

Inter-Society Color Council *Newsletter*

NUMBER 193
March - April 1968

ANNUAL MEETING ISSUE

UNUSUAL ANNUAL MEETING

The thirty-seventh annual ISCC meeting, held in New York City in April, was extraordinary and stimulating. Its flavor has been captured in a report written by W. J. Kiernan for Applied Optics. For the benefit of those who were not able to attend, parts of his report are reproduced here with the kind permission of Mr. Kiernan and Patricia R. Wakeling, editorial consultant to Applied Optics.

"The program, crammed with the dizzying number of unusual events, was an interesting digression from the norm. Color was explored in the fields of teaching, designing, art, and merchandising. Creators of the new art forms, 'Kineticism' and 'Luminism', spoke about their work. The prospects of collaboration between artists and engineers through the medium of E. A. T. (Experiments in Art and Technology) was described by the president of E. A. T. Honorary members of the ISCC were greeted at a reception and each awarded a handsome certificate. The voting delegates of the Member-bodies of the ISCC met with its officers at a luncheon. A crashing climax at the banquet showed programmed color in light in a multi-media environment with a background of electronically produced music. And with all of these exciting events, the Council still squeezed in its Annual Business Meeting, and the backbone of its technical efforts, the Problem Subcommittees Meetings.

"Six of the Problem Subcommittees met on the first day with the usual overflowing audiences. The problems discussed included: standard methods for mounting textile samples for colorimetric measurements; procedures and material standards for accurate color measurement; catalog of color measuring instruments; determination of the strength of colorants; metamerism index; and color in the building industry. It is expected that meetings of the other subcommittees, which did not meet during this session because of the lack of time and space, will be called by their respective chairmen during the remainder of this year.

"After a delightful luncheon scheduled to enable new officers and new voting delegates to get acquainted with each other, the afternoon was devoted to a 'Forum on Designing and Merchandising', with Dorothy Nickerson presiding. Mr. Guy Cattegno, Schools of the Future, presented a talk on 'Subordinating Teaching to Learning Through the Use of Color.' Mr. Cattegno's method, by the selective use of color for vowels and consonants, with each color assigned to a particular phonic, was said to speed up the learning of reading in the primary school grades. During her presentation on 'Coloring Your Thinking', Mrs. Mary Joan Glynn, Vice-President and Product Styling Director of Doyle Dave Bernbach, showed many examples of the promotional use of color in magazines and on TV. One gathered that the commercials shown on TV were the only creative aspect of TV and her enthusiasm for this subject was sufficiently stimulating to make one hasten to buy a color TV set. Mrs. Lillian Barber, an Interior and Lighting Designer, illustrated her talk on 'Color and Lighting Techniques for Contract and Residential Areas' with many examples of these techniques applied to the home and office. Mr. Herbert Aach, a teacher and painter, spoke on 'Color and Color Lighting in Art', indicating through extensive numbers of slides how modern painters are relying on color to present abstract images to the viewer. Examples of his own work, created with fluorescent pigments were particularly effective in daylight and UV black light environments. Short talks were then given by Miss Jeannette Wright, 'Upholstery, Drapery, Carpets'; Miss Mary C. Healy, 'Paints'; Mr. Bill Start, 'Bed and Bath'; Mrs. Melba Hobson, 'Fashions -- Men and Women'; Miss Mary Kay McAllister, 'Cosmetics -- Men and Women'; Mr. Karl Fink, 'Packaging'; and Mr. Arthur Groth, 'Automotive'. If their predictions come true, men and women will colorfully dress alike and enhance their body colors with cosmetic paints. The more conservative members of the Council indicated a liking for more color in the home and office, but exhibited some dismay at the predictions of the color-painted, look-alike characteristics of the two sexes.

"In the evening a reception was given to a group of Honorary Members, many of whom are also long-time members of OSA. On Tuesday morning the regular business session of the Council included reports by the President, Secretary, and Treasurer. Two new Member-body societies joined the Inter-Society Color Council, The American Society of Photogrammetry and the Institute of Food Technology, making a total of thirty-one. The Detroit Color Council became the Council's first sustaining member. The activities of

the various subcommittees on problems were summarized by Roland E. Derby, Jr., chairman of the Standing Committee on Problems. A new subcommittee has been formed, No. 31, 'On a Wider Promulgation of the ISCC-NBS Color System', with Ralph Evans as chairman. Some of the reports of the delegations from Member-bodies usually prepared by their chairmen were summarized and given orally. These delegation reports were from the Color Marketing Group, Gravure Arts Technical Foundation, Institute of Food Technology, American Ceramic Society, and the Optical Society of America. The activities of the International Color Association, in which the Inter-Society Color Council represents the United States as one of the nine founder countries, was reviewed by its first president, Prof. W. D. Wright, Imperial College of Science and Technology, London. Dr. Ernst Ganz of Switzerland is the secretary and treasurer. Dr. Gunnar T. J. Tonnquist of Sweden is vice-president. He is making arrangements for the first meeting of the Association which is likely to be held in Sweden, May or June, 1969. It is interesting to note that all of these officers are also members of the Inter-Society Color Council.

"Following the close of the business session, a symposium under the chairmanship of Karl Fink continued the exploration of the inter-relationship of color and new art forms. First, Dr. J. Wilhelm Klüver of the Bell Telephone Laboratories, Incorporated, president of E.A.T. (Experiments in Art and Technology) spoke on the prospects of collaboration between artists and engineers. This subject, treated many times on a theoretical level, now has reached the practical level of 'Do-it-yourself' stage. Dr. Klüver demonstrated that E.A.T. is acting as a 'matchmaker' for inventive technologists and creative artists who together are producing new art forms uniquely expressive of today's world. Art historian Willoughby Sharp presented a demonstration with slides and films simultaneously projected on five large screens, attempting to show some of the background of the current interface between art and science. For background effect, the sound on tape was of social significance but perhaps only remotely related to the subject. It was a test of one's mental agility to concentrate on a social message through the impact of sound and to absorb the visual impact of the five projected messages. Having thus introduced the subject of 'Kineticism and Luminism: An Introduction to the Art of Light and Movement', three leading creators of these new art forms spoke about their work and the important influences on them. Hans Haacke, a sculptor, specializes in making things which react and change to their environment. Earl Reibacke, a nuclear engineer, showed the color effects produced by rotating polarized light reflected from plastic surfaces and transmitted through crystal formations. Otto Piene, a fellow at M.I.T.'s Center for Advanced Visual Studies, demonstrated his specialty of light sculpture and projected, programmed light manifestations, closing the symposium with the generation

of ideas for creative artistic color and light decoration for home and office.

"At the banquet, having a magnificent decor arranged by a committee headed by Miss Midge Wilson, Color Association of the United States, the incoming president, Dr. Fred W. Billmeyer, Jr., paid tribute to the Honorary Members through whose efforts the Inter-Society Color Council has remained a viable organization in its thirty-seven years of existence. The evening closed with a demonstration by Tony Martin, of New York University, of his techniques for scoring or noting and programming colored light, in conjunction with electronically produced music. The projected light, with some slides and film, was shown on six large screens, three being at right angle to the other three, together with enveloping light on the ceiling, floor, and audience. This presentation will not readily be forgotten, nor will for that matter the unusual character of the thirty-seventh Annual Meeting."

NEW MEMBERS

The following applications for individual membership were accepted at the last meeting of the Board of Directors held in New York City on April 7, 1968.

Individual Members and their Particular Interests

Mr. Bill Amis
P.O. Box 447
Lakeland, Florida 33801

Preparation and control.

Mrs. Josephine Brennan
12 Englewood Road
Baltimore, Maryland 21210

Production and maintenance of color standards; color measurement; color control; uses for color standards.

Mr. John A. Callahan
Bausch & Lomb Co.
Applications Lab.
635 St. Paul Street
Rochester, New York 14602

Fluorescent materials; obtaining their spectrophotometric curves and proper interpretation of the curves.

Mr. K. S. Campbell
North Carolina State University
Dept. of Textile Chemistry
Box 5006
Raleigh, North Carolina 27607

Textile dyeing, color match prediction.

Mr. Edwin Freedman
Univac
P.O. Box 8100
Philadelphia, Pennsylvania 19101

Color as related to control and instrumentation.

Mr. Clayford T. Grimm
Clay Products Association of Southwest
P. O. Box 1726
Austin, Texas 78767

Specification standards for brick colors.

Mrs. Lucille A. Houck
1417 Cedarcroft Road
Baltimore, Maryland 21212

The use of color in the human engineering sense, in particular, to learn more about the inter-action of color and effects of the surround on the perception of color. Also color instrumentation.

Mr. William Karp
31 Truesdale Place
Yonkers, New York 10705

Translation into color merchandising concepts.

Mrs. Margaret B. Krampf
Corning Glass Works
Corning, New York 14830

Glass decorating.

Mrs. Karin Lifmann
2810 North Glade Street, N.W.
Washington, D. C. 20016

Problems of design and color coordination in specifying architectural finishes and materials. Effect of various types of lighting on color.

Miss Regina Lindemann
Benjamin Moore & Co.
548 Fifth Avenue
New York, New York 10036

Painting and decorating.

Mr. Bernard G. Murray
4150 E. 56th Street
Cleveland, Ohio 44105

Quality control application of computer technology to color matching and control. Technical service to plastic industry.

Mr. Gorman L. Quinn
236 Prospect Drive
Wilmington, Delaware 19803

Measurement and quality control, some work in theory.

Mr. F. J. Sarknas
Westinghouse Electric Corp.
P. O. Box 8608
Pittsburgh, Pennsylvania 15221

We are considering the development of an instrument that measures color.

Mr. Harry B. Smith
Odhams (Watford) Ltd.
St. Albans Road
Watford, Hertfordshire, England

Colour reproduction, control and measurement in the graphic arts (photographic, painting, and paper).

Mr. Arnold L. Spear
15 Dartmouth Drive
Plainview, New York 11803

Color communication and standardization together with the application of color technology to the graphic arts.

Mr. Oliver A. Watkins
8309 Nunley Drive
Baltimore, Maryland 21234

Mastering the tools of the trade to specify predictable affective aspects of color surround.

Miss Jacqueline Welker
PPG Industries
235 E. Pittsburgh Avenue
Milwaukee, Wisconsin 53204

Instrumental color formulation and control - establishment of representative standards and reproducible testing procedures in the control of color. Metamerism and geometric metamerism - causes, effects and prevention.

OBITUARY -- HARRY J. KEEGAN

Professor Harry J. Keegan, an individual member of ISCC, passed away in Clemson, South Carolina on April 19.

Professor Keegan, who had served as a Physicist at the National Bureau of Standards from 1921 until his retirement in 1966, was the Joseph E. Sirrine Guest Lecturer in Textile Science at Clemson University. He was the first faculty member in Clemson's School of Industrial Management and Textile Science to be awarded the Sirrine Professorship, established through the J. E. Sirrine Textile Foundation, Inc.

At Clemson Prof. Keegan was responsible for the establishment of a color measurement laboratory which was equipped with a large array of measuring instruments commonly used in the textile industry, and worked towards establishing a color clinic which would be available to professional personnel in textiles and related industries. He organized and taught courses in color instrumentation and the principles of color measurement and organized Clemson's color measurement seminar.

At the time of his retirement from NBS, Prof. Keegan was coordinator of the NBS-ARPA (National Bureau of Standards - Advanced Research Projects Agency, DOD) Infrared Optical Measurements Program. Prior to that he was supervisory physicist in charge of spectrophotometry research. His most notable contributions were the standardization of safety colors and particularly National School Bus Chrome and colors for marking physical hazards; use of reflectance data for photo-interpretation of earth and planetary scenes; and development of a procedure used extensively in industry for diagnosing sources of errors in spectrophotometers equipped with computers for automatically yielding color data. He had served as chairman of the color definitions subcommittee to the Safety Color Code Committee of the American Standards Association.

Prof. Keegan received his Bachelor of Mechanical Engineering degree from George Washington University in 1940, and served as a lecturer in mechanical engineering there for six years. He taught courses in infrared technology at the University of Michigan and in spectrophotometry for the General Electric Company's Color Measurements Courses.

The author of numerous articles and papers on spectrophotometry and colorimetry, Prof. Keegan was a Fellow of the Optical Society of America, the Washington Academy of Sciences, and the American Association for the Advancement of Science. He was a member of the American Institute of Physics, the Society for Applied Spectroscopy, the Society of Sigma Xi, and the National Geographic Society.

REPORT OF THE SECRETARY RALPH M. EVANS

During the year two new member bodies were elected to membership in the Inter-Society Color Council by letter ballot. They are the American Society of Photogrammetry and the Institute of Food Technologists. There are now 31 member bodies, 287 delegates, and 617 individual members. The names and interests of the individual members accepted during the year have appeared in the News Letter which followed the meeting of the Board of Directors at which they were approved.

The Secretary's office is pleased to announce the results of the recent election of officers. The ballots were counted in the Secretary's office on March 29 and the new officers and directors of the Inter-Society Color Council for a two-year term beginning April 9, 1968 are as follows:

President	Fred W. Billmeyer, Jr., SPE
Vice-President	Randall M. Hanes, APA
Secretary	Ralph M. Evans, SMPTE
Treasurer	Norman Macbeth
Directors	Karl Fink, PDC (2nd term)
	John Hanlon, AATCC
	William N. Hale, Jr., SPE
	Gunter Wysecki (IES)

According to the By-laws, the vice-president is the president-elect and succeeds to the presidency, and the retiring president (Warren L. Rhodes) automatically becomes a director for a period of two years.

These results were submitted officially to the Board of Directors at its meeting on April 7 and were announced officially to the membership at the business meeting of the Council.

REPORT OF THE TREASURER NORMAN MACBETH

The Treasurer submitted a report from Main LaFrentz & Co., accountants, who had examined ISCC records for 1967. This report, on file in the Secretary's office, is summarized as follows.

Balance Sheet as of December 31, 1967

ASSETS

Cash	
County National Bank	
Bowery Savings Bank	
New York Savings Bank	
Greenwich Savings Bank	\$19,619.90
Investments	3,864.47
Other Receivables	<u>576.81</u>
TOTAL ASSETS	<u>\$24,061.18</u>

LIABILITIES

Accrued Liabilities	\$ 1,028.00
Surplus	
Balance, January 1, 1967	
Deduct: Excess of Expenses over	
Income for the Year	<u>23,033.18</u>
TOTAL	<u>\$24,061.18</u>

Statement of Income and Expenses for the Year Ended December 31, 1967

INCOME

Dues	\$4,371.00
Publication Sales	1,387.68
Interest and Dividends	1,075.31
Other Income	<u>150.56</u>
TOTAL INCOME	\$6,984.55

EXPENSES

President's Office	139.47
Treasurer's Office	77.38
Secretary's Office	671.62
Newsletter	2,836.91
Special Publications	3,213.36
Contingency Fund	420.00
Cooper Union Museum	1,000.00

TOTAL EXPENSES 8,358.74

EXCESS OF INCOME OVER EXPENSES 1,374.19

1967 Budget Analysis

	<u>Budget</u>	<u>Actual</u>	Under or (Over) <u>Budget</u>
President's Office	300.00	139.47	160.53
Treasurer's Office	125.00	77.38	47.62
Secretary's Office	150.00	671.62	(521.62)
Newsletter	2,750.00	2,836.91	(86.91)
Special Publications	1,900.00	3,213.36	1,313.36
Annual Meeting	800.00	(149.18)	949.18
Cooper Union Fund	1,000.00	1,000.00	-
Contingency Fund	500.00	420.00	80.00
TOTALS	<u>7,525.00</u>	<u>8,209.56</u>	<u>(684.56)</u>

I. H. Godlove Award Fund

Statement of Receipts and Disbursements for Year Ended December 31, 1967

Balance, January 1, 1967	\$1,047.97
Receipts	<u>25.00</u>
	1,072.97
Disbursements	<u>20.00</u>
Balance, December 31, 1967	<u>\$1,052.97</u>

REPORT OF THE FINANCE COMMITTEE NORMAN MACBETH, CHAIRMAN

In its budget for the calendar year, 1967, the Finance Committee estimated an excess of Expenses over Income in the amount of \$1,484. The actual loss in operations of the Inter-Society Color Council amounted to \$1,375.

For 1968, it would appear that the Income could be estimated to be approximately \$6,000, and the Expenses approximately \$9,397. Thus, the Finance Committee recommends to the Board of Directors that the Inter-Society Color Council operate at a loss of approximately \$3,400 because of extraordinary budgeted expenditures.

The Finance Committee recommends to the Board of Directors of the Inter-Society Color Council the following budget:

ESTIMATED INCOME

Membership Dues -	
A. Individual Members	\$3,366.
B. Member Bodies	1,085.
C. Newsletter Subscriptions	164.
Publication Sales and Royalties	400.
Interest and Dividends	<u>990.</u>
TOTAL ESTIMATED INCOME	<u>\$6,005.</u>

ESTIMATED EXPENSES

President's Office	\$ 500.
Secretary's Office	300.
Treasurer's Office	150.
Newsletter	2,500.
Special Publications -	
A. Membership List	\$1,000.
B. Special Publications,	
Other	<u>500</u>
Annual Meeting (Net Expense over Income)	1,500.
Special Printing Costs for new ISCC Symbol	2,387.
Preliminary Expenses, Color Vision Symposium, Feb. 1969	300.
Honorary Membership Forms	<u>260.</u>
TOTAL ESTIMATED EXPENSES	<u>\$9,397.</u>

The recommended deficit for the year, 1968, is approximately \$3400.

The Finance Committee wishes to indicate to the Board of Directors and the voting delegates that because of delays in expenditures appropriated in the form of budgets, accumulated Surplus can be depleted for special items formerly budgeted and planned for actual completion during 1968.

The Finance Committee requests the approval of the Board of Directors for this budget and further requests the approval of the voting delegates, attending the annual meeting.

REPORT OF MEMBERSHIP COMMITTEE WALTER C. GRANVILLE, CHAIRMAN

Earlier this morning the Secretary announced the election by letter ballot of two new member-bodies, the American Society of Photogrammetry, which is concerned with aerial mapping, and the Institute of Food Technologists, who have affiliated with us because of their interest in the color of foods. On behalf of the membership committee, may I welcome these two groups as our 30th and 31st member-bodies.

Although your chairman has been diligently pursuing his responsibility during the past year, he can take little

credit for these good results and I think you should know who is really responsible. For the Institute of Food Technologists Professors Gordon MacKinney, F. J. Francis and Angela C. Little have worked hard for several years to convince their group of the merits of affiliation with the Council. If any of them are present, will they kindly stand and be recognized.

Our contact with the American Society of Photogrammetry was initiated by Mr. Kenneth L. Kelly, long time individual member and delegate with the Council. The usefulness of the affiliation is already evident since their new Manual on Aerial Color Photography contains a set of the ISCC-NBS Centroid Colors. Ken, will you please make a visual noise so that the others can join with me in expressing appreciation to you.

I hope that all members and delegates will continue to be alert to new prospective member-bodies and to help us to keep up the good record.

BUSINESS SESSION

The report of the Treasurer and of the Finance Committee, which was presented by Mr. Norman Macbeth, was acted on favorably by the Board of Directors at its April 7 meeting with the recommendation that the voting delegates act favorably on these two reports. Mr. Macbeth made the motion that these reports be accepted. The motion was seconded and carried unanimously.

The next annual meeting will be held in New York City at the Statler Hilton Hotel on Monday and Tuesday, April 14-15, 1969.

REPORT OF THE PROBLEMS COMMITTEE ROLAND E. DERBY, JR., CHAIRMAN

This report summarizes the activities and status of the various problem subcommittees.

The various chairmen are to be commended on their progress on these complex problems.

Problem 7 - Survey of Color Specifications Robert F. Hoban, Chairman

This committee did not hold a meeting in April due to a conflict with the special program. However, considerable progress has been made towards updating the material in the 1955 report and revising the format.

Problem 10 - Color Aptitude Test Forrest L. Dimmick (deceased) and Carl E. Foss, Co-Chairmen

This committee was ably led by the late Dr. Forrest Dimmick, and by Mr. Foss since its inception in 1940. The Color Aptitude Test devised by this committee has had sales of several hundred copies.

In 1964 a second edition was prepared. Dan Smith should receive special mention for assuming much of the burden of actual production and for checking the colorimetric values of this second set.

Dr. Dimmick continued to gather test data and correlations up until the time of his death.

This subcommittee is in the process of being reorganized. Angela Little of the University of California has consented to undertake the chairmanship.

The subcommittee will consider new directions and attempt to answer a few unresolved questions such as:

- 1) What do the various color discrimination tests really test?
- 2) Why is there a low correlation between the F-M100 hue test and the ISCC-CAT?
- 3) Do any of the tests measure innate ability? How are the results affected by training and experience?
- 4) Would a Hue Discrimination Test patterned after the present Saturation Discrimination Test correlate with ISCC-CAT, F-M100, or neither.
- 5) How valid are the present tests in predicting ability to meet specific job requirements?

Problem 16 - Standard Methods of Mounting Textile Samples for Colorimetric Analysis William Matthews, Jr., Chairman

An interim Report detailing several methods has been submitted to the Board of Directors and the member-bodies of ISCC. They have approved the report in substance. Upon editing by the Problems Committee Chairman, as suggested by various reviewers, this report will be published by the American Association of Textile Chemists and Colorists.

The future work of the subcommittee will consist of gathering and evaluating new methods which may be added as supplements to this Interim Report.

Problem 18 - Colorimetry of Fluorescent Materials Franc Grum, Chairman

Due to a change of responsibilities, Dr. Eugene Allen felt it necessary to resign. He is to be especially commended for his work on this committee in directing it to a reassessment of the proper goals. The ISCC is very fortunate in obtaining a man of Franc Grum's background to undertake future committee direction.

A meeting of the new committee will be held at the Eastman Kodak Research Laboratories on May 27, 1968. The Agenda of this meeting, summarized below, indicates the future direction this subcommittee will take.

AGENDA

- 1) Resume of the minutes from the last meeting.
- 2) Review of the objectives of the subcommittee.
(Dr. E. Allen)
- 3) Report on the interlaboratory tests of three samples as a part of the Problem 18 study of measurement of fluorescent samples. The report will contain:
 - a) Analysis of data.
 - b) Problems observed.
 - c) Recommendations and conclusions.
- 4) Report on measurement and evaluation of highly chromatic fluorescent samples.
- 5) Report on other committees' activity on similar problems.
 - a) A. Stenius' recommendation for fluorescent standards.
 - b) Report from ASTM Subcommittee T-5 and TG-5.
(Dr. P. Stensby)
 - c) Problems presented to this subcommittee by the Chairman of TAPPI optical properties committee.
- 6) New Business:
 - a) Adaption of testing procedure.
 - b) Publication of findings.
 - c) Another extensive inter-laboratory test using also paper samples.
 - d) Next meeting and proposals to bring the problem to an acceptable conclusion.
 - e) Any other matter that may come up from the participants.

Problem 21 - Standard Practice For Visual Examination Of Small Color Differences.

Sam Huey, Chairman

A revised report has been submitted to the ISCC Board of Directors for approval. I would like to thank Sam Huey for an excellent job in assembling in this report a distillation of many divergent views.

Problem 22 - Procedures and Material Standards for Accurate Color Measurement

Dr. Fred Billmeyer, Jr., Chairman

At the subcommittee's 1968 meeting, a preliminary written report (not given here because of its length) on Round-Robin II, "Rigorous Calibrating and Operating Procedures for the GERS," was distributed and discussed. The data will require considerable further study before a final report is written, but several conclusions of considerable value to users of this instrument were drawn. It is anticipated, also, that specifications for certain new material standards useful for

implementing the calibration and operating procedure can be drawn up.

Separate publication of the "Procedures" was considered, and the subcommittee authorized the Chairman to proceed with such publication, subject to ISCC regulations on the matter.

Round-Robin II is now considered complete, and the samples will not be circulated further. Owners of GE Spectrophotometers not participating to date were urged to sign up for Round-Robin III.

A draft set of instructions for Round-Robin III (all full and abridged spectrophotometers) was circulated and discussed. (Subsequent to the meeting, this draft was recast in final form and samples were selected, so that this Round-Robin can get underway without delay).

Similarly, draft instructions and color-difference samples for Round-Robin IV (color difference with colorimeters or spectrophotometers) were exhibited and discussed.

Presently available material standards for calibrating colorimeters and spectrophotometers were briefly summarized and discussed. There was no new business.

Problem 24 - Catalog of Color Measuring Instruments Ruth M. Johnston, Chairman

Information on most of the colorimeters and spectrophotometers made or sold and serviced in the United States has now been collected. During the past year, a special editorial subcommittee met for a day at the National Bureau of Standards to discuss some of the details of the preparation of the report. Members unable to attend sent their criticisms of the first revision of the introductory material. All of these were considered in addition to the criticisms of the members present. In general, the editorial subcommittee reached the conclusion that the introductory remarks should contain information that will assist the reader in evaluating his color measurement problem and relating it to the instrument features necessary for a successful resolution of his problem. In this way, critical comment on the virtues of particular instruments can be avoided.

It was also felt that such a thorough discussion of instrument design characteristics which must be considered when selecting an instrument for various types of measurement of importance in the solution of problems associated with color does not exist in the literature today, so that an important need will be filled by presenting such an analysis. The discussion of each individual instrument can then be brief and include only explanatory remarks which cannot be summarized in a table of instrument characteristics. In keeping with this change in emphasis, it is the committee's opinion that the title of the report should probably be changed

to: "A Guide to the Selection of Color Measuring Instruments".

It is hoped that the first report will be completed by the Fall of 1968.

Problem 25 - Determination of the Strength of Colorants
Charles G. Leete, Chairman

At the April meeting the subcommittee made the following decisions:

- 1) A proposed standard format for listing methods for strength determinations was discussed and accepted.
- 2) A spectrophotometric method for dispersed dyes using the Standard format was discussed. The method with suggested changes will now be reviewed with the company submitting the procedure. The revised method will then receive final review by the committee.
- 3) It was decided that meeting once a year was not sufficient to make enough progress in our work efforts. Therefore, a tentative meeting was scheduled for sometime in September in the New Jersey-New York area. During that meeting we would hope to accomplish the following:
 - a) Review the revised method on disperse dyes.
 - b) Concentrate a major effort on defining "strength of colorants". It is the hope of the committee that anyone wishing to express his views on this matter will try to attend and be prepared to discuss his views.
 - c) Hear and discuss a status report of the Dry Color Manufacturers' Association on their proposed method on pigments for printing inks.

An announcement of the meeting will be made in the ISCC Newsletter once a firm date and location is selected.

Problem 27 - Metamerism Index
Isadore Nimeroff, Chairman

Since the first meeting of the subcommittee, the general metamerism index group examined the colorimetric characteristics of eleven sets of metameric samples. Most of these sets consist of two samples, but some consist of three and four samples. A complete analysis of these data was given as the first progress report from the subcommittee. In the sets of samples with more than two metameric pairs, the metameric indexes, computed by the Nimeroff-Yurow method, are consistent with the magnitude of spectral mismatches.

The Chairman of the group on the special metamerism indexes reported that it was waiting for the general metamerism index group to complete at least the first phase of its work.

At the meeting the discussion ranged over a wide variety of topics. First, there appeared to be some criti-

cism of the procedure followed by the subcommittee in considering the general metamerism index before special metamerism indexes. It was pointed out that the subcommittee intends to advance both activities simultaneously.

The discussion then covered directly related topics of the relationships between source, observer, and specimen metamerism. It was agreed that these should be part of a general metamerism procedure.

The discussion then moved to indirectly related topics of color rendition, color-constancy index.

The general metamerism group will continue to seek metamerism sample sets. The special metamerism index group will attempt to correlate these rankings with metamerism indexes obtained by any special metamerism index procedure.

Problem 30 - Color in the Building Industry
Milo Folley, Chairman

This subcommittee, whose unique function is to coordinate and apply color science to color problems in the building industry, is actively concerned with application of Munsell notation to color specification problems in this industry.

They are also considering several films to enhance color education in this field. Particular emphasis is placed on the use of the concept of a Universal Color Language as detailed in the work of Kenneth L. Kelly. This procedure is an outgrowth of the procedures recommended by Subcommittee 2 on Color Names. It is also based on the availability of the ISCC-NBS centroid colors.

New Problems

A new problem was suggested to the Board of Directors by Ralph Evans. It was tentatively approved, subject to preparation of a detailed scope. The essence of the problem is to promote the wide use of the ISCC-NBS centroid colors.

The purpose of the group is to consider, with color manufacturers, ways and means of making approximate sets of the centroid colors available in as many media as possible, these being slanted, at the start at least, toward those useful in home craft work.

An objective would be to produce a form of the standard colors themselves, perhaps similar to the Nickerson fan, which would simplify assigning an ISCC number to any given color.

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

During the past year, the A. A. P. L. has had research and development work going in six areas, including

architecture, education, automotive, light-fastness of colors, a new type of paintbrush, and automation of designs and colors for textiles.

Some of our editorial material has been reproduced in the USCC News Letter, and it seems to have started a rather lively discussion.

One of our functions is to report to artists on all new products, new processes, and new instruments of potential importance to the graphic artist.

Two reasons why the ISCC is valuable to us is its continual search for technical improvement, and its insistence on relating technology to practical realities of applying color.

REPORT FROM THE AMERICAN INSTITUTE OF INTERIOR DESIGNERS DELEGATES, BEATRICE WEST, CHAIRMAN

The American Institute of Interior Designers reports on a very colorful year for 1967. Color provided the eye-catching appeal in Chapter projects in every region. These involved historic restorations, shows with museums, designers' Ateliers, student design competitions, International design conclaves, television projects with local service organizations, designer-craftsmen shows, Governor's mansions and other governmental structures -- all of which greatly influence the awareness of color in homes and industry.

The A.I.D. made a substantial gift to the Committee to Rescue Italian Art after the disastrous floods in Florence.

Of special interest for some time has been the restoration of the Lockwood Mathews Mansion in Norwalk, Connecticut. This 40-room mansion was the first great house in the United States, having been built prior to those on 5th Avenue, New York and in Newport, R.I.

Several A.I.D. members have been retained to do specific buildings in the Hemisfair in San Antonio, Tex. The Philippine Restaurant is in tones of green, gold, and other earth colors. The restaurant is in an old Victorian building which existed on the Fair site. Therefore, it was quite a challenge to give it a modern, exciting flavor without clashing with the architecture. To do so effectively, the designer resorted to up-to-date colors and combination of colors. Color, therefore, was the main consideration in the decoration. Also, at the Hemisfair in San Antonio, another member of the A.I.D. was retained by the City of San Antonio, to pass on all material and colors for all of the permanent buildings of the Hemisfair. Unlike the New York World's Fair, most buildings at the Hemisfair are being retained. Among these are Texas Culture Building, Convention Center, Women's Pavilion, the United States Building, and Confluence Theatre.

Other members of A.I.D. are involved in educational programs on the College level, where color is a fund-

amental part in the teaching of environmental design. Other A.I.D. members are involved in the color styling of manufacturers' products and in the specifications of building materials and colors for architects and builders.

Among the A.I.D. International Design Awards were Callaways hand-made area rugs, Kismet bedspreads, and Boris Kroll fabrics, woven by traditional jacquard methods in man-made fibers. Breneman Window Shades, Inc., was cited for "co-ordination of shade colors and paints to provide matching walls, and design of color wheel selector to give 3 possible room schemes for each basic shade color." It appears that no basic color scheme or colors were favored for 1967 -- ANYTHING GOES!

REPORT FROM AMERICAN OIL CHEMISTS' SOCIETY DELEGATES, A.G. PAYNE, CHAIRMAN

The FAC Colors Subcommittee of the Commercial Fats and Oils Analysis Committee has under consideration the question of whether to broaden the choice of permissible sources of illumination for use with the new solid glass FAC color standards. The A.O.C.S. Official Method Cc13a-43 currently specifies the use of a day-light type fluorescent light.

No new color problems were undertaken during the year.

The following articles were published in the Journal during the past year:

Cartenoid Pigments of Peanut Oil
Pattee, H. E. and Purcell, A. E.; JAOCS 44, 328-330 (1967)

Whiteness and Fluorescence of Fabrics
Nieuwenhuis, K. J.; JAOCS 45, 37-42 (1968)

Color Problems in Oils from Safflower Varieties
Burkhardt, H. J.; JAOCS 45, 96-99 (1968)

REPORT FROM THE AMERICAN PSYCHOLOGICAL ASSOCIATION DELEGATES, JO ANN KINNEY, CHAIRMAN

The first part of my report from the American Psychological Association consists, as usual, of a summary of research on color vision by psychologists during the past year. Our delegates to the ISCC from the APA, a particularly active group, continue to add considerably to our knowledge of color vision.

I mentioned last year that the electroretinogram has been freed from its bonds of rod domination by a number of interesting methodological and technical advances, thus becoming a useful tool for the study of color vision. One complete session of the annual meeting of the New England Psychological Association in 1967 was devoted to this topic. The session, entitled

"Recent Advances in Electrorretinography" featured papers by a number of psychologists, all of whom are now using the ERG to study color vision.

Our own APA delegates in this field have added to the progress made. This year Dr. Riggs, at Brown University, has included the additional refinement of using the Stiles-Crawford effect to show cone functioning in the ERG. Also, Dr. Biersdorf has been able to reveal a complete Purkinje shift in ERG records to different intensities of illumination.

At the University of Pennsylvania, Drs. Hurvich and Jameson continue their active pursuit of knowledge concerning color. Both they and a sizeable number of graduate students have published papers. One, by Dr. Krantz, should be of particular interest to ISCC members since it compares the perception of color differences of small and large steps in the same experiment.

At the University of Rochester, Drs. Boynton and Kaiser have tackled the measurement of chromatic contrast by a new technique, that of determining the intensity required to produce a minimum border between two fields of different color. The results have interesting applications for heterochromatic brightness matching.

Our group at the Submarine Medical Center continues to study color vision. On the theoretical level we have been particularly interested in induced colors and their explanation. On the practical level our emphasis has been on the color vision of the diver: what he can see and how his perception is influenced by a completely blue-green underwater world. Two reports on the results of color vision testing with the Farnsworth Lantern are also now available.

In the second part of my report, I wish to raise a question concerning what I consider to be an interesting omission from the first part; that is, there are no data on the relation between personality variables and color. Can an individual's thoughts, motives, emotions, and performance be influenced by color in any predictable way? This aspect of color does not appear in the report of psychologists' activities, and yet it is one which the layman, at least, considers to be the most "psychological."

There are at least two possible reasons for this situation. First, it is conceivable that in the selection of psychologists to be delegates to the ISCC, we have chosen those with no interest in this field. This possibility I dismiss. I feel that our delegates adequately represent psychologists' interests and activities in the field of color--rather more than adequately, as I think I've indicated.

The second possibility is that there is no predictable effect of color--no lawful relation between color in general and human motivation--and psychologists have

long realized this and given up the field to those in marketing research who deal with specific applications of color to specific products. It may be that many of you will reject this possibility; if so, I hope you are goaded into action. Furthermore, I hope your action will be writing me of any evidence you have to the contrary. If you do, I promise to report on it to you at the next meeting.

Following is a list of reports by APA members on color during the past year.

William R. Biersdorf, Purkinje shift in the human electroretinogram. *Am. J. Ophthalm.* 64, 4, 757-760, 1967.

Robert M. Boynton and Peter K. Kaiser, Large and small chromatic differences assessed by a contrast matching technique. Paper presented to Optical Society of America, Washington, D. C., March 1968.

Leo M. Hurvich and Dorothea Jameson, Comment on "Saturation estimates and chromatic adaptation, by G. H. Jacobs," *Perception and Psychophysics*, 3, 11, 1968.

Dorothea Jameson and Leo M. Hurvich, Fixation-light bias: An unwanted by-product of fixation control. *Vision Res.* 7, 805-809, 1967.

Dorothea Jameson and Leo M. Hurvich, The science of color appearance. *Color Eng.* 5, 29-38, 1967.

Jo Ann S. Kinney, Color induction using asynchronous flashes. *Vision Res.* 7, 299-318, 1967.

Jo Ann S. Kinney, Induced colors seen by a deuteranope. *J. Opt. Soc. Am.* 57, 1149-1154, 1967.

Jo Ann S. Kinney and Jance C. Cooper, Adaptation to a homochromatic visual world. *NavSubMedCen, NavSub BaseNL, Groton, Conn., Rep. No. 499*, 28 July 1967.

Jo Ann S. Kinney, S. M. Luria, and Donald O. Weitzman, Visibility of colors underwater. *J. Opt. Soc. Am.* 57, 802-809, 1967.

D. H. Krantz, Small-step and large-step color differences for monochromatic stimuli of constant brightness. *J. Opt. Soc. Am.* 57, 1304-1316, 1967.

Kevin Laxar, Performance of the Farnsworth Lantern Test as related to type and degree of color vision defect. *Military Medicine*, Vol. 132, No. 9, 1967 (NSMC Rep. No. 504, Nov. 1967).

S. M. Luria, Color-name as a function of stimulus-intensity and duration. *Am. J. Psychol.* 80, 14-27, 1967.

Helen M. Paulson, The performance of the Farnsworth Lantern at the Submarine Medical Research Laboratory

and in the field from 1955 to 1965, NSMC Rep. No. 466, Jan. 1966.

Whitman A. Richards, S. M. Luria, and Halsey M. Matteson, Interacting spectral sensitivity functions obtained in a contrast situation. *Vision Res.* 7, 627-644, 1967.

L. A. Riggs and A. M. L. Schick, Accuracy of retinal image stabilization achieved with a plane mirror on a tightly fitting contact lens. *Vision Res.* 8, 159-169, 1968.

Charles E. Sternheim and Lorrin A. Riggs, Utilization of the Stiles-Crawford effect in the investigation of the origin of electrical responses of the human eye. *Vision Res.* 8, 25-33, 1968.

Donald O. Weitzman and Jo Ann S. Kinney, Appearance of color for small, brief, spectral stimuli in the central fovea, *J. Opt. Soc. Am.* 57, 665-670, 1967.

D. Yager, Behavioral measures and theoretical analysis of spectral sensitivity and spectral saturation in the goldfish, *carassius auratus*. *Vision Res.* 7, 707-727, 1967.

REPORT FROM AMERICAN SOCIETY FOR TESTING AND MATERIALS DELEGATES, GEORGE W. INGLE, CHAIRMAN

The variety and intensity of color-related activities in ASTM continue at surprisingly high levels. Most of these activities related to techniques of measurement and not specific material are in ASTM's Committee E-12 on "Appearance of Materials". Other related studies arise in ASTM Committees primarily concerned with particular materials. Foremost among these is Committee D-1 on Paint, Varnish, Lacquer and Related Products.

Within Committee E-12 itself, these actions are noteworthy:

- 1) Six ASTM methods of test directed to the U. S. A. Standards Institute for its adoption.
- 2) Analysis of the reactions of photographic scientists to the utility of E-12's Recommended Practice for Description and Selection of Conditions for Photographing Specimens.
- 3) Coordinating with U. S. A. S. I. and ISO (especially TC-61 on Plastics) in refining methods of test for color, including recommendations made at the 16th C. I. E. session in 1967.
- 4) Study of two proposed methods of test: "Measuring the Distinctness of Image Gloss of Metallic Surfaces" and the "Measurement and Calculation of Reflecting Characteristics of Metallic Surfaces using Integrating Sphere Instruments". Metal coated plastic specimens

are included. The color of gold surfaces and their standardization is under study, as are methods for financing a fellowship to encourage comparison of visual and instrumental parameters of the appearance of metallic surfaces.

5) Study of solar transmittance and reflectance of materials, especially plastics, as optical properties, excluding factors of structural orientation and of heating and cooling loads.

6) Preparation of a library of computer programs for Appearance Measurement.

7) Planning for three symposia at the June meeting of ASTM in San Francisco: Solar Transmittance and Reflectance, Monday evening, June 24; Appearance of Metallic Surfaces, Tuesday afternoon, June 25, and Spectrophotometry and Colorimetry, Tuesday evening, June 25.

In studying the optical properties of paint and related materials, Committee D-1 is emphasizing:

1) Revision of the method for Instrumental Evaluation of Color Differences of Opaque Materials, incorporating MacAdam and CIE UCS color space systems. A proposed method for establishment of color tolerances will be submitted prior to the June meeting.

2) Combining methods for hiding power of non-chromatic paints and chromatic paints.

3) Aluminum Pigmented Finishes; a paper on "Optical Properties of Nonleafing Aluminum Pigments" was scheduled for publication in the February issue of J. Paint Technology.

4) Adoption of a Method of Test for Instrumental Tinting Strength of White Pigments.

5) The development of a Method for Evaluating Change in Color, with a Gray Scale. This awaits background information on development and usage of similar scales in American Association of Textile Chemists and Colorists (AATCC) and the British Society of Dyers and Colourists. Interest in this type of method is indicated by the fact that AATCC sold 1,000 copies of the gray scale during the past year. Munsell Color Company sold a somewhat smaller number for use with ASTM Method D 2616.

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

We have frequently observed that the pulse of color is so pronounced and the reaction so personal that COLOR serves as an early and positive clue to changing tastes and conditions. This is evident in strong counter currents now at work. Extensions in the applications of color continue, in a frantic effort to match the pace of

our expanding world. A counter force brings a momentary pause, with emphasis on neutrals and primary colors, influenced to a great extent by this election year and the puzzlement of economic developments.

Having progressed to seasonless colors, we are now confronted with the dilemma of advancing styling schedules to accommodate for production in giant quantities, accompanied by new color trends for the sake of effective merchandising; and the attendant phenomenon of presenting colors to consumers in too rapid succession so that they don't have time to buy, absorb, and enjoy one color mood before we move to the next phase.

The second important development is the increased interest in trend colors in fringe areas - children's toys, greeting cards, eye glasses, cosmetics (including masculine products), wigs and wiglets, paper products. The importance of color coordination is particularly evident in men's wear, in which a full range of colors is now offered in all areas.

The Association's activities have been accelerated to meet the requirements of earlier styling in all fields. As the rest of the world turns to volume production, we find increased interest in our color forecasts and information on the developing color picture in the United States. It is gratifying to find the positive leadership which is exerted by United States stylists, who formerly were followers of European trends.

In cooperation with the Government, the Color Association has just issued the new DEPARTMENT of DEFENSE STANDARD COLOR CARD of OFFICIAL STANDARDIZED SHADES for SEWING THREADS and is preparing a supplement for the DEPARTMENT of DEFENSE STANDARD SHADES for BUTTONS color card.

**REPORT FROM THE FEDERATION OF SOCIETIES
FOR PAINT TECHNOLOGY DELEGATES,
S. L. DAVIDSON, CHAIRMAN**

The primary effort of this delegation has been the planning of another panel discussion for our annual meeting which will be held in New York City on Oct. 26, 1968 at The Americana Hotel. This will be called "Fundamentals and Problems of Color, Part III". The subjects to be covered by the panel will be Color Difference Terminology, Color Order Systems, Color Atlases, Computational Methods for Color Difference, and Acceptability versus Perceptability.

A reprint of Fundamentals and Problems of Color, Part II, was distributed to the members of the ISCC along with the paper by Miss Ruth Johnston and Mr. Richards, "P. P. G. Instrumental Control (ICC): Production Methods and Experiences", which had been

presented at the Williamsburg meeting by Miss Johnston.

Activities in the local societies continue with a paper presented by Mr. Saltzman at the Western Regional Meeting in Los Angeles. The New York Society conducted a basic course in the principles of Color Technology for 52 students in 1967 and is currently presenting the same course in 1968 for 42 students.

Articles on Color Published in The Journal of Paint Technology During 1967.

Allen, E. A. (1) "Analytical Color Matching" Vol. 39, #509 pp 346-354 June 1967.

Billmeyer, F. W. (1) "The Look and Think Steps in The Analysis of Color" Vol. 39, #509 pp 342-345 June 1967.

Boyer, W. L., Manassio, J. A., and Elm, A. C. "Accuracy of Hiding Power Determinations Based on The Kubelka-Munk theory" Vol. 39, #515, pp 763-768 Dec. 1967.

Daiger, W. H. and Madsen, W. H. "Chalk Fade Evaluation of Pigmented Finishes By Use of Instrumentation And Computer Analysis" Vol. 39, #510 pp 399-410 July 1967.

Davidson, H. R. (1) "Colorimetry" Vol. 39, #509, pp 355-359 June 1967.

Donoian, H. C. and Meddia, A. I. "Scattering and Absorption of Light by Carbon Black" Vol. 39, #515, pp 716-727 Dec. 1967.

Johnston, R. M. (1) "Spectrophotometry For The Analysis And Description of Color" Vol. 39, #509 pp 346-354 June, 1967.

Johnston, R. M. and Richards, T. D. (2) "P. P. G. Instrumental Control (I. C. C.): Production Methods and Experiences", Vol. 39, #509, pp 377-384 June 1967.

Mitton, P. B., Madi, A. J. and Rodi, J. W. "Development of a Test Method For Hiding Power" Vol. 39, #512 pp 536-543 Sept. 1967.

Orwig, R. B. "Color, Strength and Dispersability of Pigments By The Sherwin Williams Miniature Sand Mill" Vol. 39, #504 pp 14 Jan. 1967.

Ross, W. D. "Kubelka-Munk Formulas Adapted for Better Computation" Vol. 39, #511 pp 515 Aug. 1967.

Saltzman, M., and Keay, A. M. (1) "Colorant Identification" Vol. 39, #509 pp 360-367.

(1) Distributed as Reprint under title "Fundamentals and Problems of Color: II Analytical Aspects of Color"

(2) Distributed as reprint - Williamsburg Paper

**REPORT FROM THE ILLUMINATING ENGINEERING
SOCIETY DELEGATES,
NORMAN MACBETH, CHAIRMAN**

1967 was an interesting year for the lighting industry in general and especially for those of us interested in color and lighting.

This was primarily due to the meeting of the Commission Internationale De L'Eclairage in Washington, D. C. in June. This is the second time that the CIE has met in the United States and the first time in forty years.

Prior to the CIE Conference in Washington, the ISCC held its annual meeting in New York City, and we were fortunate in having a large number of the visitors from abroad who were interested in color attend the ISCC annual meeting. A special reception was held for these guests from abroad. A large segment of the members of the ISCC, interested in CIE activities, attended the Washington meeting, following the ISCC annual meeting.

A reasonably large portion of the CIE program at the Washington meeting was devoted to subjects related to color and colorimetry, involving the Colorimetry Committee, the Color Rendering Committee, and the Photometry Committee.

During the past year, four important papers relating to color appeared in ILLUMINATING ENGINEERING:

- 1) Color Acceptance Studies, Preliminary Report.
- 2) Color Flattery Index for Artificial Illuminants.
- 3) Color Rendering of White Light Sources, Inherent Efficiency.
- 4) Color Television, a Major Consideration in Lighting for Stadiums and Arenas.

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

In previous years we have tried to separate the color opinions of our membership by their areas of design activity - that is - Housewares, Furniture, Electronic Equipment, etc. There seemed to be a rather positive definition of color use between the various areas of color application.

However, this year it seems the differences between color use in the various product areas is not as definitive as in the past. The electronic equipment, formerly painted in hues and shades of grey, now sports far more color interest, and business furniture that formerly tended toward sombre color and wood finishes is sporting decorator type accent colors. The cookingware field is an outstanding area of new color use. Here, color has been unleashed to its full capacity to excite and create consumer interest.

Much of the added use of color in consumer products, like cooking equipment, kitchenware products, and even electronic gear has been brought about by a surprisingly high level of technical improvement in achieving color fastness and application at reasonable production cost, backed by good quality control. Consequently, we have not tried to edit the various comments from designers into product color use categories, except as the designers have done so themselves. We felt it would be more interesting to our Association Societies' memberships to see for themselves how each designer thinks of color in relation to his own practice and expressed as his own opinion about the use of color in industry and commercial products.

**HERBERT J. ZELLER, DIRECTOR OF DESIGN,
MOTOROLA, INC.**

As far as color is concerned in our industry, while we are continually striving to add excitement to our products through color, it is always a very difficult problem. We are probably using more color in television portable products that we have in the past, and most of these colors have been more to the green side, a modified interpretation of the popular Avocado. It has been interesting to us that while Avocado has been very popular in the small appliance market, it has had practically no acceptance in small radio and portable radio design. In stereo, with the exception of the small portable stereos, the colors have remained pretty much status quo.

We have been using accents of color throughout our total line, and these have been in the yellows, greens, and oranges. We have used bright blue to a large degree, but that is because that color is identified with our Motorola identification program.

The colors in portables and in portable phonographs have been more in the earthen tones with the exception of charcoal brown and light beige.

**CORNELIUS SAMPSON, CORNELIUS SAMPSON &
ASSOCIATES**

Since we find that the correct color use as well as the design solution is inherent within each specific problem, we are reticent to generalize about color.

Color is for us a vital factor figuring in major or minor importance in every design assignment.

In designing water tanks, we find that neutrals are in harmony with the environment throughout the seasons.

In designing reservoir covers for urban and suburban areas, we find neutral color schemes of warm and cool colors combined with the neutrals can bring the design into harmony with the location.

In package designs, color is valuable in coding flavors and each competitive situation calls for custom

schemes to show your product to best advantage. Marketing is a shifting, dynamic area and the correct solution for today may be outmoded tomorrow.

In supermarket design, color can be valuable in directing attention to and suggesting the products in various departments.

We try to keep in mind the fact that the interior scheme should create a stage or setting for merchandise but should never compete for attention.

The merchandise is the star of the show.

JENS RISOM, DIVISION OF JENS RISOM DESIGN, INC.
BY WINSTON H. SUTTER, VICE PRESIDENT -
TEXTILES

Mr. Risom has asked me to reply to your letter for our opinion on color trends.

In our letter to you of last year concerning this subject, we discussed sales by color category based upon our experience with our Chroma 1 upholstery fabric which is available in 65 different colors ranging the spectrum. There has been no significant trend or change percentage-wise in the information which we reported to you then. This is not surprising, as we have found these general color trends to maintain their relative proportions saleswise over the past number of years. Specifically, approximately 50% of our sales by color have fallen into the yellowish-red, reddish-yellow hue area; approximately 10% in the yellowish-green hue area; approximately 9% in the blue hue area; approximately 7% in the black hue area; and the balance of approximately 25% from all the remaining hue areas. In our color analysis, we have broken down the spectrum into 15 different hue areas plus black and white. It is interesting to note that the above five hue areas account for approximately 75% of the sales, while the remaining 25% is divided up among the 10 remaining hue areas. We have no reason to believe that these proportions will change in the future.

As designers and producers of furniture and textiles for home and business interiors, we believe the future points to an ever-increasing variety of hues, values, and chromas in any product line which contributes to filling human desires. The days of simple "red, yellow, green, and blue" are gone. Technology, coupled with a continuously growing human awareness of color, challenges those of us who are involved to constructively understand this subtle evolution.

JAMES H. SIPPLE, DESIGN EXECUTIVE, TRIM AND
PRE-PRODUCTION, INTERIOR DESIGN OFFICE,
FORD MOTOR COMPANY

The "Ivy" or Yellow Green family of colors has again shown a strong increase in popularity and ranks as our most popular color family. The medium metallic ver-

sion of this family has replaced white as our most popular exterior color for the first time in several years.

Beiges have given way to the newly introduced metallic gold which is now our third most popular individual color.

Exterior black, grays, aquas, beiges, and yellow indicate various degrees of decline in popularity.

Interior color preferences show black, ivy green, and gold in an upward trend. Together with blue interiors, these account for 75% of interior sales.

ARTHUR N. BECVAR, MANAGER - INDUSTRIAL
DESIGN OPERATION, APPLIANCE AND TELEVISION
DIVISION, GENERAL ELECTRIC COMPANY

Recent trends in kitchen appliance colors have indicated a continuing preference for warm, rich colors, especially those blending well with wooden cabinets and other natural color materials.

Coppertone, a dark-value, shaded color, and Avocado, a medium-value, shaded color, have been joined by Harvest (in 1967), a light-value, shaded, yellow-gold color.

General Electric has thus rounded out its palette of colors by providing a soft, warm, and contemporary color.

HENRY DREYFUSS & ASSOCIATES BY
WILLIAM F.H. PURCELL

Electrical Housewares - - very light neutrals which could be classified as "off white", with accent panels - especially in control areas - in clean bright colors.

Home Entertainment (Photographic Equipment) - - Basically still neutrals but with the distinct tendency towards lighter tones for the less expensive lines of equipment - all the way to white with black accents. The top-of-the-line models are still dark greys and blacks with metallic accents.

Commercial Electronic Equipment - - increased use of clear primary colors. Also a distinct trend towards lighter neutrals with frequent use of darker neutral accents.

Business Machines - - Lighter neutrals are still in the majority, but there is an increased trend towards the use of clear primary color for accent panels.

Transportation - - Airplane interiors are showing a very definite trend towards lighter interiors with strong accents of bright primaries.

Telephone Equipment - - Of all the various telephone colors offered, the biggest runner is still white by 27%.

Next in line is beige by 19%. This, of course, excludes black which is a non-premium color.

ZIERHUT, VEDDER, SHIMANO, INDUSTRIAL DESIGN

Interestingly enough, I seem unable to get any clear-cut, strong color opinions out of the ZVS staff. While this may be puzzling to you, it is also somewhat puzzling to me. Generally, I gather that there have been no major changes of direction out here on the West Coast. There has been a pattern of a somewhat greater use of color, per se, in commercial products. Industrial products retain their generally conservative approach, and consumer products have not changed measurably. For example, in appliances there is the occasional drift back to white, whereas colors such as avocado and copper seem to still prevail.

One interesting direction which may be worth noting is taking place in the commercial field, with, for example, electronic calculators (and this might, of course, apply to typewriters and other office business machines) using accent 'decorator' colors, which generally are the grayed green, blue and red range. By definition these colors are removable panels or field modifiable, giving an inexpensive option to the buyer of the equipment.

ROBERT HOSE, ROBERT HOSE ASSOCIATES

In the area of commercial electronic equipment we seem to be getting further away from the greys of the last decade and into light pastel colors on housings, with complimentary pastels on control panel areas. I have noticed an interesting increase in the use of off-whites.

In the area of electric housewares we seem to be trending toward stronger colors (blues, oranges, etc.) on floor care equipment. Small houseware items for kitchen-dining areas seems to be going toward off-whites and light pastels for housings. Frequently control areas are accented by using metallic, satin aluminum or satin gold for backgrounds, with designations in charcoal grey and white, respectively. From my observation it appears that warm charcoal grey is tending to replace black on control panel areas.

There also seems to be a tendency to use more color variety on different models in a company's line of products. Sophistication of color usage is frequently varied with respect to price and features of various models.

In the field of capital goods and equipment there seems to be a strong tendency to get away from the traditional greys and into more colors. There seems to be no industry standard in this area of color, and companies like to have their own color image.

BENJAMIN E. WERREMEYER

Furniture and Home Furnishings - - Color sanity is appearing on the scene: The 'mod' phase of anything goes -- has gone, thankfully. Blacks and whites will find even greater usage as style setters, as well as in average homes, although the shelter 'books' and decorators will be pushing the "gold-tones" for 68/69. The big trend is that the consumer will begin to insist on color and design in depth and longer style cycle, as opposed to something new every week, which has been pushed so long.

Institutional Furniture and Interiors - - With the introduction of bronze metal finishes on furniture and trim, the pure colors of the last several years (which have worn well and have not been influenced by 'trends') will be softened, not to pastel tones, but to rich muted tones, which will live for a generation. While this change will influence all colors used in institutional work, there will be a marked predominance of earth colors as institutional interiors become more comfortable, but not more faddish.

LEON, GORDON, MILLER AND ASSOCIATES, INC.

It is recognized by business and industry that the majority of individuals in the United States today are under the age of 25. The present and potential market for the next decade is a youth market. This country has now, and will have, the youngest group of consumers of any country at any time in history. This fact is reflected in the use of brighter color, stronger texture, higher reflectance factors and more youthful combinations in all areas of interior furniture, products, fabrics and environments.

ALEXANDER F. STYNE, CONSULTING DESIGNER

COLOR TRENDS

Note: Colors are described in Munsell terms (1) and by ISCC-NBS color names on the third level of the Universal Color Language (2). Centroid colors are used to indicate color spaces within which the described colors can be located by visual interpolation. Most of the Centroid colors mentioned can be found in the ISCC-NBS Color Charts (3).

Reference:

1) A Color Notation by A. H. Munsell, Munsell Color Company.

2) A Universal Color Language by Kenneth L. Kelly, Color Engineering, March-April 1965.

3) ISCC-NBS Centroid Color Charts, Standard Sample No. 2106, Office of Standard Reference Materials, National Bureau of Standards, Washington, D. C. 20234.

Commercial Electronic Equipment:- - trend away from highly saturated colors encountered on some

computers in recent years (chroma /10 to /14 in middle values 5/ to 7/) and towards more subdued, non-aggressive near-neutral (chroma /2 to /6 in values 4/ to 7/) as industry begins to realize importance of avoiding visual conflict in and around face panels, read-outs etc. Hues may follow general trends in favor of grays and near-grays when beiges will go to sleep for awhile.

Home Furnishings - - Walnut and fruitwood and finishes approximating these will most likely change towards Japanese and American light colored woods. Oak and substitutes such as Elm and Ash will appear in finishes around Centroid 76. l. y Br and 87. m. Y. The Home Entertainment field will pick this trend up, but now non-wood textures, forecast by vinyl bonded to metal as on current car tops may start something new here. Despite the anti-import efforts, more exotic wood veneers are likely to be shown, such as Zebra, Satinwood and other highly figured Indian and African species. They will be used often in their natural colorations. The engravers and printers won't be far behind in producing almost-better-than-life reproductions for the high-pressure laminates.

Upholstery fabrics seem to become darker and more saturated, as the LSD trend of mm highly saturated, but lighter valued colors seems to go under. Greens around Centroid 142. deep G, 141. s. G. and 139. v. G should be in evidence. Reds may gain in versions between 11. v. R and 34. v. rO. Yellows will follow the quieter trend near 82. v. Y and towards 85. deep Y. Blues will level off or become less evident.

Major Appliances - - Some lines show at present only white, 120. m. yG and "coppertone" (54. brO to 55. s. Br and 57. l. Br). The 1970's should bring brighter Greens around 130. brill. yG and Blues. "Coppertone" will have had its run and brown might change towards 47. d. gy. Br and towards 43. m. r Br.

Bathroom Plumbing Fixtures - - After the present medium pastels in short ranges the Porcelain enamel and Clay product manufacturers will introduce again more saturated colors and attempt textured and more-than-one colors glazes and enamels with which the clean-look problem, encountered last time especially in maroons and blues, may be solved. The colors will follow closely the General Home Fashions cycle on the normal time-delay.

Exterior Building Products - - The present loss of favor in most beige colors (lying roughly between and centered around 33. br Pink, 60. l. gy. Br. and 79. l. gy. y Br.) will make way for Grays, which are just beginning to come back. These will be not pure Neutrals (N/) but lie in chroma steps /1 to /3 and so be actually near-neutrals. As Ivory whites (92. y White) have not been seen for awhile they should be rediscovered soon. Brighter Greens will be shown (129 v. yG and 139. v. G), but builders and the public will be wary, because of the fading problem which is more

evident in saturated colors. Exterior colors are perhaps more subject to local trends than colors in any other use. The recent fad of deep reds (13. deep Red) is likely to remain just that.

REPORT FROM THE NATIONAL ASSOCIATION OF PRINTING INK MAKERS, INC. DELEGATES, F.L. WURZBURG, JR., CHAIRMAN

In last year's report we mentioned that the AAAA/MPA was planning to extend the use of the Standard-Four Color Proofing Inks for Wet Letterpress Magazine Printing to the offset field. At the request of the AAAA/MPA Committee, NAPIM developed a set of offset proofing inks which closely correspond in hue to the letterpress standards. These have been accepted, and the new standard has just been issued as GATF Research Progress Report No. 76, dated February, 1968. This specification is available to all interested parties from GATF.

NAPIM has been asked to take part in a re-evaluation of the letterpress standards issued in 1964 by NAPIM. A committee called the GATF Technical Advisory Committee for Magazine Four-Color Letterpress Proofing has been set up to improve further the standardization begun with the earlier specifications. Experience has shown that variations have been occurring in the amounts of ink carried on color bars supplied by different publications and even by the same publication. It was suggested that one facility, possibly GATF, control the standard color bars furnished to engravers. This same facility would also undertake to maintain the referee densitometer. It will also provide engravers, printers, publishers, and agencies with the proper tools to obtain correlation between densitometers in the field.

A research program on instrumental analysis of colorants in printed ink films is being reviewed by the Association. The objective of the program is to determine whether a satisfactory theory can be developed to account for the distribution of printing inks on and in the surface layers of printed matter together with the contribution from the substrate.

The Boxboard Research and Development Association is sponsoring at NPIRI a research program to determine the factors involved in the development of gloss finishes on prints and to develop a reliable method for evaluating the gloss holdout properties of paperboard.

NPIRI is working on the application of optical transmission measurements to the determination of particle size distribution in dilute pigment suspensions. The Mie Equations are being used to evaluate the light absorption and scattering from different particle sizes over the range of wavelengths from the ultraviolet through the infrared.

The biennial NPIRI Technical Conference scheduled for June will include a symposium on the color measure-

ment of printed films. Many speakers, well-known, to ISCC members will be taking part in this symposium.

A New York University/New York State Technical Services Seminar on color measurements in the graphic arts was held in New York in March. Mr. Bassemir of the NAPIM delegation spoke at this seminar.

At the NPIRI course for ink technicians held at Lehigh last summer, Messrs. Bassemir, Erikson, and Wurzburg took part as instructors in the area of color.

REPORT FROM THE NATIONAL PAINT, VARNISH AND LACQUER ASSOCIATION, INC. DELEGATES, EVERETT R. CALL, CHAIRMAN

The primary effort of the National Paint, Varnish and Lacquer Association in the field of color over the past year has been directed toward the production of a new film entitled "COLOR... THE MAGIC TOUCH". Three five minute segments of this series have been completed and it is also available as a fifteen minute film. Another three segments and a second fifteen minute film, plus the total thirty minute film will be available during the coming year.

The objective of "COLOR... THE MAGIC TOUCH" is to acquaint home economics students, housewives, etc. with color, to make them aware that they can use color without fear of being 'wrong', and to make them aware of the effects that various light sources have on color. This series is not technically oriented. No attempt is made to try to explain the phenomenon of color, but rather to point to the facts of color.

This film series will be shown by Members of the National Paint, Varnish & Lacquer Association throughout the country and will be distributed through the Association's film library to home economic classes and civic groups.

NPVLA's delegation to ISCC has met once during 1968 and will meet again the day following the CMG meeting in Atlanta next November. Several problem areas are before the group for further investigation, and upon completion of this investigation, recommendations regarding these problems will be directed to proper groups.

REPORT FROM THE OPTICAL SOCIETY OF AMERICA DELEGATES, DOROTHY NICKERSON, CHAIRMAN

Two meetings of the Optical Society have been held since our report last year to the ISCC. The program in October included invited papers by Prof. M. G. J. Minnaert (Netherlands) on Optical Phenomena in the Landscape, by Prof. Glenn A. Fry on Use of the Eyes in Driving, and by Dr. H. J. Kostowski on Absolute Standards of Spectral Radiance. Dr. Edwin H. Land, Ives Medallist for 1967, discussed his Retinex Theory

of Color Vision. Sessions of contributed papers included those on color and physiological optics. These and other papers were discussed later at informal "Technical Group" meetings. The one devoted to Vision and Color is reported in the March 1968 JOSA.

While the March meeting included no formal session on color, Richard S. Hunter and Gilbert L. Gibson discussed in the Instrumentation session Recent Improvements in the Accuracy of Photoelectric Tristimulus Colorimetry. Papers of interest to colorimetrists were included both in sessions devoted to physiological optics, space and atmospheric optics, information processing, and in two of the invited papers, one by Dr. Frank J. Studer on Spectroradiometric Photometry, another by Dr. Lorrin A. Riggs on Objective Methods of Studying Human Vision. Eleven "Technical Groups" met informally. The one on Color turned out to be an extremely lively all-afternoon audience-participation session under the chairmanship of Dr. Gunter Wyszecki, with discussions that ranged from "color-rendering of light sources" to "the dimensions of color perception - are they more than three?" (this last a question raised in connection with recent papers by Ralph Evans).

An event widely noted within the Optical Society in 1967 was the Nobel Prize award to three men well known in the field of color vision: Prof. George Wald of Harvard University, Prof. H. K. Hartline of Rockefeller University, and Prof. Ragnar Granit of the Royal Caroline Institute of Medicine and Surgery, Stockholm. They shared the 1967 Nobel prize for physiology for investigations on "the primary chemical and physiological visual processes."

The Uniform Color Scales Committee has continued its studies this year under the chairmanship of Dr. Deane B. Judd. A paper discussing scaling methods for the size of differences perceived between members of a geodesic series of colors was published in March (JOSA 57, 380-6). A report of its last meeting (October 1967) contains two significant items: (1) that by a smooth modification of the Munsell system a correlation of 0.80 with the committee scale values was achieved when a suitable non-Euclidean distance formula was used, and (2) that Step G (of the committee long-time program) will be made entirely in the form of ratio judgments. Experimental material for use in making these visual observations is now in circulation.

For author and subject indexes of 1967 papers on color, colorimetry, color vision and related subjects published in the *Journal of the Optical Society*, see the December 1967 number, pages 1558-84. An excellent summary by Dr. Gunter Wyszecki of recent CIE Colorimetry Committee agreements appears in the February 1968 JOSA, including agreements reached at the 1967 Washington meetings.

It should be noted also that *Applied Optics*, a second publication of the Optical Society, contains occasional

papers on color, lighting, and vision, reviews of pertinent books and meetings. The 1967 volume contains reports of both the ISCC and CIE June meetings. An issue is now in preparation, organized by Dr. J. T. Atkins of duPont, that will feature color measurement.

For 1968 the list of representatives from the OSA to the ISCC remains unchanged.

**REPORT FROM THE SOCIETY OF MOTION PICTURE
AND TELEVISION ENGINEERS DELEGATES,
R. M. EVANS, CHAIRMAN**

This year has seen further use of color by the major television stations. This has emphasized a number of long-standing problems, one of which deals with the optimum color balance for a subtractive original film which has to be transmitted and displayed by an additive system. As usual, the answer will be found empirically and the society's Color Committee has continued to play the leading role in this effort.

A problem of increasing importance has been how to transmit with optimum quality a motion picture print that has been made for the theater.

The articles on color that were published in the journal have been submitted to the News Letter Bibliography Committee.

**REPORT FROM SOCIETY OF PHOTOGRAPHIC
SCIENTISTS AND ENGINEERS DELEGATES,
ALBERT J. DERR, CHAIRMAN**

The delegation is pleased to report a year of continuing interest in color problems as they relate to the science and technology of photography. A successful conference was held in Chicago in May of 1967 which resulted in several interesting papers relating to color photography. Some of these were published in our journal *Photographic Science and Engineering*. A bibliography of the articles of interest to the SPSE membership which appeared in this journal during 1967, is appended to this report.

Professor Lloyd Varden, a member of this delegation, has organized a two-day seminar under the auspices of our New York Chapter. This is a tutorial seminar entitled "Color-Materials Exposing and Processing" to be held at the Barbizon Plaza Hotel in New York City on May 9 and 10. Professor Varden will also present a half-day summary of the highlights of this seminar, at our annual conference which will be held in Boston on June 10 and 14.

The Society appreciates the continued opportunity to participate in the Inter-Society Color Council which yields a broader scope to the interchange of ideas concerned with the science of color.

**Bibliography - Articles of Color Interest - Photo
Science and Engineering - Vol. 11, 1967**

C. A. Bishop and L. K. J. Tong
Formation of Azo Dyes by Oxidation of p-Phenylene-diamines, page 30.

C. J. Bartleson and E. J. Breneman
Brightness Reproduction in the Photographic Process, page 254.

D. C. Hubbell, R. G. McKinney and L. E. West
Method for Testing Image Stability of Color Photographic Products, page 295.

C. J. Bartleson and R. F. Witzel
Illumination for Color Transparencies, page 329.

R. Verbrugghe, M. DeBelder, and G. Langner
Influence of Color Coupling Process in Granularity and Sharpness in Color Films

**REPORT FROM THE SOCIETY OF PLASTICS
ENGINEERS, INC., DELEGATES
MELVIN M. GERSON, CHAIRMAN**

Color activities within the Society of Plastics Engineers are co-ordinated by the COLORING AND FINISHING OF PLASTICS PROFESSIONAL ACTIVITIES GROUP under the chairmanship of Mr. Robert Charvat.

An extensive program on color problems in plastics manufacture was incorporated into the SPE Annual Technical Conference in Detroit, May 15 to May 18, 1967. A special feature was a panel discussion on the problems of co-ordinating color matches in various types of plastic materials. This panel consisted of engineers from the automobile companies whose daily function it is to rationalize these problems.

COFIN PAG has prepared a series of programs on color subjects for presentation at local SPE sections. These are available to the various local program chairmen for scheduling at their convenience.

In addition, an extensive color program at the 1968 Annual Technical Conference in New York (May 6-10) has again been planned. A Regional Technical Conference on the subject of COLOR IN PLASTICS is being planned in co-operation with the Cleveland Section of SPE for presentation January 21, 1969.

The following articles on color and color problems appeared in 1967 in the "SPE Journal", the official publication of the Society:-

- a) Coloring and Finishing of Plastics, An Annual Review of Technology by R. H. Zabel, June, p. 37.
- b) Measurements of Color and Other Appearance Attributes in the Plastics Industry by R. S. Hunter, Feb., p 51.

REPORT FROM THE TECHNICAL ASSOCIATION OF
THE PULP AND PAPER INDUSTRY DELEGATES,
JOHN M. PATEK, CHAIRMAN

Most of the action by TAPPI relating to color is delegated to the Optical Methods Committee. This committee issues standards and holds technical sessions covering the optical properties of paper.

It is the policy of TAPPI to participate in international standardization, and recommendations by the CIE and ISO are considered in developing standards. For example CIE recommended Reconstituted Daylight, and the recognition by the CIE of diffuse as well as 45° - normal illumination have had a bearing on TAPPI standards.

The increasing availability of competitive instruments and the removal from the market of a specific instrument on which TAPPI had standardized awakened recognition of the desirability of developing more general standards referred to the performance of a specific geometry, light source, receptor, and reference standard.

The necessity for including the influence of fluorescence in color measurement has rendered present TAPPI standards covering color measurement inadequate. TAPPI has initiated some work toward developing new standards, but much remains to be done.

The availability of new fluorescent tubes with better spectral distribution and incandescent sources with higher color temperatures together with the expanded use of fluorescent dyes plus recent CIE recommendations has created an arena of conflicting opinion based on incomplete information. TAPPI has initiated the writing of a Technical Information Sheet to describe the significance of present day sources in color measurement.

The recommendations by committees of USASI, CIE, and ISO for the establishment of new light sources for visual appraisal of color have been given careful con-

sideration by TAPPI in drawing up a new proposed standard for viewing fluorescent paper. It specifies the CIE recommended Reconstituted Daylight D6500 and soon will be published for comment. It is recognized that the graphic arts people will continue to use their own standard which has always been lower in color temperature than the TAPPI standard.

Since the paper industry is vitally concerned with the reflectance measurement of white and near white paper, it is looking toward the acceptance of absolute reflectance as the basic standard, and is now waiting for CIE or ISO recommendations for the determination of absolute reflectance.

An area in which TAPPI is vitally interested is in programs and methods for the digital output of appearance data. A technical session is to be held on June 27 in conjunction with the ASTM annual meeting in San Francisco at which will be given a series of papers covering "On Machine Measurement of Optical Properties". There will also be a discussion session covering several papers on absolute reflectance.

ED. NOTE

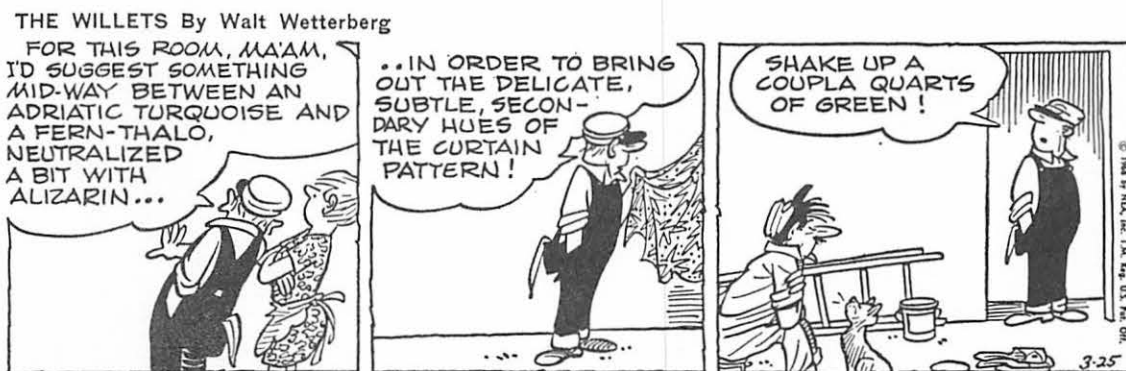
The preceding reports from member-body delegations were the only ones available at press time. Additional reports will be printed as they become available.

NEW NEWS LETTER FORMAT

Your editor has heard numerous complimentary comments about the new format of the News Letter. Credit for the change belongs to Karl Fink, who, as an ISCC Director, chairman of the delegation from the Package Designers Council, chairman of the recent annual meeting, and a participant in the Forum at that meeting - - has been busy. And creatively so.

MISCELLANY

The following apt comic strip was submitted by Mr. Don Riley of Mimeoform, printers of the News Letter.



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