succeeds Joy Turner Luke for the AEA; Joyce S. Davenport succeeds Louis A. Graham for the CMG; Robert Gaal was appointed for the GIA; and William J. Cunningham succeeds Thomas G. Webber for the SPE. Some new formats for material items were approved: the new look of the *Newsletter,* a new service certificate, a new IMG application form, and the format for a new classification of publications coming from the Problems Committee: *ISCC Technical Reports.*

During the year, in addition to the Annual Meeting, the ISCC was involved in the following activities: It entered into joint sponsorship with the FSCT and the MCCA of a very successful Symposium on Color and Appearance Instrumentation in March, 1978. It lent its endorsement (though not necessarily those of its member-bodies) to Intercolor '79, an exhibit and symposium to be held in Switzerland in 1979 (erroneously listed as 1977 in *Newsletter* 252, p. 9). It continued its endorsement of the journal *Color Research and Application,* now in its third year of publication; and it cosponsored with the Canadian Society for Color the highly successful Third AIC Congress *COLOR 77* in July, 1977.

The dates, locations, and topics of future ISCC meetings, as far as they are now known, are these: The 1979 Annual Meeting will be held at the Roosevelt Hotel, New York City, on April 23-24, 1979. The 1980 Annual Meeting will be held at the Holiday Inn (Downtown), Rochester, New York, on April 21-22, 1980. Following a plan of alternate years away from New York, the 50th Anniversary Annual Meeting in 1981 will be held in New York City, but the hotel and dates have not been selected. The Judd Memorial Conference on Color Metrics, chaired by Rolf G. Kuehni, will be held in Williamsburg, Virginia, on February 11-14, 1979. There will be a 1980 Williamsburg Meeting on February 4-6, 1980; this will be an interim meeting of the AIC sponsored by the ISCC, on the topic of Chromatic Adaptation, chaired by Peter K. Kaiser. Space is held in Williamsburg for a meeting on February 9-11, 1981, but the topic and chairman have not been selected.

It is with deep regret that I close this report by noting the loss through death of Roland E. Derby, Jr., one of the most loyal and active supporters of the Council throughout most of its history, and at the time of his death on December 25, 1977, Past President, Chairman of the AATCC Delegation, and General Chairman of the not-yet disbanded Organizing Committee for *COLOR 77;* Peter C. Goldmark, first recipient of the ISCC Macbeth Award; and Honorary members R. G. MacDonald, Frederic H. Rahr, Walter M. Scott, and Helen D. Taylor. They will be missed for many years to come.

REPORT OF THE TREASURER
S. LEONARD DAVIDSON

Despite the lack of income from a Williamsburg Conference and lower income from the Annual Meeting, the income of the Inter Society Color Council (exclusive of interest) in 1977 was slightly more than the expenses incurred by it ($44.13).

This coming year we are proposing to spend $3,505 more than we estimate we will receive. We will expend approximately $4,700 for a 5 year supply of covers for the *Newsletter,* which we will amortize over a 5 year period. We are required to reprint the membership list in 1978, and this will cost approximately $1,500. Also included in our estimated expenses is amortization of the present insurance costs plus additional costs for liability insurance. This insurance will protect the Council during its regular meetings and conferences.

Rising costs are expected in operating the various offices of the Council.

We are not reporting any income (or loss) from *COLOR 77* The cost of the publication of *COLOR 77* is still not known. However, arrangements have been made with the publisher to keep our cost to a minimum. The actual cost will be determined by the cost of English Pounds.

I want to take this opportunity to thank all of you for your cooperation during the past year and for the honor of serving as your Treasurer.

INTER SOCIETY COLOR COUNCIL ASSETS AND LIABILITIES DECEMBER 31, 1977

Assets

Cash in bank – Regular Checking Account	$14,476.62	
Cash in bank – Regular Savings Account	4,166.63	$18,643.25
Certificates of Deposit		11,179.37
Prepaid Insurance		169.55
Unpaid Dues – Billed 1977		1,232.00
Total Assets		$13,224.17

Liabilities

I. H. Godlove Award Fund (in Checking Account)		62.20
1977 Audit		350.00
Prepaid Registrations 1978 Williamsburg Conference		8,675.00
Total Liabilities		9,087.20
Difference		22,136.97
Balance I. H. Godlove Fund		846.49
Total Assets		$22,983.46
	1976[1]	1977[2]
Total Assets	$21,603.51	$22,983.46

[1]Includes $975 in unpaid IMG and Member Body Dues
[2]Includes $1,232.00 in unpaid IMG and Member Body Dues–

INTER SOCIETY COLOR COUNCIL 1977 GENERAL FUND

Income

Dues – IMG and Member Bodies		$11,317.89[1]
Publication Sales		
Newsletter	$ 497.00	
Royalties	189.86	686.86
Use of Mailing List		55.00
Annual Meeting		
Registrations and Banquet	3,780.00	
Meeting and Banquet Expenses	(3,044.67)	735.33
Total Income		$12,795.08

Expenses

President's Office	$ 73.98
Secretary's Office	2,700.00
Treasurer's Office	364.88
Board of Directors	510.90
Newsletter	8,478.45
AIC Dues	40.00
Bank Charges	17.38
Godlove Award – Engraving	31.20
Bonding Officers	218.00
1975 Audit	300.00
Artwork – New Designs	16.16
Total Expenses	$12,750.95
EXCESS OF INCOME OVER EXPENSES 1977	44.13

Interest

Savings Account	$ 205.93
Certificates of Deposit	742.79
	948.72
TOTAL INCOME TO BE ADDED TO ASSETS	$ 992.85

[1]Actually received

INTER SOCIETY COLOR COUNCIL I. H. GODLOVE AWARD FUND

Income

Interest – Savings Account	$ 47.44
Total Income	47.44

Expenses

Reuby Process Co. – Engraving	$ 31.20
Total Expenses	31.20
EXCESS OF INCOME OVER EXPENSES	$ 16.24

Fund Balance

Balance Dec. 31, 1976	$830.25	
Excess of Income over Expenses	16.24	
BALANCE Dec. 31, 1977		$846.49

Assets

Savings Account	$784.29	
Due from General Fund	62.20	
TOTAL ASSETS Dec. 31, 1977		$846.49

INTER SOCIETY COLOR COUNCIL 1977 DUES ACCOUNT

	Billed	*Received*
Member Bodies	$ 2,400	$ 2,325
IMG	11,646	8,993
Total	$14,046	$11,318
Written Off[1]	(1,510)	
Change to Retired Status[2]	(54)	
Prepaid 1978 Dues	85	
Received 1-1-77/12-31-77	(11,318)	

Bank Charges	(17)
Carried Forward to 1978[3]	$ 1,232

[1]Resignations, Deaths, Non Payment of Dues (55 IMG members)

[2]11 IMG Members

[3]$75 – 1 member body and $1,157 for 75 IMG members.

DUES AND SUBSCRIPTIONS

IMG – 1978

Number	Rate per Year	Amount	Total
554	$15.00	$8,310	
61	20.00	1,220	
15	7.00	105	
1	12.00	12	
1	10.00*	10	$9,657
632			

IMG – 1977

57	$15.00	$ 855	
9	20.00	180	
4**	10.00	40	
1***	5.00	5	
71			1,080
			$10,737

MEMBERBODIES – 1978

32	$75.00	$2,400	2,400	
32			$ 2,400	

LIBRARIES – 1978

9	$30.00	$ 270		
5	35.00	170	440	
14			$ 440	
				$13,577

*Overpaid 1977 $5

**Prorated Dues for New Members

***Overpaid 1976 $10

REPORT OF THE FINANCE COMMITTEE
S. LEONARD DAVIDSON, CHAIRMAN

The 1978 budget was approved by the Finance Committee and subsequently by the Board of Directors at its February meeting. A copy of the budget is given at the end of this report. It indicates an increase of $3,500 in expenses over the amount proposed in 1977. This increase in large part is due to the cost of printing the membership list, amortizing the cost of the *Newsletter* covers, and the establishment of a miscellaneous account ($2,830). The balance of the increases have been made to allow for increases in the costs of the offices of the Secretary, Treasurer, and The Board of Directors.

Covers for the next 5 years will be paid for from an existing savings account but must be amortized to keep our reserves at the present level.

In order to keep the membership list reasonably current, it is reprinted on a biennial basis.

The miscellaneous account will provide for the payment of insurance policies when due and other occasional expenses that arise.

Income for 1978 has been estimated to remain essentially the same as received in 1977.

Income from the annual meeting and the Williamsburg conference is expected to be low because the annual meeting was moved to Washington, D.C. and the registration level for the Williamsburg conference. No income from *COLOR 77* is shown because one large expenditure must be made. This is the cost of the proceedings. There may be some income but the amount is uncertain due to the fluctuation of the dollar versus the pound.

The Finance Committee recommends that if our income is not sufficient to meet expenses, an increase in dues be considered.

It was agreed that any changes in dues would be considered after 6 months of 1978 when comparisons can be made to actual income and expenditures and the budgeted figures for them.

It was the consensus of the Finance Committee that Member-Body dues should be increased if any increase is necessary and that IMG dues should not be changed.

INTER SOCIETY COLOR COUNCIL

1978 Budget

	1978 Budget	1977 Budget	1977 Actual
Income:			
Membership Dues	$ 2,325	$ 2,025	$ 2,325.00
IMG Dues	9,300	8,700	8,977.89
Annual Meeting (Net)	700	1,200	735.33
Royalties		300	189.86
COLOR 77 (Net)		350	
1978 Williamsburg Conference (Net)	300		
Other	500	500	552.00
Total Income	$13,125	$13,075	$12,780.08
Expenses:			
President's Office	$ 200	$ 200	$ 73.98
Secretary's Office	3,000	2,700	2,700.00
Treasurer's Office	500	400	364.88
Board of Directors	500	250	510.90
Newsletter	9,000	9,000	8,478.45
Audit	400	350	300.00
AIC Dues	50	45	40.00
Problems Committee	150	150	0.00
Printing	1,400		
Newsletter Covers – Amortization	930		
Miscellaneous	500		282.74
	$16,630	$13,095	$12,750.95
Excess of Income Over Expenses	($ 3,505)	($ 20)	($ 29.13)

REPORT OF THE MEMBERSHIP COMMITTEE ROBERT F. HOBAN, CHAIRMAN

No report has been received.

REPORT OF THE PUBLICATIONS COMMITTEE WILLIAM BENSON, CHAIRMAN

As all of you have observed by this time the cover of the *Newletter* has been changed. Carl Fink designed the new cover, and Carl Foss saw to it that the spectrum was properly printed. We hope that you like the new appearance of the *Newsletter*... I have had a few quite favorable comments and no complaints so I take that as a good sign. The cost of the cover has been mentioned in the report of the Finance Committee, but I wanted to add a comment to relate this cost to other costs of publishing. The cost of the cover amounts to about the cost of publishing an additional issue each year.

MINUTES OF THE ANNUAL BUSINESS MEETING

The 1978 Annual Business Meeting of the ISCC was called to order by the President, Charles W. Jerome, at 1:30 p.m. on Tuesday, April 18, 1978, in the Ballroom of the L'Enfant Plaza Hotel, Washington, D. C. Reports (reproduced elsewhere in this Annual Report issue of the *Newsletter*) were presented by the President; the President-Elect, Mr. Franc Grum; the Secretary, Dr. Fred W. Billmeyer, Jr.; and the Treasurer, Mr. S. Leonard Davidson. Mr. Davidson also reported as Chairman of the Finance Committee. 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.

Brief reports were then presented by Dr. William Benson, Chairman of the Publications Committee, and Mr. Robert F. Hoban, Chairman of the Problems Committee.

Mr. Alexander F. Styne, General Chairman of the Annual Meeting, then reported on the series of "Color In Use" Workshops held on the previous evening. He introduced the following reporters who described the content and conclusions of the indicated workshop: Dr. Ruth M. Rich reported on the workshop "Color Quality Control in Industry," moderated by Mr. Rolf G. Kuehni; Mr. Danny C. Rich reported on the workshop "Visual Effects of Colored Light," moderated by Mrs. Joy Turner Luke; Mrs. Therese Zook reported on the workshop "The Munsell System and the Universal Color Language," moderated by Mr. Kenneth L. Kelly; Dr. William A. Thornton reported on the workshop "Light Sources and Surface Color Appearance," moderated by Mr. Edwin K. Robinson; and Ms. Nadine Bertin reported on the workshop "Color Trends in the Home Fashion Industry," which she had moderated.

Mr. Jerome then asked Mr. Franc Grum to make a brief report on member-body relations.

At the close of the meeting, the following newly-elected officers and directors officially took office: Mr. Franc Grum, President; Dr. William D. Schaeffer, President-Elect; Dr. Fred W. Billmeyer, Jr., Secretary; Mr. S. Leonard Davidson, Treasurer; Mr. Charles W. Jerome, Past-President; Mrs. Bonnie Bender, Dr. Stephen F. Bergen, and Mr. Edward L. Cairns, Directors. The following Directors, who had served the Council well during their terms of office, retired: Dr. Henry Hemmendinger, Mr. Raymond Spilman, and Mr. Alexander F. Styne.

There being no further business, Mr. Jerome adjourned the meeting at 2:30 p.m.

Respectfully submitted,
Fred W. Billmeyer, Jr.
Secretary

REPORT FOR THE BOARD OF DIRECTORS

Highlights of the October 9, 1977, Board of Directors meeting were published in *Newsletter* 251, p. 3, and those of the February 5, 1978, meeting in *Newsletter* 252, p. 3. The following items of general interest, in addition to those mentioned in the Secretary's Report published elsewhere in this issue, arose at the April 16, 1978, Board meeting.

In January, 1977, the Board of Directors approved a Study Group on Future Activities of the Council, which has met several times in the interim with the charge to "examine, study, define, prepare and recommend future goals of the Council, such that experts in the field of color will be challenged to participate in the ISCC problem-solving functions." The Study Group reported to the Board on April 16. Its recommendations may be summarized in the general terms of the following needs for improving and strengthening the Council:

1. More exposure is needed of ISCC – what it is and what it does. Presently ISCC is operating too slowly, disorganized, and very little useful work is coming out of it.
2. More active interdisciplinary interaction is needed with member bodies.
3. There is a need for restructuring the Problems Committee. The projects should have more substance, and the results should be more visible.
4. Meetings and conferences should be better prepared and annual business meetings made more interesting.

The report of the Study Group continued with an extensive analysis of how to meet these needs, including many specific recommendations. These are being considered by the Board, and it is anticipated that many of them will be adopted in the near future.

A further financial report on the *COLOR 77* Congress was made, and in fact the account for this meeting has now been closed, showing a profit to the Council of around $550. Next year's Treasurer's Report will provide details. Meanwhile, the Council is acting as the publisher's agent for selling the proceedings of *COLOR 77* in the United States and Canada. Inquiries should be directed to the Treasurer.

The Standing Rules of the Council were modified by the addition of a new paragraph reading as follows:

"ARTICLE SR IV-Board of Directors. Section I. If a member of the Board of Directors is absent from three consecutive meetings of the Board without prior written notices to the President or the Secretary, his office will be considered vacant."

Plans for the 1979 Annual Meeting were discussed. Mr. Calvin S. McCamy was appointed general chairman for this meeting, and it was announced that the Symposium, probably to be held on Tuesday morning as in 1978, would be provided by the Society of Motion Picture and Television Engineers with Richard Bauer as chairman and the title "Accuracy of Color in Motion Pictures and Television." It was also decided that the topic for the 1980 Annual Meeting Symposium would be "Art, Science and Industry in Color Imaging."

A new type of Problems Subcommittee report was authorized. Such a report would be of a type which would not be

directly suitable for journal publication because of its length or nature. Such reports have been prepared by Problems Subcommittees in the past, and much information has been lost because there was no easy way for publication. It was agreed that in cases where such a Problems Subcommittee report was approved, it should be published by the ISCC in limited edition as an *ISCC Technical Report.* Such reports would be produced by photocopying in small number and sold at cost from the Secretary's office. A cover page utilizing the Council's logo in the form of the spectrum strip would be used and the reports would be spiral bound between clear acetate sheets. In addition a paper ranging between a "long abstract" and a full article, which would carry the objectives and conclusions of the report but not the detailed results, would be prepared for publication in a suitable journal. This paper would indicate what additional material was in the full report and how it could be obtained. A *Newsletter* article and, if warranted, a press release could supplement the paper for additional publicity.

It was agreed that publication of *ISCC Technical Reports* would begin in the very near future. The first such report which will be numbered *ISCC Technical Report 78-1* will be a report of the Subcommittee for Problem 18 titled "A Comparison of Several Proposed Methods for Evaluating Daylight Simulators in the Ultraviolet Range," prepared by David H. Alman and Franc Grum. A second *ISCC Technical Report* based on a report of the Subcommittee for Problem 22 now circulating for approval would also be issued this year.

An Ad-Hoc Committee consisting of Dr. Hemmendinger and Mr. McCamy had been working on a revision of the guidelines for the Macbeth and Godlove Award Committees. They had left distinctions between the two sets of guidelines where required, regularized many details, and left some differences. These revised guidelines were prepared for final study by the Board, and it was hoped that they could be approved in time to be printed as part of the new membership list when it is prepared later this year.

Finally, there was considerable discussion of the fees for attendance at ISCC meetings, in which the Board agreed that a thorough study of this subject was advisable. The Finance Committee was directed to study the fee question, but one aspect of it was discussed further at this Board meeting. This was the meeting registration fees and Council dues for students. It was voted that the registration fee for full-time students at any ISCC annual meeting would be set at a nominal $1.00, to become effective at the 1979 Annual Meeting. The chairman of the By-Laws Committee was asked to prepare for the necessary modification to adopt a student membership fee, similar to the current retired membership rate now in existence, at the next Board meeting.

(This report was prepared by the Secretary.)

REPORT OF THE MACBETH AWARD COMMITTEE
HENRY HEMMENDINGER, CHAIRMAN

The Macbeth Award was established by Mr. Norman Macbeth, Jr. in honor of the memory of his father, Norman Macbeth. It is particularly appropriate that the Macbeth Award be given at this symposium devoted to Color and Illumination. His work is known to all of you for his role in establishing facilities to control the illuminant in critical color judgments; this was but one part of his pioneering work in the new field of illumination engineering. It is of interest on this occasion that Mr. Macbeth was the founder, editor, and publisher of the first technical journal on lighting. The Macbeth Award is given in recognition of recent important contributions in the field of color, preferably within the five to ten years preceding the Award. The work may concern a specific project, application, service, or use of color, or other accomplishment related to color in science, art, industry, education, merchandizing, or other areas of concern.

It is now almost two decades since Fred Billmeyer published in 1960 a paper on the use of digital computers for colorant formulation. His was one of the first contributions, perhaps the first explicit one, on this application of the modern computer. As we all know, the phenomenal development of computer availability and computer capabilities has caused its application to color to be the dominating aspect of industrial colorimetry in recent years. Indeed, many of us are concerned lest these achievements of the computer in industrial colorimetry be so overwhelming as to become the controlling influence, with the output of the computer becoming the main objective rather than a tool with which people can work. In nominating Fred for the Macbeth Award, the Award Committee took pleasure in recognizing that the recipient has in the past decade done all within his considerable power to undo the mischief which was caused by the opening of that Pandora's box in 1960. In his capacities as teacher, as researcher and research mentor, as author, as editor, and as an officer of major colorimetry groups, he has played a major role in protecting colorimetry from the danger that the output of the computer may appear more vital than the conclusions of people. Allow me to quote from the report of the Awards Committee to the ISCC Board of Trustees:

"The 1978 Macbeth Award Committee of the ISCC unanimously recommends to the Board that the award be granted to Dr. F. W. Billmeyer, Jr. Our recommendation is based primarily on the following considerations:

1. **Teaching and Research.** Beginning at a time when color science was virtually unrecognized in American universities, Dr. Billmeyer has organized a department of undergraduate, graduate, and extension teaching which is of major importance in maintaining a source of trained personnel for colorimetry research and for its industrial application. Since its founding slightly more than a decade ago, this department has produced almost a hundred technical papers.

2. **Writing.** A continuing series of journal publications, and especially the volume, *Principles of Color Technology* (written jointly with Max Saltzman), have provided an important tool for those entering on careers in industry.

3. **Editorial.** He has taken a substantial initiative in the planning of a new color research journal, and has carried out with distinction the editorial responsibilities of that journal.

4. **Organizational.** In a variety of activities, notably on behalf of the ISCC, the CIE and the AIC, he has performed invaluable services of planning and organization.

In summary, it is the conclusion of this Committee that Dr. Billmeyer's efforts have made and are continuing to make a most important contribution to the vitality and effectiveness of color research and of color science in all fields of application."

REPORT OF THE PROBLEMS COMMITTEE
ROBERT F. HOBAN, CHAIRMAN

REPORT OF THE SUBCOMMITTEE FOR PROBLEM 6, SURVEY OF COLOR TERMS
C. JAMES BARTLESON, CHAIRMAN

Dr. Bartleson, the former chairman of this Subcommittee, offered to complete the work he had begun on the revision of the 1949 *Comparative List of Color Terms,* and was reinstated as chairman on his return to the U.S. after graduate study in England. The Subcommittee files were turned over to him in March, 1978.

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

This Subcommittee remains on standby status, with the 1977 revision of its 1974 report available for purchase from the chairman.

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 18, COLORIMETRY OF FLUORESCENT MATERIALS
THOMAS E. CULLEN, CHAIRMAN

No report has been received. An agenda for the annual meeting of the Subcommittee was published in *Newsletter* 252, p. 1.

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

During the past year the ISCC Problem Subcommittee for Procedures and Material Standards for Accurate Color Measurement worked in two separate areas to complete the "Guide to Material Standards and Their Use in Color Measurement."

At the time of the last annual meeting or shortly thereafter the working draft of the guide was submitted by members of the writing committee. This committee was composed of Dennis Osmer, Bob Marcus, Jack Christie, Bill Venable, Jim Davidson, and Ellen Carter. Dr. Fred Billmeyer rewrote and edited the working draft in order to produce a consistent and clear report. The final draft was mailed to the entire subcommittee for their study and suggestions. Written comments were sent to the chairman so that the changes could be completed prior to this year's meeting. I want to thank all those who participated in the writing and suggestion phases of the guide.

In the meantime two surveys were conducted. The first survey asked the subcommittee members where they purchased standards and at the same time updated the membership mailing list. The second survey requested information of approximately 100 companies who might provide standard materials, calibrated standards, or measurement and/or calibration services. The replies from this survey were incorporated into Tables to be included in the guide.

On Monday, April 17, 1978 the annual meeting of the subcommittee was held in L'Enfant Plaza Hotel, Washington, D. C. Forty members and guests attended the meeting. Ellen Carter, the subcommittee chairman reviewed the work of the past year. Fred Billmeyer discussed the changes in the guide which had been suggested after the mailing to the subcommittee. The subcommittee members then voted to accept the guide with the changes and to forward it to the Coordinator, Rolf Kuehni, and Problems Committee Chairman, Bob Hoban, for their approval. The guide will become an *ISCC Technical Report* when approved by all the appropriate people. A motion was also made and passed to allow the chairman to make any necessary editorial changes. However substantive changes would be resubmitted to the subcommittee.

Next a working group composed of Cal McCamy, Bob Marcus, Fred Billmeyer, and Ellen Carter was formed to collect information and periodically revise the guide. It was suggested that the guide and the special tables for the guide should be dated so there would be no confusion about revisions.

A short discussion on the future work and goals of the subcommittee followed. Some of the areas considered were diagnostic standards for geometric considerations in color instrumentation, micromeasurements, fluorescent standards, retroreflective standards, and others. Bill Venable stated that CIE committee 2.3 is very active in the area of retroreflective standards and that perhaps its report would be available by the next annual meeting. It was also agreed that before next year's meeting communication should be made with Problem 18 on Fluorescent Materials to agree where the two committees could help each other.

Finally the chairman asked for a subcommittee member to act as Secretary to duplicate and mail information to the subcommittee members. Two people volunteered pending approval by their companies.

Since many members of this subcommittee also have a strong interest in CORMSAG, the subcommittee meeting was adjourned at this time and followed immediately by a meeting of CORMSAG chaired by Bob Marcus.

As chairman I would like to close this report with a couple of comments. At a later meeting of subcommittee chairmen, it was suggested that some subcommittees might want to shorten their names and update their scopes or submit working plans with specific short term goals. Both of these suggestions are appropriate to this subcommittee. I also think that the timing of the suggestions is ideal for the subcommittee, as this will be a year of completion of the guide and starts in new directions for the subcommittee. I would like to invite all to send their suggestions or comments to me on areas of interest that would fall into the area of this subcommittee. The present scope can be found in the back of the membership directory.

REPORT OF THE COUNCIL ON OPTICAL RADIATION MEASUREMENT SPECTROPHOTOMETRY APPLICATIONS GROUP (CORMSAG)

A TASK GROUP OF THE SUBCOMMITTEE FOR PROBLEM 22
ROBERT T. MARCUS, CHAIRMAN

A meeting of CORMSAG was held in conjunction with a meeting of ISCC Problem Committee 22 – Procedures and Material Standards for Accurate Color Measurement. With Robert Marcus as chairman, the meeting began at approximately 11:30 a.m. in the Montcalm Room of Loew's L'Enfant Hotel in Washington, D.C. Dr. Marcus announced that CORMSAG may try to organize a workshop on spectrophotometry and that the annual meeting of CORM will be held May 17 at the NBS in Gaithersburg. He recognized Dr. Venable

of the National Bureau of Standards for a report of that organization's latest activities.

Dr. Venable introduced Jack Hsia who will be taking over some of the administrative tasks so that Dr. Venable may devote more time to research. The Bureau has made definite progress during the last year. They have completed work on a 6° hemispherical – diffuse reflectance sacle. Although 6° is not the only angle possible, it is representative of a near normal geometry. Work has also been completed on a 45° - 0° scale of reflectance, which will be published in the near future. In this case, the instrument is directional but the samples were rotated to insure that they were non-directional. At this point, Cal McCamy questioned whether directional measurements would be the same as anular measurements.

In the near future, the Bureau will be reissuing didymium and holium oxide glasses with more general application than the previous issue which had been geared towards the General Electric Recording Spectrophotometer. From the new calibration, a user should be able to estimate both the band width and the band shape of his instrument, or he can calculate a correction when he knows that information.

Colorless retro-reflectance standards should also be issued soon.

The Bureau will provide measurement assurance and check manufacturer's standards for haze with a new instrument.

Aluminum and rhodium mirror standards with near normal reflectance measurement calibrations should be produced soon.

With the acquisition of the inverse fourth power densitometer, Dr. Venable's group will begin issuing densitometry standards. They will supply standard reference material, density tablets for the printing and x-ray industry, along with standard resolution charts. Plans exist for doing microdensitometry at a 45° - 0° illuminating viewing geometry.

Future projects at the Bureau should include work on fluorescent safety colors and standards for intermediate values of translucency. The Department of Agriculture will be sponsoring some of the work on the translucency standards.

Following Dr. Venable's presentation comments were requested from people present in the meeting. Dr. Hemmindinger commented on the precision of 6° - hemispherical reflectance measurements. He believes that a CIELAB color difference of less than 0.25 should be achieveable with one third of that being in lightness. He feels that the cam on his Hardy might be adjusted so that he could realize a 0.07 chromaticity difference in CIELAB. Dr. Billmeyer said that such precision was a superb achievement, but that Dr. Hemmindinger should use caution in attributing the differences to the cam on the Hardy. Dr. Hemmindinger said that he had some redundant data which helps support his impression that a cam correction may work.

REPORT OF THE SUBCOMMITTEE FOR PROBLEM 25D, DETERMINATION OF THE STRENGTH OF COLORANTS – DYES
CHARLES D. SWEENY, CHAIRMAN

During the past year committee members assisted in organizing and conducting a color measurement workshop and seminar. This was held at the American Association of Textile Chemists and Colorists Technical Center in Research Triangle Park, N.C. The meeting was well attended by members of the textile industry.

The data generated from the reflectance round-robin are being analyzed. Upon completion of the analysis, a report will be prepared for publication.

The committee is reviewing several proposals for standard depth evaluation. An experimental program and criterion for evaluations is currently being designed.

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. A brief report appeared in *Newsletter* 252, p. 1.

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

Twenty seven members attended this meeting, many of them having attended and supported this sub-committee in previous years, and who had participated in the round-robin project.

The meeting was conducted rather as a discussion session between all, to extract comments and suggestions regarding a new approach to the project of determining the tinting strength of pigments.

Due to the fact the ISCC sub-committee meets only once a year, it is extremely difficult to have numerous participants working on a round-robin series, when many are in diversified fields of application, and to try to correlate results in a meaningful way.

Before this meeting Co-Chairman, Ed Cairns of E. I. DuPont; Al Keay of Allied Chemical and Chairman, Joyce Davenport of DeSoto, Inc. discussed the pros and cons of our previous testing. We decided a more controlled method should be implemented. A specific method of testing, with one source of organic pigment, titanium dioxide, resin, primer and substrate should be used at all locations. Each participant (which has been narrowed to four active members), will endeavor to reproduce results as closely as possible to each other.

There will be a round-robin exchange of panels between this group to correlate the results; then one series of panels will be sent out into the field, for instrumental evaluation by other members who expressed a wish to participate. Because of the excessive handling of the panels, it was decided a thermo setting acrylic resin would be the most applicable media. Film thickness will be an important factor, as will viscosity, grind, and type of application. The panels will be marked where they should be read on the instrument, to assure each participant can fit them in whatever instrument they are using. The panels will be accompanied by a form to extract all possible information; specular component excluded and included, etc. Two participants will represent the pigment suppliers (Ed Cairns and Al Keay) and two from customers standpoint, Jacqueline K. Welker, P.P.G. Industries and Joyce S. Davenport, DeSoto, Inc. I wish to thank all attending the subcommittee for their staunch support and their invaluable input. If there are any further suggestions please feel free to call me at DeSoto, Inc. – 312-391-9426.

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

No report has been received. A brief report and an agenda for the annual meeting of the Subcommittee appeared in *Newsletter* 252,p. 1.

REPORT OF THE SUBCOMMITTEE FOR PROBLEM 30, COLOR IN THE BUILDING INDUSTRY WALDRON FAULKNER, CHAIRMAN

This Committee proposes to establish guidelines to improve the presentation of colored building products in manufacturers' literature so that they can be better selected and more accurately identified by architects and designers.

Building materials and their colors are usually selected first by general category, then from producers' catalogs or printed illustrations. The final choices are based on the visual appraisal of physical samples. New methods of reproduction and presentation of color and texture in readily available form can lead to better decisions.

In 1976, a Task Force (under Problem 30) on "The Presentation of Colored Building Products" was established with the approval of the American Institute of Architects. It has already studied and evaluated a number of catalogs of building materials from *Sweet's* by means of score cards and is tabulating the results. A preliminary report was presented at the Annual Meeting in 1978, for discussion.

This Committee will continue the work of the Task Force. Its goal is to develop guidelines for the presentation of colors (including appearance textures) of building materials in such form as to be useful to producers and users.

A list of the members of former Task Force is attached. It is now Subcommittee 30.

Members of Subcommittee 30
"Color in the Building Industry"

Waldron Faulkner, FAIA, Chairman
Thomas J. Belanyi, AIA
Faber Birren
Andrew F. Euston, AIA
Paul J. Grayson, AIA
Albert Halse, AIA

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

A report of the Subcommittee's activity at the Annual Meeting appears in the report from the Industrial Designers of America Delegates, and reports of other activities of the Subcommittee appeared in *Newsletter* 251, p. 5, and 252, pp. 1-3.

REPORT OF THE SUBCOMMITTEE FOR PROBLEM 34, COLOR DIFFERENCE PROBLEMS RUTH M. RICH, CHAIRMAN

No report has been received. An agenda for the annual meeting of this Subcommittee appeared in *Newsletter* 252, p. 3.

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

Your chairman got involved in a home building project the past year that gobbled up much of his time but thankfully the members of the committee were active.

Several Subcommittee #35 members were highly honored. Steve Bergen was elected to the Board of Directors of the ISCC. Jack Preston has become a member of the Executive Council of the American College of Prosthodontists and is a member of the examining board of the American Board of Prosthodontics. Bob Berger became the first dental technician to lecture to the American College of Prosthodontists in New Orleans last October. Henry Sahel of Paris, France completed his year as president of the Congres National de L'Association Dentaire Francaise in 1977. Ronald Goldstein was elected President of the American Academy of Esthetic Dentistry. Dick Lombardi's contributions to the dental literature relating to color and esthetics were recognized at the annual meeting of the Academy of Esthetic Dentistry last August.

Steve Bergen has assumed the chairmanship of the Color and Color Matching Committee of the American College of Prosthodontists and of the delegation of the ACP to the ISCC. His committee has been most active in pursuing the joint aims of Subcommittee #35 and the Color and Color Matching Committee.

The meeting of Subcommittee #35 at the annual ISCC session in Washington, D.C. was well attended and productive. Jack Preston gave a comprehensive review and slide presentation of light and lighting for the dental environment with specific recommendations on how to achieve an optimum effect. The results of his investigations will be published in the July Dental Clinics of North America.

Errors in color definitions and concepts in recently published dental literature and brochures were discussed and means of preventing a repetition of such errors in the future were recommended. Steve Bergen's color committee is actively pursuing this goal.

Wayne Wozniak of the Division of Bio-physics of the American Dental Association reported during the year that the American Dental Association was interested in publishing an issue of the Journal of the A.D.A. that could be used by the dentist and dental technician as a basic reference for color. Plans for such an issue were discussed during the two days of the ISCC meeting.

Steve Bergen gave a progress report of the Color and Color Matching Committee and of the on-going evaluation of the Chromascan. His full report is included in this *Newsletter* as the ACP delegation chairman.

Henry Hemmendinger presented his recommendations for using the CIELAB system in dentistry to convert measured color data to Munsell coordinates. The system would eliminate the need for the cumbersome system presently used and should be adequate for most instances.

The editor of the Newsletter of the American College of

Prosthodontists, Dr. J. D. Larkin, has continued to give excellent coverage of ISCC affairs during the past year. His kindness is most appreciated.

The committee looks forward with enthusiasm to the coming year.

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

Inter-Society Color Council Problems Subcommittee 36, Color Acceptability Standards, met in Washington, D.C., for the third annual meeting on April 17, 1978. Thirty people attended, which is approximately the same number as attended last year. Only seven of the thirty people had attended this committee meeting at least once before. In review, the purpose of this committee is to fill the need in industry for visual guides to acceptable color tolerances at two levels, labeled "tight" and "commercial." It is expected that these visual guides could be used to supplement a dialogue between two people attempting to describe to each other the magnitude of color variation from a standard that is acceptable, and in which directions. The work of the Design Task Group, completed earlier, indicated that people of diverse backgrounds could generally agree upon examples of acceptable color differences.

Since the annual meeting last year, chairmen have been found for the two remaining task groups. Mr. William Longley, Ford Motor Company, is the chairman of the Samples Task Group. This group is already in the process of collecting plastics samples representing color tolerances that are actually in use in industry today. Mr. Longley has collected samples of three colors in polypropylene. He has about twenty samples in a light tan color, about fifteen in a bright red, and about a dozen in a medium blue. Mr. R. Mathew, Americhem, Inc., is active in this task group and has collected several more sets of samples from housewares, building construction, automotive, industrial (signs), and miscellaneous (toys) applications. Three people attending the meeting in Washington volunteered to send in additional samples. In addition to plastics it is possible that these people may be able to provide samples in paint and ceramics. It is important to gather as many samples as possible, as quickly as possible, to keep the work of the task group moving. Any readers who have samples to submit in these or any other materials are invited to contact the chairman and participate.

As soon as enough samples are collected, they will be measured. To eliminate potential measurement problems, all samples will be measured on the same instrument. Funds for this work have been budgeted by the Color and Appearance Division of the Society of Plastics Engineers, sponsor of this problem. These samples will indicate the areas of color space in which there is currently activity and the size of the tolerance in each hue region. It will be interesting to determine if tolerances are similar in all industries.

The data generated from the samples will be forwarded to Harold Marcus, Munsell, who is chairman of the Materials Task Group. This Group has the responsibility of preparing prototype sets. This group will select the materials for preparing the sets and the method of presenting the samples. The prototype sets will be used for validation. During validation, potential users will be questioned about the suitability of the sets.

Dr. Fred W. Billmeyer, Jr., notified the subcommittee that the scope of the problem would need to be revised. There is apparently a danger that issuing of "standards" could be misunderstood as an activity in restraint of trade. This change will have little impact on the work of the committee. In addition to revising the wording of the scope, the name of the committee will also change. The membership empowered the chairman, with the assistance of interested parties, to rewrite the scope for resubmission to the ISCC Board of Directors.

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

Thirty-six people attended the annual meeting of Subcommittee 37, Artists' Materials, to hear reports on the first year's progress and to participate in decisions on the future direction of the work. Each report was followed by questions and discussion.

Dr. Treva Pamer, Chairman of Task Group .01, reported on the results of her tests to identify the pigments used in the blue acrylic paints on the market. Copies of her paper, which is to be given at the annual meeting of the American Institute for Conservation (AIC) to be held this summer, were distributed. Many paints were found to be accurately labeled. Some were incompletely labeled, and in a few cases the labels either indicated a pigment which was not present or which was intermixed with another less lightfast pigment. In addition to publication through the AIC this report will be rewritten for artists' publications.

The methods of pigment identification used for this group of paints included x-ray powder diffraction, x-ray fluorescence, spectral reflectance curves, as well as methods described in ASTM D1135-65, Standard Method for Chemical Analysis of Blue Paints and ASTM D3256-73, Standard Method for Chemical Analysis of Phthalocyanine Blue and Green Pigments.

Dr. Henry Hemmendinger, who had done the spectral reflectance measurements for Dr. Pamer, spoke on the further use of these data to determine the tinting strength of the paints.

Mr. Henry Levison, Chairman of Task Group .02, displayed test panels to illustrate the results of tests on the lightfastness and color stability of artists' vehicles and pigments. Included were pigments not presently being used in artists' paints but which have proved satisfactory in industrial applications.

The results of some of his tests are in the article "Color Stability of Artists' Vehicles" in the latest edition of *Color Research and Application,* Vol. 3, No. 1. Some of his tests on pigment lightfastness were described in Levison's report Artists' Pigments; Lightfastness Tests and Ratings published by Colorlab, P.O. Box 1286, Hallandale, Florida, Florida 33009 in 1976. All results will be put in a form suitable for artists' publications.

Dr. Catherine Jenkins from the Art Hazards Center in New York, who is Chairman of Task Group .03, had prepared a paper on the subject of toxicity in artists' paints with special emphasis on the cadmium paints. She spoke informally on the subject explaining the extent of the hazards.

The implications of the reports were discussed with suggestions contributed by other specialists present in the audience.

This meeting was followed by two others which included most of the same people. There was a meeting of ASTM Subcommittee D01.57, which was devoted to establishing the

Task Groups necessary to write test methods needed by the NBS Standing Committee to revise the obsolete Artists' Oil Paint Standard.

At the last meeting of the day representatives of artists, dealers, and manufacturers discussed their mutual problems informally. Artists' groups represented were Artists Equity Association and the Chicago Artists Guild. Manufacturers attending included Permanent Pigments, M. Grumbacher, and F. Weber Co. There were also art material dealers, conservators, and several art teachers present so that all viewpoints were adequately covered. Comments made following the meetings indicated that participants felt the meetings were valuable.

REPORT OF DELEGATION CHAIRPERSONS MEETING

The Delegation Chairpersons Meeting was well attended with nearly two thirds of the delegations represented. There was excellent exchange of ideas and discussion concerning responsibilities of the delegations, their Societies, and the Council. The value of jointly sponsored meetings between ISCC and member body societies was pointed out and discussed.

Chairpersons were reminded that written reports to the Council of their Society's activities are currently due, and in the discussion that followed, it was agreed that this report would include a bibliography of papers on color which have been published in their Society and related fields. It was also suggested that these could be compiled and published yearly by the ISCC as a reference manual of current work.

The cooperation of member bodies in promoting the journal, *Color Research and Application,* by supplying membership information to Wiley was again requested. Ms. Joyce Davenport was introduced as the new liaison person for the member bodies.

The meeting ended with a positive note of increasing communication during the coming year.

(This report was prepared by Franc Grum, President-Elect).

REPORT FROM THE AMERICAN ARTISTS PROFESSIONAL LEAGUE DELEGATES FRANK C. WRIGHT, CHAIRMAN

No report has been received.

REPORT FROM THE AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS DELEGATES THERESE R. COMMERFORD, CHAIRMAN

A subcommittee of Research Committee RA36, Color Measurement Test Methods, prepared an evaluation method, "Instrumental Measurement of Textile Materials for the Determination of Color Difference." This method has been approved by the Committee and the Technical Committee on Research (TCR) for publication in the AATCC Technical Manual.

"Color Technology in the Textile Industry" is a compilation of papers; some published in the last several years, others written specifically for this book. Publication was delayed but the volume now is expected to be available in the near future.

The Gray Scales for Color Change and for Staining were revised and submitted to ISO/TC38 Subcommittee 1 for consideration at their June meeting in Ottawa. The unit of color difference used to define the differences between pairs of chips at each fastness rating was changed from AN40 to CIELAB, incorporating the Pauli extension. A section was added to each method conforming the decisions adopted by Working Group 7 of ISO/TC38/SC1, and is as follows:

Spectrophotometric measurement of the chips shall be taken with the specular component included. The colorimetric data shall be calculated using the C.I.E. 1964 10° observer data for Illuminant D65.

Research Committee RA36 is currently investigating the following:

- an instrumental method of assessing standard depth,
- the preservation of textile standards,
- the measurement of pairs of dark samples, glossy and matte, with the specular included vs. excluded,
- a method of assessing the fastness of whites containing optical brighteners,
- the visual and instrumental methods on shade matching of textile materials proposed by the U.S. Army Natick Laboratories for its own use.

RA36 is sponsoring a two-day symposium on "Color Science in the Textile Industry" to be held in May of 1979 at Charlotte, N. C.

A workshop/seminar on "Color Measurement in the Textile Industry" was held in December of 1977 at AATCC Headquarters in Research Triangle Park. This workshop was planned by ISCC Problem Subcommittee 25-D.

The following papers related to color were published in *Textile Chemist and Colorist,* February 1977 - March 1978.

"Automation: Damned If You Do, Damned If You Don't," I. Gailey, February, 1977, p. 25.

"A New Horizon in Lightfastness Testing," R. S. Babiarz and M. J. Schuler, March, 1977, p. 61.

"Advances in Color Metamerism," G. Wyszecki, April, 1977, p. 70.

"Determination of Cationic Dyes in Acrylic Fibers," E. Kissa, July, 1977, p. 148.

"A Technique for Color Communication," R. Besnoy, W. J. Marshall, and K. McLaren, September, 1977, p. 206.

"Mildew Stains on FR Treated Cotton Fabrics," A. J. Treece, J. L. Bare, and J. O. Mundt, October, 1977, p. 226.

"Dyebath Reuse in Batch Dyeing," F. L. Cook and W. C. Tincher, January, 1978, p. 1.

"Computer Assisted Color Quality Control," J. D. Hudson, Jr., March, 1978, p. 47.

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

The American Ceramic Society delegation held a meeting at the time of their Annual Meeting in Detroit, May 9, 1978 (as required by the ISCC by-laws). There are some changes in the membership due to retirement, and replacement of some of the delegates who were unable to maintain active interest and participate in the activities of the delegation. With the new membership the delegation now has representatives from most of the ACS Divisions having interest in color.

It was decided that the delegates, in cooperation with the ACS program committee and the ISCC, will have a conference on color in conjunction with the ACS 81st Annual Meeting, to be held in Cincinnati in May, 1979. Von Tury reported that he cooperated with the Munsell Color Foundation in its fund-raising drive. Twenty-five personal letters were attached to each of the 25 official communications which he sent out.

In the Whitewares Division of ACS, F. Joseph Von Tury, Vontury, Inc. gave a talk on "Color, Craftsmanship and Ingenuity: Creative Surface Treatments to Improve Marketability of Ceramic Products." He pointed out that the ceramic industry has a richer heritage in color than any other industry. "It is in a unique position in the matter of color. Through no other medium is it possible to produce so many colors in true and permanent shades.

"It was only a few years ago that we creative people were somewhat frustrated because the ultimate consumers were not given the best in ceramic products. There was a latent desire on the part of the consumer for more color and patterns, especially in the tile market.

"What has happened almost overnight is that foreign producers, recognizing this basic want of consumers, developed automatic methods of producing exotic designs, textures and colors that in my younger days could be created only by craftsmen on an exclusively custom basis. Recently I visited several trade showrooms in all categories of ceramic products, and I was happy to find a greater diversification in production with a wider color palette.

"Research work to develop new designs and techniques and to extend the color ranges goes on constantly, and follows trends in interior design and architecture.

"A problem which the color producer will face is color matching an effect instead of color matching a color. This situation has arisen with the increased use of reactive glazes.

"We find that colors used can greatly affect total design expression and will contribute to design success or failure. Color may well be the key to the future prosperity of the industry and even to the very survival of certain segments of it.

"The greatest difficulty I had in preparing this talk was to try to define the responsibility of the craftsman and his collaboration with the engineer. I have always believed that there should be closer cooperation between the technical forces and craftsmen. The industry can use the craftsman's creative powers, and should give him technical assistance.

"Finally, the industry needs the engineer's ingenuity to develop methods for a large-scale profitable production of the craftsman-created samples.

"This coordinated effort will result in the proper use of material and tools which is often the key to the success or failure of a product." (The above are excerpts only).

Following are the reports of some of the delegate members:

Dr. Clarence A. Seabright, The Harshaw Chemical Company, Division of Kewanee Oil Co.:

"In the field of Whitewares there has been no major change in the last year. The use of Avocado on sanitary ware appears to be gradually falling off. Off-white colors, such as Ivory, Bone, etc. are finding more use. These colors can be used with accessories of any hue and are appealing to many people. On the other hand, use of very dark brown colors such as Expressor continues to be important. In tiles, the use of off-whites, perhaps with a speckle, is finding wide spread usage.

"Use of yellow and buff stains in the porcelain enamel field appears to be increasing. In glass, the use of non-ceramic decorating materials continues important on non-returnable containers. If legislation requires the use of returnable containers, we should find the use of ceramic glass enamel decoration increasing."

Paul W. Cook, Director of Design, The Sterling China Company:

"In the commercial china field for hotels, restaurants and institutions in this year of 1978 there are some definite color trends.

Probably the one most important trend is with the "so-called" naturals' Beiges, terra cottas and all shades of browns are definitely "in." However, in our industry I perceive a definite turn toward the lighter shades, especially beige or sand tones. The butcher block look and wicker for garden rooms are setting the pace. The ceramic industry obviously follows.

Reactive glazes, once again in browns and beiges, with many textures is also a definite trend. Casual decor in the dining rooms today seem to call for the "stoneware" look. Speckles, the "running" or "drip and dribble" edges of the colored glazes gives the "craft look" that is so popular. Also, in our industry we achieve textures by using hand applied brush-stroke techniques.

The long time popularity of old gold has finally waned, and beige is the new neutral. Black is still popular in the sophisticated market, but it also has lost much of its punch. As far as other trends: we are experiencing a new, but somewhat limited, interest in blue, both light blue and dark cobalt. Greens come and go, but we note an interest in a soft mint green today as a fresh approach to the "overworked" avocado green.

In conclusion, the warm, natural tones are the winners, hands down, in our commercial field. We have just received a brand new orange underglaze color from Germany which is the brightest we have ever used. It will be a comer, as it is cheerful and is appropriate for nursing homes and hospitals when mixed with a bright lemon yellow."

N. William Wagar, Supt. of Development & Tech. Services, Hercules Incorporated, Drakenfeld Colors:

"The major trends that I see in our industry related to color involves Federal regulation: FDA, EPA and TSCA. These regulations are directed both toward the pigments themselves and the glass colors. The end result will be limitations on the use of various pigments, designs and glass colors. The current activity is related to ware that comes in contact with food.

Pigments containing heavy metals, e.g., cadmium reds, will have to be used with much greater care in the future.

The fluxes used with the colors will have to be of special design and fired carefully to meet specs.

Designs will have to take into consideration the color density in the food contact areas and how this relates to the permissible levels of heavy metals.

The overall result is that the color user will be required to be aware not only of the appearance of the product but of the safety specifications as well.

People in the industry are working toward satisfactory answers by co-operative efforts between all parties concerned: government agencies, color manufacturers, and the color consumers."

Editor's note:

F. Joseph Von Tury, chairman of the ACS delegation to the ISCC, received the ACS 1978 Design Division Award at their Annual Meeting held in Detroit in May. It was given "in recognition of his long, faithful, and dedicated service to the Design Division." The citation is engraved in 24-carat gold on a Lenox china plate.

In the same month, the American Hungarian Foundation Distinguished Service Award was presented to him "in recognition of outstanding public service in community and civic

affairs, leadership as a world renowned ceramicist, artist-craftsman and designer and for enhancing the appreciation of the Hungarian heritage in America."

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

We completed a new delegation membership this year after a long period of delegation inactivity and held a meeting in Chicago on August 30, during the national A. Ch.S. meeting.

A number of possible activities were discussed and plans are underway to implement several of them. Included are an article in Chemical and Engineering News about the ISCC, monitoring of A. Ch.S. journals for color articles and a joint symposium on color at a future A. Ch.S. meeting.

It has become clear to us that, though many A. Ch.S. members work in the area of color, no organization within the A. Ch.S. has adequately represented their interests. We hope to be able to help full this need in the future.

REPORT FROM THE AMERICAN COLLEGE OF PROSTHODONTISTS DELEGATES
STEPHEN F. BERGEN, CHAIRMAN

The American College of Prosthodontics is taking a very active role in the field of Color and Color research. We have taken upon ourselves a series of goals and are well underway to achieving them. Below is a summary of this year's activities.

1. Dr. Richard McPhee has completed a dialogue with the Journal of Prosthetic Dentistry so that any article submitted to them in the future that concerns color will be submitted to our committee for evaluation. In the past, our journal has printed misinformation concerning color, and we hope that it will no longer print such articles.
2. Dr. Gene King has been preparing a skin shade guide produced from the materials that we are currently using in Maxillofacial Prosthetics, and we are now ready to spectrophotometrically evaluate this guide and compare it to spectrophotometric readings of human skin.
3. Dr. Jack Preston has written an article on office lighting, and it is going to be published in July 1978.
4. Dr. Preston is also proceeding on plans to read teeth spectrophotometrically, intraorally. He is preparing a protocol for a research grant.
5. Dr. James Holtan is exploring various methods of room lighting measuring techniques, including actual Kelvin temperature and measurement of the quantity of light.
6. I am involved with a publication of a mini-glossary of color terms for the dental profession. In addition I am exploring the idea of testing for color defectiveness on a mass scale. Dr. Preston and I are evaluating the validity, effectiveness, and use of the Chromascan, an instrument devised to read the "color" of teeth and translate the numbers into formulations for porcelain restorations.

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

During the past few years the American Institute of Architects has formalized the structure of its committees. Its ISCC delegates are now called the "Committee" on the Inter-Society Color Council and come under the AIA Commission on Practice and Design. They are appointed formally each year by the President of the Institute. The Chairman of the Committee files an annual report to the Commission on Practice and Design. All this helps to supervise the work of the various committees and to keep records of their accomplishments. It has been useful in establishing closer ties between the Institute and the Council. Their chief connection is through the work of Subcommittee 30, "Color in the Building Industry."

REPORT FOR THE AMERICAN PHILATELIC SOCIETY

As the APS became a member-body of the ISCC only on April 16, 1978, its delegation has not yet been formed. Liaison will be with the Executive Secretary, James T. DeVoss, P.O. Box 800, State College, PA 16801. The Society just admitted its 100,000th member (since its founding – not the number of present members). Its journal, *The American Philatelist,* is well known to stamp collectors around the world.

REPORT FROM THE AMERICAN PSYCHOLOGICAL ASSOCIATION DELEGATES
SIDNEY STECHER, CHAIRMAN

No report has been received.

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

No report has been received.

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

No report has been received, but news of the Society was published in *Newsletter* 252, pp. 6-7.

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

No report has been received.

REPORT FROM THE ARTISTS EQUITY ASSOCIATION DELEGATES
LINDA LEWIS TAYLOR, CHAIRMAN

Artists Equity Association has formed a new Technical Committee which is chaired by June Fedel. The purpose of the committee is to distribute to AEA members information acquired through ISCC Problems Subcommittee Number 37.

An Artists Equity Triennial is currently in progress at the Museum of the Philadelphia Civic Center. The Triennial which began April 28, 1978, will continue through May 28, 1978. It is being sponsored by the Philadelphia Chapter of Artists Equity and the Philadelphia Civic Association. Lucas Samaras is the AEA guest of honor and F. Eugene Dixon, Jr. is the Civic Association's guest of honor. Panel discussions, demonstrations, and gallery talks are being held throughout the Triennial.

A report on the work of ISCC Problems Subcommittee 37, Artists Materials will be made by Chairman Joy Turner Luke at the national meeting of AEA in Philadelphia on June 16, 1978.

Chairmanship of ASTM's Committee D01.57 Artist Paint and Related Materials, has been accepted by Joy Turner Luke in order to coordinate information gathered by both ISCC and ASTM Committees on Artist's materials.

Joy Turner Luke has also been made a member of the National Bureau of Standards Standing Committee for Revision of CS-62 Artist Oil Paint Standards.

REPORT FROM THE ASSOCIATION OF PROFESSIONAL COLOR LABORATORIES MARTIN HERSHENSON, CHAIRMAN

No report has been received from this new member-body, which is concerned with the processing of color photographic materials.

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

No report has been received.

REPORT FROM THE COLOR MARKETING GROUP DELEGATES JOYCE S. DAVENPORT, CHAIRMAN

Bi-annual meetings were held during 1977. The Spring meeting was at the Sheraton Ritz Hotel April 24th-27th in Minneapolis. The theme was, "The Magic of Color." Washington, D.C. was the location for the fall meeting of CMG, both had excellent attendance and stimulating programs.

A board of directors meeting took place in Hershey, PA in October. It was an intensive three-day session with many important decisions made.

During the year emphasis has been placed on frequent regional meetings to acquaint new members with the function of CMG and to discuss business and color on a regional basis. The attendance at these meetings has been very good, especially when one considers some members must travel a considerable distance. We have tried to make these meetings as interesting and informative as possible by combining them with tours of the hosts' business facilities. The regions are broken down as follows:

New England – Up-State New York
New York Metropolitan Area
Mid-Atlantic States
East Central States
North Central States
Southern States
Western States
Canadian States
Foreign

CMG has expanded its program by developing three new directional committees, Marketing, Education, and Technical. The Color Directions Committee is still a very important function of the organization and is broken down into fourteen workshops. These fall into seven catagories:

1. Paint, chemicals, automotive, and exterior paneling
2. Paper, color cards, graphics, and advertising
3. Carpets, resilient flooring, and paneling
4. Home furnishings and interior designs
5. Wallcoverings and woodgrains
6. Ceramic tile, plumbing fixtures, laminates and appliances
7. Fashion, fibers and cosmetics

The Color directions palette that evolves from these workshops has proven to be an excellent merchandising tool.

Last year CMG was asked to present a series of seminars for students of the Fashion Institute of Technology in New York City. The seminars were so successful that Color Marketing Group members were asked to present another series. Speakers were chosen from our fashion workshop, and again found enthusiastic and attentive students. CMG speakers were as follows:

Seminars/Speakers

Color and the Textile Industry
Joseph Abelson
ICI United States Inc.

Colorology
The Psychology and Symbolism of Color

Patricia Barnes
Color Consultant

Natalie Schiaffo
Kaysar Loungewear

Fabrics of Ethnic Origin
Joyce Nacker
Color Consultant

Members of the CMG participated in a program organized by the National Paint and Coatings Association.

The conference held at the Greenbrier, White Sulpher Springs, West Virginia, April 19th - 21st, 1978 was attended by representatives from industry and governmental agencies.

The purpose of the meeting was to discuss the governments present procurement policy versus commercial acquisition. The program was presented as three workshops. The first was chaired by Everett R. Call, NPCA introducing four CMG speakers who covered the aesthetic approach to color, communication, the universal color language, color systems and the technical aspects.

How to Buy Color

Morris Gall, Director, Advertising and Color
Glidden Coatings and Resins Division
SCM Corporation

How the User Sees and Describes Color

James Grabowsky, Manager, Color Laboratory
Glidden Coatings and Resins Division
SCM Corporation

Color in the Marketplace

R. T. Halloway, Merchandising Manager
Bennett's Colorant Division

Procurement Color Problems are Color Opportunities

Joyce S. Davenport, Supervisor
Color Development, Color Research
DeSoto, Incorporated

The second workshop included speakers from G.S.A. Federal Supply Service, the Department of Housing and Urban Development and the Department of Defense. The third workshop comprised panelists from industry and government. The conference was an excellent forum for the exchange of ideas and new approaches to paint procurement.

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

No report has been received. However, news from the Association was published in *Newsletter* 250, p. 4.

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

The Annual Meeting of the FSCT was held October 26, 27, and 28, 1977 in Houston, Texas. At that time a brief meeting of the ISCC Committee (ISCC delegation) was held. The Bruning Award of the Federation was presented to Prof. F. W. Billmeyer, Jr. for his outstanding contributions to the Technology of Color in the coatings industry. The award for the best paper about color published in the Journal of Coatings Technology in 1977 was presented by the Dry Color Manufacturers Association to Ruth Johnston-Feller and Dennis Osmer for their paper "Exposure Evaluation: Quantification of Changes in Appearance of Pigmented Materials" published in the February issue.

The 1978 Annual Meeting and Paint Industries' Show will be held November 1, 2, and 3 at the Conrad Hilton Hotel in Chicago.

The major effort of the ISCC delegation in 1977 was planning the Symposium on Color and Appearance Instrumentation sponsored by the Federation, the Manufacturers' Council on Color and Appearance (MCCA), and the ISCC. The Symposium was held March 14-16 in Cleveland, Ohio and was very successful. About 150 persons plus about 35 exhibitors and 16 speakers attended. The format of dividing the half days between paper presentations and rotating workshops was very practicable and helpful to those attending. Instrumentation clinics were held from 5 to 7 PM on the 14th and 15th which were well attended and appreciated.

A second effort of the ISCC Committee during 1977 was the preparation of the descriptive booklet and instruction sheet for the Color Aptitude Test in cooperation with the ISCC's Subcommittee for Problem 10. This new edition of the test will be available from Federation Headquarters in June of 1978.

Galley proof for the color and optics terms of the Federation's Paint/Coatings Dictionary was corrected. Publication is currently scheduled for late summer of 1978.

Articles of possible interest to ISCC members that were published in the Journal of Coatings Technology in 1977 include the following:

1. R. Johnston-Feller and D. Osmer, "Exposure Evaluation: Quantification of Changes in Appearance of Pigmented Materials," February, p. 25.
2. M. L. Ellinger, "Correlation of Weathering Results," April, p. 44.
3. B. Bender, "Color Trends Mirror Changing Life Styles," April, p. 59.
4. A. M. Keay, "Exposure Studies of Organic Yellow Pigments in Exterior Architectural Paints," June, p. 31.
5. S. Panush, "Non-Chromate Pigments for Automotive Finishes," June, p. 38.
6. F. B. Stieg, "ABC's of White Hiding Power," July, p. 54.
7. R. S. Hunter, "Applications of Appearance Measurements in Coatings Industry," September, p. 87.
8. J. L. Scott, "Seasonal Variations – Nemesis of Repeatable/Reproducible Accelerated Outdoor Durability Tests?", October, p. 27.
9. R. A. Kinmouth, Jr. and J. E. Norton, "Effect of Spectral Energy Distribution on Degradation of Organic Coatings," October, p. 37.
10. G. W. Grossman, "Correlation of Laboratory to Natural Weathering," October, p. 45.
11. L. R. Freimiller, "Guidelines for Exposure Testing of Exterior Paint," October, p. 80.
12. R. C. Zeller, "Color Measurement in the Iron Oxide Pigment Industry," November, p. 91.

REPORT FROM THE GEMOLOGICAL INSTITUTE OF AMERICA DELEGATES ROBERT GAAL, CHAIRMAN

No report has been received.

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

This report summarizes the activities and programs centered on color and color reproduction in which GATF is engaged. The activities and programs include in-house research projects, cooperative work with other graphic arts industry associations, reports to the graphic arts industry, and educational programs presented in all sections of the country.

Research projects include the following:

The GATF Color Communicator: A new prepress color generating and viewing device with the above name is now commercially available from GATF.

The GATF Color Communicator provides a convenient means for displaying a desired color and specifying it in terms of process color contributions. Thus the device is a visual-technical communications link for artists, designers, printing salesmen, and the production personnel in press and prepress areas. The Communicator produces a displayed color from the dot areas of the process colors that are combined over a particular printing surface.

The GATF Color Communicator is a neutral gray plastic unit and consists of the following components:

1. Four partially transparent prepress screened color proofing films: cyan, magenta, yellow, and black.
2. A slot for inserting the substrate to be printed.
3. A viewing window (1 cm x 1.5 cm) behind which the four partially transparent prepress screened color proofing films and the printing substrate can be brought into optical contact for viewing the desired color.
4. A pressure plate behind the viewing window to ensure optical contact among substrate and films for examination.
5. Four slots and four sliding tabs (one for each process color).
6. Calibrated percent dot area scales for each process color.
7. Dimensions (1, w, d) 16 1/8 x 5 1/8 x 3/8 inches.

A sample of the paper or other substrate to be used is inserted into the slot behind the viewing window. Between the paper and the window are four overlaid, independently movable transparent halftone wedge strips, one in each process color (cyan, magenta, yellow) and one in black. Halftone dot area percentages vary from 0% to 100% along the length of each strip. The percentage showing at the window is changed by sliding the tab attached to each color wedge. The center

line marked on each tab indicates on an adjacent scale the percent dot area displayed for that color.

There are three basically different ways to use the device: (1) Predetermined dot area percentages are set with the Communicator index tabs in order to observe the resulting color. For example, measured percentages from color separation dot areas can be entered in the device to check whether the printed color will be right. (2) The Communicator tabs are moved by trial and error until a match is made with a desired color sample. (3) The Communicator tabs are manipulated until the color is produced corresponding to a mental concept. In (2) and (3), the final positions of the tabs indicate the dot area percentages required for each process color to produce the chosen combined color. These percentages uniquely specify the color for the substrate used.

Undercolor Removal Studies: During 1977, a new project was started to study the color gamut as it relates to the recommended standards for web offset publication proofing. One of the specifications in the recommended standards requires that for four-color web printing the sum percentages of tone values should not exceed 260 percent. It is the undercolor removal requirement to achieve 260 percent coverage that is of particular interest in the color gamut study. It was decided to reproduce a transparency at four different levels of undercolor removal (UCR) in order to study and illustrate its effects on the color gamut and the fidelity of a four-color reproduction. Prepress proofs suggest that there may be a significant loss in available contrast in the reproduction as the amount of UCR is increased from 360% to 260%. However, no conclusions will be made concerning the effects of UCR on available contrast and color gamut until press proofs are available.

Cooperative Association Studies

The first revision of the recommended publication proofing standards was published in May, 1977 and copies are available from AAAA, ABP, and MPA. The revised standards include specifications for viewing the copy and proof, and emphasized the use of the Standard Offset Color References as the only accepted standards for hue and amount of ink.

In October, 1977, the Standards Review Committee met to determine to what extent the recommended standards were being used and what problems were being encountered in using them. In September, prior to this meeting, GATF sent a survey to its U.S. corporate members to determine the extent that the recommended standards were being used. Of the 22 percent of the surveys that were completed and returned to GATF, 40 percent were using the recommended standards and 60 percent were not. However, of the 60 percent that were not using the recommended standards, 32 percent would like to use them, but did not have information on how to obtain a copy of the publication. An additional 32 percent were not aware of the recommended standards, and 26 percent were not involved in web offset printing. The remaining 10 percent did not use the standards because they objected to the recommended rotation of colors and indicated that the recommended proofing stock was "too white – too bright."

Educational Programs

Seminars and Workshops: Programs dealing with color have been presented for the industry in the following areas: Color Printing Standards and Controls, Color Theory and Quality Control, and Color Separation Update.

A GATF Color Proofing Conference was held on May 23-24-25, 1977 in Philadelphia and was attended by 184 people.

REPORT FROM THE GRAVURE TECHNICAL ASSOCIATION DELEGATES
OSCAR SMIEL, CHAIRMAN

No report has been received.

REPORT FROM THE HOUSE & GARDEN COLOR PROGRAM DELEGATES
NADINE BERTIN, CHAIRMAN

The House & Garden Color Program became a member-body of the ISCC on April 16, 1978. For a description of the program with a color plate of the 1978 House & Garden Colors, see "The House & Garden Color Program" by Nadine Bertin, *Color Research and Application 3,* 71-78 (1978).

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

No report has been received.

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

This has been a banner year for IDSA/ISCC with many mutual contributions and rewards.

Professor Alexander Styne, IDSA of Miami University produced and managed a great ISCC Annual Meeting at the L'Enfant Plaza Hotel in April of this year. In addition, Professor Styne presented a major paper on April 18 entitled "Coloration by Specific Commercial Light Sources."

Through the efforts of Professor Styne and myself, with support from the officers on the ISCC Board of Directors, we accentuated an existing ISCC interest, "How Color is Used," by creating a positive "Color in Use" category of ISCC action. This activity originated in January, 1977, and was defined at the ISCC Annual Meeting in April, 1977 by Ray Spilman, FIDSA. "Color in Use" was then made a major theme of the ISCC Annual Meeting.

Beyond initiating the "Color in Use" theme, Professor Styne and Mr. Spilman originated and produced three new events, namely:

1. Professor Styne developed "Color in Use" workshops. Four in number, these evening sessions covered major color applications from quality control to an explanation of the *House and Garden* color selection system.

2. An art show featured the work of artist members and associates who related their work to the science of color. The idea originated with Mr. Spilman's observation of Mrs. Richard Hunter's creative collages composed of color swatches sent in to HunterLab by clients wishing scientific control measurements of their materials. Professor Styne developed the idea, and, under the management of Joy Turner Luke from the

Artists Equity Association, organized a beautifully run show. The show was hung by members of the Mid-Atlantic Designers Group under the direction of Neil Smith, IDSA and Jerry Proctor, IDSA with assistance from Carroll Gantz, FIDSA.

3. *Problem 33 – Human Response to Color.* This IDSA inspired and led subject involves the cross-fertilization of knowledge among ISCC members regarding the measurable effects of color upon people's actions, whether it be direct or indirect.

This year, Professor Styne, the Problem Chairman, turned the Problem 33 Session at the ISCC Annual Meeting over to Mr. Spilman. Together, they developed the theme "Color on Consumer Objects" as a panel subject. The following distinguished panel was assembled: Carroll Gantz, Manager, Industrial Design, Black and Decker Manufacturing Co. (Subject: Color Selection on Hand Tools); Robert G. Smith, Director, JC Penney Design Systems (Subject: Color Use on Objects and Environments in Retail Stores); Robert Schmeck, Director of Corporate Design, Pitney-Bowes (Subject: Color Determination on Business Machines); and Professor Robert Redmann, Head, Department of Industrial Design, Bridgeport University (Subject: Color Education of the Industrial Designer).

The audience response to these professionally prepared presentations was excellent with several members personally complimenting the very high quality of the panelists and their subjects.

It is hoped that we can expand this type of presentation into the areas of color response in food, light application, and regional color preferences as they relate to environmental, cultural, and educational backgrounds.

Finally, it was suggested to Mr. Spilman that designers begin to think of format and subject matter for a proposed mini-conference about the use of color in and on objects to be held at Williamsburg in 1981.

In Summation

IDSA representatives to ISCC, through their participation, are making an important impact in broadening the knowledge of "Color in Use" among the ISCC membership. In return, we of IDSA who are involved in ISCC are being educated to the mysteries and value of the accurate use and knowledge of what color is and how it can be measured.

I suggest, for our own professional growth, that we in IDSA more often inform ISCC how we use color and what we *do* with color.

Your suggestions and help would be appreciated.

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

The annual report is perforce very short because the activity level has been low. Some of us (Y. Maing, J. Hutchings, A. Little) met at the Colour 77 meeting at Troy, N.Y. in July 1977 to review program proposals. The idea of a working subcommittee under ISCC aegis was once again viewed with favor, but, to date, the formulation of a proposal has not been successful.

The membership of the delegation has undergone some changes within the past two years and at present the following have expressed an interest to continue: F. Clydesdale, University of Massachusetts; J. Cook, Coca-Cola Corp.; J. Hutchings, Unilever of U.K.; D. MacDougall, Meat Research Institute, Bristol; Young Maing, General Foods; J. Yeatman, Consultant.

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

Enrollment in the Collaborative Reference Program has increased. The Color and Color Difference report has been expanded to include spectrophotometric curves and the samples now include a white reference sample. Both of these changes have been implemented to make this report more useful and the data more meaningful to the participant. One of the most interesting spin-offs of this program has been the study of the absolute white reflectance standard by both National Bureau of Standards and the National Research Council.

IBM and Philips Electronic Instruments Inc. have joined the MCCA.

The MCCA chaired the exhibit program of both members and nonmembers at the recent AIC meeting in Troy, New York in July 1977.

The MCCA also sponsored a very successful Workshop Program at the FSCT/ISCC/MCCA Symposium on Color and Appearance Instrumentation in Cleveland, Ohio, March 14-16, 1978. This symposium was a unique and instructive combination of lecture sessions and workshops. The workshops featured "hands-on" demonstrations of both the visual and instrumental means of color and appearance control and evaluation.

REPORT FROM THE MYCOLOGICAL SOCIETY OF AMERICA DELEGATES
KENT H. McKNIGHT, CHAIRMAN

No report was received from this new member-body, but a short article describing the Society and its activities appeared in *Newsletter* 253, p. 3.

REPORT FROM THE NATIONAL ASSOCIATION OF PRINTING INK MANUFACTURERS DELEGATES
GERALD I. NASS, CHAIRMAN

Mr. Gerald I. Nass of U. S. Printing Ink Corporation, East Rutherford, New Jersey, has been designated the new chairman of the NAPIM delegation. He replaces David M. Kirkpatrick, who retired this year from Borden Chemical Company.

The NAPIM Color Standards Committee completed its cooperative effort with the AAAA/MPA Committee in preparing the first revision of *Recommended Standards for Advertising Materials for Web Offset Publication,* which was issued in May, 1977.

The NAPIM delegation has also been cooperating with the Fibre Box Association (FBA) and the Paper Shipping Sack Manufacturers Association (PSSMA) in a program to develop acceptable color standards for Department of Transportation labels printed directly on corrugated containers and other packaging materials. DOT has suspended until March 1, 1979 the stringent color requirements originally proposed. NAPIM, FBA, and PSSMA are attempting to develop standards with color tolerances that can be met by container and bag manufacturers in commercial practice.

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 year 1977 has been a good year for the Optical Society of America. The concept of Topical Meetings and Workshops seems to be fulfilling a real need and several more are planned for 1978. The membership increased by 5% this year to 7,171 members. This year was also the first publication of the new journal *Optics Letters* and is included in the present journal package for members. The 1978 Annual Meeting will be held at the Jack Tar Hotel in San Francisco, California.

The 1977 Annual Meeting was held in Toronto, Canada, and featured five sessions of invited papers on vision, two of which were concerned more or less with color. The first, on retinal-receptor optics, included talks by Ferenc Harosi on microspectrophotometric studies of vertebrate rods and cones, Jay Enoch no waveguide properties of vertebrate receptor cells, and Gary Bernard on microspectrophotometry of butterfly receptors. Bernard reported that four spectral classes of receptors have been demonstrated in the eye of a single individual butterfly. The second session, a symposium on color vision, consisted of talks by C. J. Bartleson on chromatic adaptation, and by Vivianne Smith on prediction of color-matching functions. The remaining three sessions of invited papers on vision were concerned with visual strategies in marine forms, vision by man and machine, visual image assessment and ocular motility. Each of the invited-papers sessions on vision was followed by a session of closely related contributed papers.

Awards

The Society presented the Frederic Ives Medal to Emil Wolf, for outstanding contributions to physical optics and the theory of coherence. The C.E.K. Mees Medal was presented to André Maréchal. Walter P. Siegmund was the recipient of the David Richardson Medal for advances in applied optics. Mark S. Fred and Frank S. Tomkins were joint recipients of the William F. Meggers Medal for their work in spectroscopy. The 1977 Distinguished Service Award was presented to Stanley S. Ballard, a former president of the Society, Secretary for Local Sections, and member of many committees during the past four decades.

Uniform Color Scales System

In a meeting of those concerned with the OSA Uniform Color Scales System held on November 16, 1977, consideration was given to the possibility of initiating an ISCC Problems Subcommittee to work on such problems as: 1) presentation of OSA-UCS material to art students in ways by which they might more immediately see, and better understand, the unique possibilities of the new set of color materials; 2) explore application of this system to other fields such as gems; 3) considerations of availability in the future that would promote more widespread use; and 4) best methods for storage of samples for permanence.

Publications

Appended is a listing of the papers published in the Journal of the Optical Society of America in 1977 in the field of color.

Color

W. S. Stiles, G. Wyszecki and N. Ohta, "Counting metameric object-color stimuli using frequency-limited spectral reflectance functions," J. Opt. Soc. Am., 67, 779 (1977).

S. J. Kishner, "Effect of spectrophotometric errors on color difference," ibid., 67, 772 (1977).

Edwin J. Breneman, "Perceived saturation on complex stimuli viewed in light and dark surrounds," ibid., 67, 657 (1977).

Fonald Bergsten and Susan Huberty, "White-light Fresnel diffraction by a circular aperture," ibid., 67, 643 (1977).

Colorimetry

David L. MacAdam, "Correlated color temperature," ibid., 67, 839 (1977).

Gordon B. Donaldson, "Instrumentation for the Farnsworth-Munsell 100-hue test," ibid., 67, 248 (1977).

Color Measurement

M. Guirao and M.L.F. deMatiello, "Saturation of colored samples at various levels of reflectance," ibid., 76, 647 (1977).

Color Vision

K. Takahama, H. Sobagaki, and Y. Nayatani, "Analysis of chromatic-adaptation effect by a linkage model," ibid., 76, 651 (1977).

Richard W. Bowen, "Chromatic two-pulse resolution with and without luminance transients," ibid., 76, 1501 (1977).

Israel Abramov, "Color vision in the peripheral retina. I. Spectral sensitivity," ibid., 76, 195 (1977).

James Gordon, "Color vision in the peripheral retina. II. Hue and saturation," ibid., 76, 202 (1977).

Joel Pokorny and Vivianne C. Smith, "Evaluation of single-pigment shift model of anomalous trichromacy," ibid., 76, 1196 (1977).

Steven L. Buck, Francine Frome, and Robert M. Boynton, "Initial distinctness and subsequent fading of minimally distinct borders," ibid., 76, 1126 (1977).

Vivianne C. Smith and Joel Pokorny, "Large-field trichromacy in protanopes and deuteranopes," ibid., 76, 213 (1977).

Homer B. Tilton, "Scotopic luminosity function and color mixture data," ibid., 76, 1494 (1977).

Bruce A. Drum, "Cone interactions at high flicker frequencies: Evidence for cone latency differences?," ibid., 76, 1601 (1977).

Arne Valberg and Brian W. Tansley, "Tritanopic purity difference function to describe the properties of minimally distinct borders," ibid., 67, 1330 (1977).

D. H. Kelly and D. van Norren, "Two-band model of heterochromatic flicker," ibid., 76, 1081 (1977).

Jeanne L. Benton and John J. McCann, "Verigated color sensations from rod-cone interactions: Flicker-fusion experiments," ibid., 76, 119 (1977).

REPORT FROM THE PHILATELIC FOUNDATION DELEGATES ROY H. WHITE, CHAIRMAN

Since the Philatelic Foundation became a member-body on April 16, 1978, no report has been received. A major purpose of this educational Foundation is the authentification of old postage stampe and other philatelic items. It has in preparation, with ISCC assistance, a book on the colors of postal items.

REPORT FROM THE SOCIETY OF MOTION PICTURE AND TELEVISION ENGINEERS DELEGATES
ROLAND J. ZAVADA, CHAIRMAN

That modern technology can be used by creative people in the production of motion pictures and television programs was ably demonstrated during the Society's 119th Technical Conference in Los Angeles. Particularly significant were flawless presentations of one-inch video tape on monitors carefully adjusted to show uniform color balance, brightness, and contrast.

Of the more than 100 technical papers (available on tape) presented during the conference, 18 concerned color:

- A Low Cost Color Television Recording System
- Saticon: The New Color TV Camera Tube
- Automatic MicroProcessor Color Camera Set-Up Unit
- A New High-Temperature Color Positive
- A Progress Report on a New Bleach for Eastman Color SP Print Film
- Forced Processing of Modified Eastman Color Negative II Film 5247
- Major Factors Affecting Apparent Screen Brightness in Large Theater Screen
- A Bleach System for Color Positive and Negative Film That Reduces Waste Treatment Requirements
- New Type Fuji Color Negative Film, 35mm Type 8517, 16mm Type 8527
- New Type Fuji Color Positive Film – Hot Process
- A Proposed Economical System for Archival Preservation Storage of the Color Motion Picture Film Image
- Embossed Relief Images for Color Motion-Picture Applications
- Methods for the Color Conversion of Monochrome Films
- What is a Normal Exposure for Color Films?
- Color Rendering and Its Evaluation
- Color Filters in Motion-Picture Cinematography
- Hilbert Transform Chroma Processing in the Electronic Still Store
- Digitalized Process Amplifier and Color Encoder

At the Society's 11th Television Conference in San Francisco, three papers on color were presented:

- Direct vs. Color Under
- Eastman Ektachrome Video News Film High Speed (7250) Tungsten and a Rapid Access Color Reversal Process
- "DSEG" Digital Special Effects Generation for Color Video

Seven recipients of Society awards for 1977 were recognized specifically for their outstanding contributions to the science of color:

Honorary Membership to Dr. Peter C. Goldmark, Goldmark Communications Corporation, for heading the development of field sequential color television.

Honor Roll, awarded posthumously, to William T. Wintringham for exploration of human response to various visual stimuli.

Progress Medal to E. Carlton Winckler Sr., Imero Fiorentino Associates, for contributing to the improvement of color television programming through the use of proper lighting techniques resulting in better quality of the television image received in the home.

Herbert T. Kalmus Memorial Award to Roland G. L. Verbrugghe, Agfa-Gevaert, for development of color films useful in making color motion pictures for theater and television use.

David Sarnoff Gold Medal to Renville H. McMann, Thomson-CSF Laboratories, for color masking and encoded signal correction, and the first high-quality portable color camera.

Special Commendation to Bernard D. Loughlin, Hazeltine Corp., for developments in color and monochrome television and Charles B. B. Wood, BBC, for improvements to the technology of televising of color film.

Among the subjects under study by the Society's Engineering Committees are electronic correction methods to compensate for deviations introduced through use of nonstandard phosphors in the production of color television picture tubes, color rendering index, green ambient light in theaters, color reference test film for telecine use, taking characteristic of color cameras, colorimetry of picture monitors, and the speed of reversal color films.

Papers on color published in the SMPTE Journal during 1977 are listed.

Papers Published in the SMPTE Journal Volume 86 (1977)

KAISER, ARTHUR. Comb filter improvement with spurious chroma deletion. No. 1, Jan., pp. 1-5.

VANREUSEL, G.; DE RAMAIX, M; and VANHOREBEEK, R. Color film processing and environmental protection. No. 1, Jan., pp. 15-19.

MOTOKO, TOSHIO and SUGIURA, YUKIO. Direct laser-beam recording of color television signals on color print film. No. 2, Feb., pp. 71-73.

DAVIDSE, J. and KOPPE, R. P. A chroma-key system insensitive to variations of the background illumination. No. 3, Mar., pp. 140-143.

LAW, HAROLD B. The shadow mask color picture tube: how it began. No. 4, Apr., pp. 214-221.

STAES, K. Light sources as an integral part of the color photographic system. No. 8, Aug., pp. 537-543.

DEMARSH, LEROY E. Evaluation of color rendering in film and television. No. 9, Sept., pp. 624-625.

STAES, K. A spot exposure meter designed for color photography. No. 10, Oct., pp. 721-725.

PRITCHARD, D. H. U.S. color television fundamentals: a review. No. 11, Nov., pp. 819-828.

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

No report has been received. However, news from the Society was published in *Newsletter* 250, pp. 5-6, and 252, p. 8.

REPORT FROM THE SOCIETY OF PLASTICS ENGINEERS COLOR AND APPEARANCE DIVISION DELEGATES
WILLIAM J. CUNNINGHAM, CHAIRMAN

No report has been received. However, news of the Division was published in *Newsletter* 252, p. 8.

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

The annual technical conference was held in Pittsburgh on May 16 through 18. Two papers were presented dealing with color applications in the graphic arts.

Effect of Paper on Color Quality of Prints, R. M. Leekley, R. F. Tyler, and J. D. Hultman, The Institute of Paper Chemistry: Unwanted light reflected from the upper surface of the ink film limits the blackness of blacks and color purity in printed products. The amount encountered at the viewing angle depends upon the roughness of the paper, the extent to which ink fills or levels this roughness, the size and shape of the ink pigment particles, and the extent to which they are covered by a film of dried ink vehicle. A new instrument has been developed for measuring the colorimetric effect of surface reflection and a method of expressing the result in visually uniform color difference units. This provides a more satisfactory prediction of the extent of color degradation than "paper surface efficiency" or print gloss.

Color Space, Computer Color Matching Technology, L. A. Schlapfer, E. I. duPont de Nemours & Company:

Techniques developed for paint systems may be applicable to ink makers and printers involved in color matching. Computer color matching will be useful to: (a) define color limits of pigments now used; (b) design an optimum pigment selection to produce the maximum amount of color space and determine if the color to be matched falls within the color space available; (c) determine if deletion or addition of a pigment color reduces or expands color space; (d) determine the effect of substituting one pigment for another.

At the meeting of the TAGA Color Committee those topics of concern to the graphic arts that were presented at the annual ISCC meeting were discussed.

R. Maurer and C. Rinehart reviewed the papers presented at the Williamsburg Conference on "The Objectives of Pictorial Color Reproduction."

The problems of metamerism in color reproduction were discussed. Several examples of a color film that reproduced dark browns as purple were circulated. The original of the photograph was a textile sample of embroidered yarns. Spectophotometric curves of the dark brown sample were available and showed very high reflectance extending into the infrared region. The reproduction of textile samples has been a consistent problem in the graphic arts because of the unusual spectral reflectances encountered with synthetic dyes.

Problems of metamerism have also been encountered with the electronic scanners used for color separation. Closer attention to the selection of filters used and the need for sharp cutoff in the ultraviolet and infrared regions of the spectrum was suggested as a means of improving color rendition.

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 continues to work on the review of several testing methods involving optical properties of paper. These include gloss, reflectance, opacity, transparency, and color. Activity has been initiated on the development of a method for determining whiteness of nonfluorescent pigments and fillers. Mr. S. J. Popson will become chairman of the committee and of the Delegation on January 1, 1979.

COLOR IN USE

Workshop 1

Color Quality Control In Industry
Moderator: Rolf G. Kuehni
Reporter: Ruth M. Rich

Prospectus. Conventional color quality control involves visual evaluations. More and more frequently, instrumental color quality control is being used in colorant producing and using industries. Color quality control involves proper sampling and sample preparation and standardized viewing or measuring conditions. It generally assesses strength of colorants, depth of shade, color difference, metamerism and possibly appearance in general.

Report. Rolf Kuehni made a brief presentation discussing the various aspects of color and appearance quality control. He covered such topics as sampling sample preparation repeatability of sample preparation and standards kept for reference purposes. Various methods of evaluation were discussed including spectrophotometric and colorimetric instrumental methods and visual methods. Naturally, the variables applicable to all of the methods were noted.

The discussion that ensured was lively and extensive, not adjourning until nearly eleven pm. One of the popular topics was the relative importance of visual and instrumental evaluations. Discussions covered aspects of their reliability and repeatability the intelligent use of technology and intelligent use of the data generated. Representatives of various industries spoke about their practices and experiences.

Various points of view concerning quality control systems, training of technicians and review and periodic training of inspectors were offered. On-line monitoring of material was mentioned as an area of growth in the color measuring field.

The group finished where it began with a vigorous discussion of sampling methods, ideal and pragmatic.

Workshop 2

Visual Effects Of Colored Light
Moderator: Joy Turner Luke
Reporter: Danny C. Rich

Prospectus. Three projectors will be used to demonstrate examples of additive and subtractive color and the interesting phenomena of colored shadows. Black and white slides will be combined with colored light to explore the Land effect, and the result of photographing the induced colors will be shown and discussed. The equipment will be kept simple to encourage participation, questions, and discussion.

Report. Mrs. Luke was faced with a very difficult task in her presentation. The work shop was comprised of both nontechnically and technically trained participants. After some encouragement from the more technically oriented participants

she began an introduction to the visual effects of colored lights.

Mrs. Luke began with a description of the spectrally selective properties of transparent colors and applied the principle to the reflective colors of artists' materials. With that well in hand she introduced the novices to the differences between additive and subtractive mixing. She was able to demonstrate the connections between the three additive primaries and the three subtractive primaries and the neutrals, black, gray, and white. She was now ready to demonstrate the visual applications of the primaries. She began with a reproduction of Maxwell's color photography experiment. She displayed black and white slides of a complex scene with three projectors. When she placed the three colored filters, red, blue, and green, in front of the projectors the objects in the scene appeared in their original colors. Application of this principle was referenced to television and mention was made of the interest of visual telephone communication. At this point she introduced and demonstrated Edwin Land's experiment on two primary, color reproductions. The discussion of this phenomena led to the demonstration of an old artists' technique known as colored shadows. Both the Land effect and the colored shadows were shown to be examples of color constancy and simultaneous contrast. Examples of the colored shadow effect were also given in photographs of some colored shadows. Finally a mondrian paper display was set up and used to demonstrate a dramatic example of simultaneous contrast in an apparently random display. At the close a few moments were spent discussing the effect of field size on simultaneous contrast and assimilation was demonstrated

The work shop was a rewarding and worthwhile venture and those who failed to participate indeed missed a great opportunity to "see" some of the ways in which the eye can be fooled. The discussion was extremely useful to anyone who must use their eyes to judge the color appearance of a complex field.

Workshop 3

The Munsell System and the Universal Color Language
Moderator: Kenneth L. Kelly
Reporter: T. F. Zook

Prospectus. Because of its extreme versatility, the Munsell System of color notation was used to specify the boundaries of the ISCC-NBS color-name blocks. These color names can be used at three levels of accuracy of color designation. The Color Names Dictionary (CND) interrelates the most used color names from the well known color-order systems and collections of color standards through the Munsell notations of the colored samples illustrating these color names. The ISCC-NBS Centroid colors illustrate the most typical color in each color-name block of the (CND) color-name charts. The Universal Color Language updates the CND and describes a six-level scale of accuracy of color designation, including the three above using color names. The UCL has the flexibility to add level 7 or a fractional level such as 2b or 2c between levels 2 and 3. The UCL and the CND have been published together as NBS Special Publication SP 440, with the UCL illustrated in color. Applications of SP 440 and the Centroid colors include a) determining a descriptive color name in one of the color-order systems for a color given its Munsell notation; b) determining the closest color name for a color in one color-order system to the desired one in another within the CND block structure, or on a finer point-to-point basis; or c) setting up color or color-name tolerances around a Munsell or a Centroid color. Other applications will be discussed.

Report. This session was designated in the conference program as "mostly for newcomers." It developed into a comprehensive and useful review of basic resources which the newcomer can utilize in familiarizing himself with the fascinating world of color.

Among those attending were an architect, a chemist, several dentists, a gemologist, a physicist, and a teacher of color at a fashion institute. The very diversity of interests of the participants, essentially novices to the technical world of color, underscores how important it is that fundamentals should continue to be a key part of the overall program of the ISCC. Otherwise, the struggle to understand can easily be overwhelmed by the complexities of the advanced mathematical formulae, the prolific computer print-outs, the esoteric language of the initiates, and the unavilability of access to the sophisticated scientific instruments used by the more affluent color community.

Mr. Kelly summarized the significant contributions made to the world of color by the developers of the principal "landmark" color systems and provided the participants with an opportunity to see representative examples drawn from those historic systems.

The survey included a discussion of the following major stepping stones in the evolution of a systematic approach to the study of color:

1. Robert Ridgway's 1912 book of *Color Standards and Nomenclature* with its 53 color plates and 1115 named colors. Ridgway's work was based upon 74 hues with two step differences. Ridgway's hue is indicated by a Roman numeral, lightness by a letter of the alphabet and chroma by a series of from one to five blips or apostrophes before the letter designation. This work was important to naturalists including those in the fields of ornithology, geology, botany and biology.

2. Maerz and Paul's *A Dictionary of Color,* 1st edition 1930 with its 56 color charts was presented together with an explanation of how to use the color plates. Its importance as a source of historical color names was emphasized. An admonition was given that in the 2nd edition there are significant color variations from the authoritative 1930 first edition.

3. The Color Harmony Manual (CHM) of 1948 was shown and this significant work was described as being based on a 24 hue circle of hexagonal color samples arranged like the spokes of a wheel with the axis of the solid having white at the top and black at the bottom. It has as fundamental colors yellow, red, blue and sea green. The eight principal colors of the hue circle are each split into three equi-distant steps and include:

yellow-ultramarine blue
orange-turquoise blue
red-seagreen
purple-leafgreen.

The CHM system resulted in a "color solid" in the form of a double cone with white at the "north Pole," black at the "South Pole", and the colors with the highest saturation appearing at the "equator" – each being the apex of one of the 24 monochromatic triangles. It was stated that the CHM system is based upon constant dominant wave-length, and that the apex or strongest sample for each hue is always the same

distance from the floor. Complementary colors in the CHM color solid are situated exactly opposite one another. Mention was also made of the shadow series (also called the equal purity series) of correlated colors of apparent equal saturation which run parallel to the vertical axis. They give an effect of having been evolved through reduced illumination. The CHM color solid contains 28 equal value circles into which it may be organized in terms of equal white and black content. Both the 28 equal value circles and the 24 monochromatic triangles are present simultaneously in the CHM color solid. One disadvantage of the CHM color system is that it is not easy to expand any chart to higher chromas without redesigning it. The continuing impact of this system in art and architecture in continental Europe was acknowledged.

The CHM colored chips are hexagonal and have a matte finish on one side and a glossy finish on the other side. It became an important resource in the mass merchandizing market since it filled the need for a systematized listing of colors and color specifications. However, it was abandoned when the Container Corporation of American found it too expensive to keep producing it. The CHM is a smoothing and updating of Wilhelm Ostwald's color-order system from Germany. Several new charts were added and individual samples were added as new pigment systems allowed. The result was an evener spaced and fuller coverage than was contained in the original Ostwald system.

4. *The Horticultural Colour Chart* (HCC) of 1938 was described as a system of flower colors based on a hue circle of 64 saturated colors with tints, shades and tones of those saturated colors which ultimately resulted in 200 named colors. The HCC has been superseded by the Royal Horticultural Society (RHS) Colour Chart of 1966.

5. The 1941 Textile Color Card Association's 9th *Standard Color Card of America* which has been used for fashion and flag colors was demonstrated by showing one page which illustrated visually the colors produced by designated dyes on side by side samples, first on a satin finished fabric and then on the matte finish or grosgrain. This system extended through a total of 216 colors. Each colored sample is identified by a serial number and a color name.

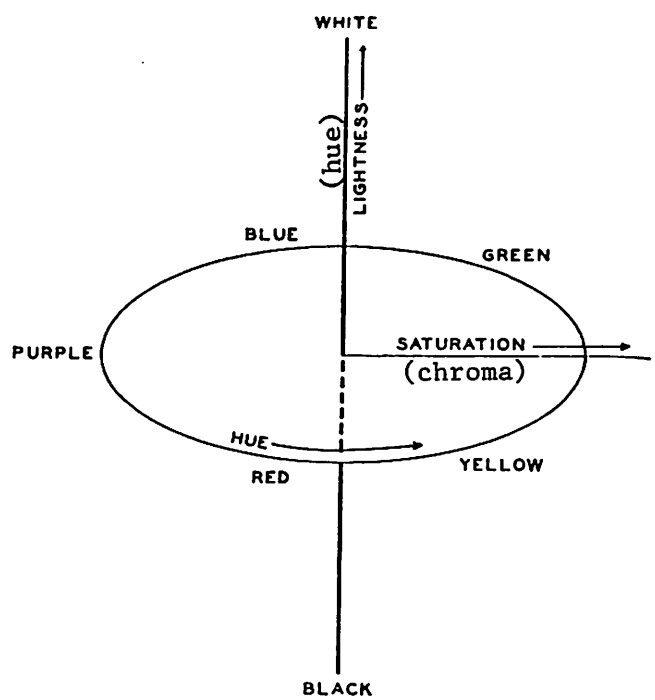
6 The 1948 *Plochere Color System: A Guide to Color Harmony* by Gladys and Gustave Plochere was developed with a color and a serial numbering system. It contained 1248 colors shown on separate 3x5 cards. Each color bears a code designation which indicates its color, paint formula and color name. This system was evolved from nine basic pigments and variations obtained by mixing one or more of them with a specified volume of black and white.

7. *The Munsell Book of Color,* both the 1929 book to 20 charts and about 400 matte color chips and the current two volume set of 40 charts consisting of 1600 glossy color chips, were also shown to the group. This work evolved from the artist A. H. Munsell's work in teaching color to his students and to artists. It has continued as an increasingly important system used throughout the international color world.

The Munsell Color Solid was described as having a hue circle containing five generic hues, R, Y, G, B and P, and five intermediate hues YR, GY, BG, PB and RP, each placed midway between each succeeding pair of generic hues. These ten major hues are visually equally spaced around the equator of the solid. The hue circle is further expanded by the addition of 10 secondary hues which fall exactly half way between each pair of major hues. Mr. Munsell divided this hue circle into 100 *visually equal* hue steps. He further divided these 100 visually equal hue steps into 10 consecutive intervals of 10 hue steps each, numbered 1 to 10 in the direction of hue progression, that is, R-Y-G-B-P. Each major hue was assigned to hue step 5 of each 10-step interval, or at 5R, 5YR, 5Y, 5GY, 5G, 5BG, 5B, 5PB, 5P and 5RP. Each secondary hue was assigned to hue step 10 of each 10-step interval, or at 10R, 10YR, 10Y, 10GY, and so on. It can be seen that hue step 10R is the same as hue step 0.0YR, that is, hue step 10 of any interval is the same as hue step 0.0 of the succeeding hue interval. Thus there are 10 hue steps between successive major hues or between successive secondary hues.

The vertical axis of the color solid ranges from black at the bottom to white at the top in ten *visually equally* spaced steps with the intermediate grays in between. The vertical axis of lightness was given the designation of "Value" by Munsell.

"Chroma" or saturation extends horizontally outward from the vertical axis from the neutral of the same value with two chroma steps between successive color chips, e.g. 2, 4, 6, 8, 10, 12, 14 and 16, and furthermore has the advantage over the CHM color solid that the Munsell color solid can be expanded in the future in any part as suitable pigments are developed. If a horizontal cut through the color solid (constant value) is thought of as a wagon wheel, chroma for each hue can be thought of as increasing along a spoke of that wheel. Grayish colors appear near the hub of the wheel and colors are more saturated as they progress toward the rim of that wheel.



Based on Figure 1: Dimensions of the Color Solid

Kelly and Judd: *Color: Universal Language and Dictionary of Names;* NBS SP440, p. 2, December 1976.

The two volume *Munsell Book of Color* consists of 40 charts with each hue having a chart illustrating the colors at the 2.5, 5, 7.5 and 10 points on the hue scale. The 2.5 and 7.5 charts fall midway between each pair of adjacent major and secondary hue charts. Colored samples belonging to the same hue designation are arranged on each constant-hue chart, with

the darkest near the bottom of the chart to the lightest at the top of the chart. Black is not shown although the scale is from value "0" (N 0/), black to value 10 (N 10/), white in visually equal steps.

The chroma or saturation of a color is shown by the arrangement of the color chips in visually equally spaced steps of chroma as one moves out horizontally from the neutral of the same lightness toward more vivid colors.

The Munsell notation is written listing first the hue, e.g. 5R; then after a *space* the value followed by a slash line, e.g. 6/; and finally the chroma following the slash line; e.g. /10. The full designation thus is written 5R 6/10. H stands for hue, V for value, and C for chroma, and the Munsell notation is always given in this order: H V/C, with a space between the H and the V.

Because of the construction of the Munsell color system, the Munsell notation of any color which is not represented by a chip can be interpolated or extrapolated from those Munsell chips which are nearest to it. The procedure is first to select the two consecutive constant-hue charts which bracket the hue of the sample. Next the value of the sample is determined by selecting the two consecutive value levels on either of these two constant-hue charts which bracket the value of the sample. Then estimate the relative value of the sample as, say, 0.6 value (0.6/) higher than the chips in the 5/ level toward the chips in the 6/ level, or at 5.6/.

If the hue of the sample falls between the 5R Chart and the 7.5R Chart, for example, the observer can mentally picture 5 half-step hue intervals between these charts, i.e. 5.5R, 6.OR, 6.5R, 7.0R and 7.5R. If the hue of our sample falls just above the mid point of this progression, for example, its hue notation would be 6.5R.

Chroma is usually the hardest for the beginner to estimate. Now hold the sample over the lowest chroma chip in the 6/ level of the 7.5R chart and move it out toward the highest chroma chip in that level. Find the two chips whose chromas bracket that of the sample. Estimate its relative chroma as, say, three-quarters of the difference from the /6 chip to the /8 chip, or at /7.5, remembering that successive chips are two chroma steps apart. The full Munsell notation of this sample is 6.5R 5.6/7.5.

Tolerances can also be set using the charts in the *Munsell Book of Color.* For example, a sample whose Munsell hue is 7R could be designated to have a fairly tight hue tolerance of 6R-8R, or an even tighter tolerance set at 6.5R-7.5R. Value and chroma tolerances can be set by the same method.

From this presentation, it became evident that the *Munsell Book of Color* can be used as a color measuring instrument by those who master it whereas others without it would have to use a much more costly optical instrument such as a colorimeter or spectrophotometer.

Participants in the workshop received a copy of a schematic diagram illustrating the six levels of accuracy of color designation of the Universal Color Language (UCL). This diagram shows how the UCL is the key to unlocking and understanding how toenter into any color system. It consists of six levels of color designation, ranging from the least precise which is level 1 through the most precise at level 6. To illustrate how it works – at level 1 a color might be called simply "brown." At level 2, the color is further described as "yellowish brown," while at level 3 it is again redescribed more precisely to be "light yellowish brown," as represented by ISCC-NBS centroid color No. 76. Then at level 4 the color is designated as being close to Munsell color chip 10YR 6/4. Level 5 provides a more precise color notation with an interpolation of the Munsell notation to 9.5YR 6.4/ 4.25 – a notation based on a half hue step, a 0.1 value step and a 0.25 chroma step. At the most precist level, No. 6, the Munsell notation is more precise with an interpolation which is based on 0.1 hue step, 0.0_5 value step and 0.1 chroma step to appear as 9.6YR 6.4_5/4.3. As an alternative at level 6 the color may also be designated mathematically in the CIE (International Commission on Illumination) notation on the basis of spectrophotometric analysis of the sample, whose chromaticity coordinates (x and y) and daylight reflectance (Y) are, x = 0.395, y = 0.382, and the relative luminance Y = 35.6%.

One of the "best buys" in the color field must be a combination offer available from our own government – the National Bureau of Standards (NBS) Special Publication (SP 440) *Color: Universal Language and Dictionary of Names,* together with the *ISCC-NBS Centroid Color Charts* (SRM 2106) which are both available as a combined set under the designation SRM 2107. These can be obtained from the Office of Standard Reference Materials, NBS, Washington, D.C. 20234 for $19.00. Two hundred and fifty one color chips come with the combined set and there is a Munsell notation for each chip. With these resources the newcomer, as well as the more experienced user, has a key to enter the world of color.

Several other currently available color sources were mentioned during the workshop, such as the Consumer Color Charts, the Munsell Color Cascade of strong chroma samples, and the Standard Safety Color Code Charts. The Standard Safety Color Code Charts are available for $18.00 the set from Lee E. Metcalfd, MTH-21, U.S. Department of Transportation, Washington, D.C. 20950. A Munsell Color Catalogue may be obtained from Munsell Color, 2441 N. Calvert Street, Baltimore, Maryland 21218. Large sheets of Centroid Colors can be purchased from Hale Color Consultants, 1220 Bolton Street, Baltimore, Maryland 21217. This ninety minute workshop did not get into a detailed discussion of the recently released *Uniform Color Scales,* obtainable from the Optical Society of America, 2000 L Street N.W., Washington, D.C. 20036 on a very limited basis.

Mr. Kelly's workshop provided an opportunity for the novice to see samples from other color-order systems, to see the Munsell Color Solid and to learn how it was constructed, and to understand how the Universal Color Language could act as a key to understanding many color designations. He also showed that the combined set of *Color – Universal Language and Dictionary of Names* and the *ISCC-NBS Centroid Color Charts* could provide a central "most typical" representation for the color designated as well as a key to where a specifically named color could be found in a given color system. As always, the workshop under Kenneth L. Kelly was given with wit, wisdom and above all with a vivid sense of the wonderful world of color which its participants could retain as visual images. It clearly demonstrated that there are abundant basic references available for orienting the newcomer to the color field whose needs do not require (or whose financial resources or geographic locations do not permit) access to advanced laboratory instrumentation.

FUTURE MEETINGS

ISCC Annual Meetings

1979: April 26-27 – Roosevelt Hotel, New York, N.Y.
1980: April 21-22 – Rochester, N.Y.

Williamsburg Conferences

1979: February 11-14
1980: February 4-6
1981: February 9-11

American Society of Interior Designers

1978: Washington, D.C. – July 22-25, 1978

Graphic Arts Technical Foundation

1978: La Quinta, CA, September 28-October 1

The American College of Prosthodontists

1978: Las Vegas, Hotel Sahara, October 16-22

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 to 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 of 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.

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

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