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REPORT OF THE 36TH ANNUAL MEETING
STATLER HILTON HOTEL, NEW YORK, N. Y.
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36TH ANNUAL ISCC MEETING

The unusual tone of the 36th Annual ISCC Meeting was set by our foreign guests. The presence of distinguished visitors added stature to the Problems Committee Meeting and the symposium, and humor to the social events. Most of us felt fortunate that the C.I.E. attracted them to the United States so that we could enjoy them at our meeting.

Most ISCC'ers felt that changing the format of the business meeting was a good idea, especially since it increased the pace of the meeting and gave time for Ralph Evans' invited lecture, "The Perception of Color." Mr. Evans' perception of his subject led to a landmark lecture. Although many of Ralph's precepts are unusual and controversial, his usual clear exposition and convincing illustrations are powerful persuaders.

Dr. Wyszecki assembled and coordinated an excellent symposium on "Metamerism." The subject was discussed from four points of view: by Walter C. Granville, Granville Color Service, for art and industry; by A. Brookes, Farben Fabriken Bayer, Germany, for industry; by Isadore Nimeroff, National Bureau of Standards, on degrees of metamerism; and by Eugene Allen, American Cyanamid Company, on a study in dimension. Those who attended felt that they better understood what metamerism is and how to represent it. Many samples were shown to illustrate metamerism due to observers, to viewing conditions, and to light sources.

Color Engineering generously provided sample copies of the May/June issue containing a series of articles on metamerism--including sample pairs arranged for by Walter Granville. This series is recommended reading for anyone who deals with color.

Other metameric sample pairs were provided by the Derby Company, (cloth samples) and by Macbeth Corporation (paint pairs illustrating slight and severe metamerism, and "distance effects").

Davidson and Hemmendinger distributed a paint "Color Rule" which has been used for years as the Glenn Color Rule to demonstrate observer and viewing condition effects. All of these samples plus their associated data make excellent educational material.

Ed Stearns responded to the receipt of the Godlove Award with a charming and interesting commentary--including a demonstration of photochromism in which he copied the ISCC symbol on photochromic cloth. Ed was surprised by a special treat arranged by Fred Billmeyer, who invited Ed's professor of physical chemistry at Rensselaer, Professor Hendrick S. Van Klooster. Both he and Ed seemed delighted.

Dr. R. G. W. Hunt, Kodak, Harrow, England, responded with thanks from our guests. His feelings were warmly expressed and warmly received.

The meeting was topped by a very appropriate and interesting invited lecture by Professor W. D. Wright. At the International Color Meeting in Lucerne, I thought I heard Professor Wright say that color measurement will have reached its apex when instruments agree with observation. I think I heard him say it again at this meeting. His discussion of the complexity of visual stimuli combined with interesting mental processing made one wonder that any color measurement based on comparing two small circles could be at all useful in describing color experience. Of course, we knew that color measurement is limited. Having heard Professor Wright, some of us suddenly realized that we were not fully conscious of how limited it really is!

W. L. R.

DR. EDWIN I. STEARNS
RECEIVES
GODLOVE AWARD FOR 1967

During its 25th Anniversary Meeting of April 6, 1956, the Inter-Society Color Council accepted a fund donated by Mrs. Margaret N. Godlove in memory of her husband Dr. I. H. Godlove. This fund was to provide for an award to be known as the "Godlove Award" that was to be presented biennially to a qualified person selected by an appropriate committee. The criterion of merit for the awardee was stated by Mrs. Godlove in a letter of September 28, 1955, to Dorothy Nickerson, then President of the Inter-Society Color Council: "... to an individual who has made outstanding contributions to the advancement of the science of color."

The committee for this sixth Godlove Award consists of Isay A. Balinkin, Calvin S. Hathaway, Norman Macbeth, Dorothy Nickerson and W. J. Kiernan, Chairman. Its activities were organized in accordance with the "Recommended Practices Governing the Godlove Award Committee." Through the hospitality of Calvin S. Hathaway, R. Wistar Harvey, Curator of Decorative Arts, it met and carried on its deliberations in the magnificent surroundings of the Philadelphia Museum of Art on November 3, 1966.

The committee decided unanimously, to recommend that the Award be presented to Dr. Edwin I. Stearns of the American Cyanamid Company for his outstanding contributions to the advancement of the science of color. Dr. Stearns was nominated for this award by the American Association of Textile Chemists and Colorists through their member-body delegation to the Inter-Society Color Council, Dr. Roland E. Derby, Jr., Chairman.

Dr. Stearns became a member of the Council in 1943 and was President of the Council in 1952 and 1953. It was at the very beginning of his membership that he created one of his most spectacular achievements: the calculation of the proportions of the constituent dyestuffs or pigments required to produce a color match. The first such color match to be calculated anywhere in the

world was published in 1944 in the American Dyestuff Reporter.(1) The concept of combining spectrophotometric data, colorimetric measurements and calculation of dye formula had been solved by Dr. Stearns in the laboratories of the American Cyanamid Co. The mathematics involved were disclosed that same year in the Journal of The Optical Society.(2) The originality of this work was attested by the issuance of U. S. Patents.(3) All of the instrumental color matching done today in laboratories all over the world follow the precepts disclosed in his original papers.

He has also made major contributions to instrumentation,(4,5) interpretation of spectrophotometric data,(6,7,8,9) statistics,(10,11,12) and analytical chemistry.(13) A complete list of the sixty publications and sixteen patents relating to his professional career is attached to this report.

Dr. Stearns has been very active in the affairs of our memberbody, the American Association of Textile Chemists and Colorists, and in other organizations, such as: American Chemical Society, Technical Association of the Pulp and Paper Industry, Synthetic Organic Chemical Manufacturers Association, American Society for Testing and Materials, Manufacturing Chemists Association and National Research Council. He has lectured widely, nationally and internationally, in universities and before many scientific societies.

While the Godlove Award is given on the basis of his outstanding contributions to the advancement of the science of color, we would be remiss if we did not report on other facets of his life. Dr. Stearns was born in Matawan, New Jersey in 1911. He received the degree of Bachelor of Chemical Engineering, Summa Cum Laude, from Lafayette College in 1932; the degree of Master of Science, majoring in physical chemistry, in 1933 from Rensselaer Polytechnic Institute; and his Ph.D. degree from Rutgers University in 1945. His scholastic honors include election to Sigma Xi, Phi Beta Kappa, Tau Beta Pi, Phi Lambda Epsilon and Alpha Chi Sigma. He has been employed by the American Cyanamid Company from 1933 to the present time and has served in various capacities, including research, production, control, technical services, and sales. At the present time, he is Manager, Sales Development, Dyes and Textile Chemicals Department.

He has three children: Richard, who received his Ph.D. from Princeton and is a mathematician with General Electric; Robert, who is teaching economics at Ohio State and who expects his Ph.D. from Yale shortly; and Mary-Dinnis, a student at Connecticut College. Dr. Stearns' hobby is ornithology and he is an honorary member of the Uner Ornithological Club. He is also a member of the American Ornithological Society, and the National Audubon Society. He has contributed eleven articles to the literature on ornithology. His community activities are chiefly through the Presbyterian Church in which he is active as an elder.

While this report necessarily cannot give all of the details of his career in industry and his personal life, the committee has demonstrated why it was unanimous in its decision to recommend the presentation of this year's Godlove Award to Dr. Edwin Stearns.

W. J. KIERNAN
For the Godlove
Award Committee

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**DYEING
FOR A LIVING**(Following the presentation of the Godlove Award, Dr.
Stearns made the following remarks in acknowledgement.)

It is a great source of personal satisfaction and pride to have your peers judge you worthy of the Godlove Award and I wish to thank the Award Committee and the officers and board of the Council for my nomination.

I am happy that I have been selected because I am a representative of the textile industry. It is true that I am also a member of the Technical Association of the Pulp and Paper Industries. It is true that I have five or six publications in the pigment field. But for years I was a delegate of the American Association of Textile Chemists and Colorists and most of my work has been in that area. The textile industry is a major consumer of colorants. Textile representatives have been very active in the affairs of the Council. Therefore, in a broad sense I consider this award a recognition of the contributions of the textile oriented colorists.

I have been very fortunate to have been associated with some wonderful people during my life. Years ago, when I was in research, Robert Park was head of our laboratory. I remember that when he wanted to use a mathematical formula he would never look it up in a handbook but would derive it under the theory that if he derived it he could apply it more intelligently. Orrin Pineo was a research physicist. It is a little known fact that Pineo was the holder of the basic patent on the G. E. spectrophotometer (U. S. Pat. 2,107,836).

One man classified as a laboratorian was Charles Pinzka. At that time he had a high school diploma and financial problems which delayed him from going to college. Since then he has earned his doctor's degree and is a professor of mathematics at a leading university. How many of you have had laboratorians of that caliber?

More recently I have known Gene Allen well. Gene derived the present system of color matching and put it into effect. When Gene sits down at the console of a computer it purrs contentedly.

Therefore, in a broad sense I consider this Godlove Award a recognition of the contributions of my company. I am the fortunate individual who has been singled out to represent them and to receive the award.

Also, I could not have accomplished what little I have without the inspiration and help of many people in the ISCC. Dorothy Nickerson has been a tremendous help. When I was asked a question about color differences I would telephone her for the information. Long ago I learned that Deane Judd worked under the rule that any letter from a private citizen had to be answered within two days no matter how much other work suffered. I would write to him and get a prompt, authoritative reply. I. H. Godlove worked for a competitor, so I did not feel free to consult him on a regular basis, but I knew him well and had hours of discussions with him at meetings of ISCC and other technical organizations. I never knew a man more dedicated to the advancement of color technology.

One problem of reminiscing is that one never knows when to stop. There are many more people that I should name as contributing toward my honor today.

One of my unique experiences which I share with Roland Derby and a few others, is that I have seen a large number of spectrophotometric curves. Before my day, spectrophotometers were not automatically recording and this limited the number of curves one man would see. Today, data from a spectrophotometer are fed directly into a computer and again a man does not see many curves.

In my doctorate thesis I studied the relation between chemical structure and light fastness of dyes. Altogether I evaluated 4925 spectrophotometric curves.

The conclusion I drew from these 4925 curves was that the Hammett reaction constant for dye fading was 0.2 for azo dyes on wool, a remarkably little mouse to come from such a mountain of data.

As nearly as I can estimate, I have looked at personally, and drawn conclusions from, about 300,000 spectrophotometric curves. This averages one curve every four minutes for 10 years. In the course of working with 300,000 curves I have had many interesting experiences but I have time to recount only one.

One of my early assignments was the standardization of dyes with colorimetric data. Back in 1934 this was unheard of. For years dyes had been put on a textile skein and compared visually with a standard dye lot applied to another skein prepared at the same time. Under the direction of expert colorists the batches would be adjusted for strength and shade. Most of the people in my company had no faith in the new-fangled colorimeter. I recall one incident which helped convince some doubters.

At that time we made a dye now known as CI Mordant Brown 4. One of the intermediates used in its manufacture is picramic acid, a close relative to TNT. The dye itself in the pure dry form was explosive, but as long as it was wet, or sufficiently diluted with salt, it was safe to handle. The dividing line was about 65% real. If more pure it would explode, if less pure it could be ground to a powder safely. Our standard practice was to add salt to the final wet stage of manufacture to bring the purity down to 65%, then put it in a blender and add more salt to bring it down to a homogeneous mixture of 55% purity, then sample and add more salt to reach 50% for the commercial product.

The blender consisted of a steel drum with a thin piece of metal in one end, loaded with steel balls to give a grinding action. The drum was laid on its side and rotated for several hours. It was blended in a special shed far away from the plant and having only three sides. The drum was placed so the thin end pointed toward the open side.

For 50 batches everything was monotonously alike, each batch tested around 65%. Then one day the colorimeter reported one batch as 90%. This result was given to the manufacturing supervisor who was a disbeliever. If the colorimeter was correct, the blending was dangerous, but if a budding young colorist had made a mistake in interpreting the data, everything would be normal. I think he checked the log sheet to see if the salt had allegedly been added. But his decision was to disregard the colorimeter and enter the standard blend.

Well gentlemen, seldom has the correctness of a colorimetric result been verified with such a thunderous acclaim. The blast was heard as far away as East Manville.

Little by little we wore away the prejudices and today one of my cherished possessions is a sample from what I believe is the first dye lot that was shipped anywhere in the world solely on the basis of colorimetric standardization.

I would like to add a little in praise of the ISCC. There is no better place for a man to go to increase his stature as a colorist than by association with ISCC members. I know of no other organization where there is greater exchange of ideas and stimulating hallway discussions.

This verbal exchange is vital because there is so much in the literature that it is most difficult to be aware of it all. For instance in 1953 the Committee on Colorimetry of the Optical Society of America published a book called "The Science of Color." The twenty-three co-authors included about all the famous colorimetrists of the time. On page 189 they stated that "the sample polarization error must be eliminated by averaging two measurements or rotating the sample." Yet in 1945 I had published a description of an optical device to eliminate the effect of polarization.

As long as this exchange of information continues, you will benefit professionally and the Council will continue to accomplish its objectives.

I wish to thank Mrs. Godlove for establishing this award and again thank everyone involved for selecting me as the recipient this year.

E. I. Stearns

DR. STEARNS TO RECEIVE
1967 OLNEY MEDAL AWARD

Not only the ISCC, but also one of its member-bodies, is honoring Dr. Edwin I. Stearns this year.

The American Association of Textile Chemists and Colorists will present its highest scientific award, the Olney Medal, to Dr. Stearns on October 19, 1967, during the Association's National Technical Conference at New Orleans. The award is given for outstanding achievement in the field of textile chemistry, and the recipient is selected by unanimous vote of the committee of five senior members of AATCC.

AATCC is the largest technical and scientific society in the world of textile chemistry, with nearly 9,000 members in 45 states and 48 countries outside the U. S.

REPORT OF THE PRESIDENT
WARREN L. RHODES

The president welcomed distinguished visitors and guests. The C.I.E. Meetings provided us with an unusual opportunity to invite visiting delegates to attend and to participate in the ISCC Meeting. ISCC officers and delegation chairmen entertained our foreign guests Monday night at a reception. We were pleased that such a large number could accept our invitation.

As reported last year, an International Colour Council has been proposed. The primary purpose of the International Colour Council is to sponsor international color meetings on some regular and systematic basis. The Inter-Society Color Council will represent the United States, informing and participating in the Council activities. Our delegate to organizing activities is Deane Judd.

Chairman for the 1968 Symposium will be Karl Fink, current ISCC Board Member. Subject for the Meeting will be Creativity. The meeting will be held at this hotel, April 8th and 9th. The Board is also planning a Symposium for 1969. Topic for this Symposium will be Perception.

We are still collecting papers based on lectures presented at the Williamsburg Conference, Instrumental Approaches to Colorant Formulation. Seven papers have been distributed in the ISCC Newsletter. Four or five more papers are reasonably certain to be collected.

The Board has taken some actions which I would like to call to your attention. We have formalized an honorary membership category. At present there are five members: Kasson Gibson, Elsie Murray, M. Rea Paul, Helen Taylor, Michael Zigler. Approximately 26 other individuals are under consideration for membership.

A new award has been established in the memory of Norman Macbeth, Sr. The award will be sponsored by a fund established by his son, Norman Macbeth, Jr. A committee will be formed to determine the procedure for selection and presentation of the award.

The Newsletter has flourished under its new Editor, Dr. Randall Hanes. A change in format and style of the Newsletter has been recommended by the Board. This new format and style was proposed by Karl Fink.

We are continuing our discussions with Color Engineering Magazine, concerning the desirability and form of formal arrangement between ISCC and Color Engineering.

The Board has scheduled a Fall Planning Meeting where the functions, purpose and long range plans of the Council will be discussed.

Other ISCC activities will be described by the speakers who follow.

W. L. Rhodes, President

REPORT OF THE SECRETARY
RALPH M. EVANS

The ISCC now consists of 246 delegates from 29 member-bodies and 553 individual members, as usual showing a modest increase from last

year's figure.

During the year seven reprints from the Williamsburg Conference were sent out to the membership. One of the main projects of the secretary's office during the year was the updating of the address list complete with Zip code numbers, resulting in the revised membership list.

REPORT OF THE TREASURER
NORMAN MACBETH

The Treasurer submitted a report from Gremmel and Wuerfel, accountants, who had examined ISCC records for 1966. This report, on file

in the Secretary's office, is summarized as follows.

Balance Sheet as of December 31, 1966

ASSETS

Cash

County National Bank
Bowery Savings Bank
Greenwich Savings Bank
New York Savings Bank

\$20,706.91

Investments

3,864.47

Dues Receivable

139.00

TOTAL ASSETS

\$24,710.38

LIABILITIES AND CAPITAL

Newsletter Paid in Advance		\$ 24.00
Accounts Payable		279.01
Surplus		
Balance, December 31, 1965	22,677.66	
Add: Income over Expenses -	<u>1,729.71</u>	
Current Year		
Balance, December 31, 1966		<u>24,407.37</u>
TOTAL LIABILITIES AND CAPITAL		<u><u>\$24,710.38</u></u>

Statement of Income and Expenses for Year Ended December 31, 1966INCOME

Dues		\$ 4,159.00
Publication Sales		
News Letter	165.00	
Bibliography	23.75	
Royalties	<u>292.62</u>	481.37
Interest and Dividends		<u>1,158.16</u>
TOTAL INCOME		\$ 5,798.53

EXPENSES

Secretary's Office	111.66	
Treasurer's Office	95.66	
President's Office	61.23	
News Letter	2,055.31	
Special Publications	461.63	
Annual Meeting	44.14	
Williamsburg Meeting	85.00	
Contingency Fund	154.19	
Cooper Union Museum	<u>1,000.00</u>	
TOTAL EXPENSES		<u>4,068.82</u>

EXCESS OF INCOME OVER EXPENSES\$ 1,729.71

1966 Budget Analysis

	<u>Budget</u>	<u>Expenses</u>	<u>Under or Over Budget</u>
President's Office	\$ 500.00	\$ 61.23	\$ (438.77)
Secretary's Office	100.00	111.66	11.66
Treasurer's Office	100.00	95.66	(4.34)
News Letter	2,500.00	2,055.31	(444.69)
Special Publications	1,400.00	461.63	(938.37)
Williamsburg Meeting	1,045.56	85.00	(960.56)
Annual Meeting	400.00	44.14	(355.86)
Contingency Fund	124.19	154.19	30.00
Cooper Union Museum (Special Expense Voted by Board of Directors)	<u>- 0 -</u>	<u>1,000.00</u>	<u>1,000.00</u>
TOTALS	<u>\$6,169.75</u>	<u>\$4,068.82</u>	<u>\$(2,100.93)</u>

I. H. Godlove Award FundStatement of Receipts and Disbursements for Year Ended December 31, 1966

Balance, January 1, 1966	\$ 1,035.58
Receipts	<u>25.00</u>
TOTAL	1,060.58
Disbursements	<u>12.61</u>
Balance, December 31, 1966	<u>\$ 1,047.97</u>

FINANCE COMMITTEE REPORT
NORMAN MACBETH, CHAIRMAN

Your Finance Committee has examined carefully the Treasurer's report. It has been noted that the total Income for the past fiscal year, ended December 31, 1966, was \$5,798.53. It is also noted the total Expenses were \$4,068.82. The Inter-Society Color Council, therefore, operated with an excess of Income over Expenses, amounting to \$1,729.71.

After reviewing Estimated Income, it would appear the income from membership dues, publication sales and royalties, interest and dividends, will amount to \$6,041.00, as shown on the attached Exhibit I. Similarly, it is anticipated the total Expenses for the year will amount to \$7,525.00.

The Finance Committee, therefore, recommends the following budget:

ESTIMATED INCOME

Membership Dues -	
Individual Members	\$ 3,312.
Member Bodies	1,015.
Newsletter Subscriptions	164.
Publication Sales & Royalties	450.
Interest and Dividends	<u>1,100.</u>
TOTAL ESTIMATED INCOME	\$ 6,041.

RECOMMENDED BUDGET

President's Office	\$ 300.
Secretary's Office	150.
Treasurer's Office	125.
Newsletter	2,750.
Special Printing & Publishing -	
Membership List	1,000.
Application Blanks, Stationery	400.
Reprints	500.
Annual Meeting	800.
Cooper Union Fund	1,000.
Contingency Fund	<u>500.</u>
TOTAL RECOMMENDED BUDGET	\$7,525.

NOTE: Excess of budgeted expenses over budgeted income is - \$1,484.

Recommended operating deficit for the year 1967

During the past fiscal year, the Inter-Society Color Council paid one-half of their pledge to the Cooper Union Museum, and it is recommended the second half be paid during the fiscal year, 1967, and this amount is included in the budget.

Depending upon final plans, there may be additional expenditures with regard to printing costs, relating to a possible redesign of the Inter-Society Color Council insignia.

Also allowed for in the Contingency Fund is the possibility of certain expenses relating to the Annual Meeting which will be used at the discretion of the Board of Directors, concerning the invitation of certain, selected foreign delegates coming to the CIE meeting in Washington.

Please note the Finance Committee is recommending to the Board of Directors and the Annual Meeting an excess of Budgeted Expenses over Budgeted Income.

The amount is \$1,484.00. In view of previous years when there has been an excess of Income over Expenses, the Finance Committee feels this recommendation is not out of order.

The Finance Committee requests the approval of the Board of Directors, which approval must also be obtained from the voting delegates attending the Annual Meeting.

Respectfully submitted,

Dorothy Nickerson
W. J. Kiernan
Roland E. Derby, Jr.
Norman Macbeth, Chairman

BUSINESS SESSION

The report of the Treasurer and of the Budget Committee, which was presented by Mr. Norman Macbeth, had been acted on favorably by the Board of Directors at its April 17 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 by Mr. Walter Granville, and on roll call vote, 25 voting delegates voted in the affirmative. There were no negative votes.

The next annual meeting will be held in New York City at the Statler Hilton Hotel on Monday and Tuesday, April 8 and 9, 1968.

MEMBERSHIP COMMITTEE REPORT WALTER C. GRANVILLE, CHAIRMAN

Several organizations have been contacted during the year about affiliating as member-bodies. Recent correspondence with the Institute of Food Technologists indicates that they are definitely interested and intend to submit their application in the near future.

PROBLEMS COMMITTEE REPORT

(Ed. Note: The status of each of the various problems was summarized in the March-April 1967 issue of the N.L. Reports are included in this issue only for those subcommittees that provided additional information as a result of the meeting.)

Subcommittee on Problem 18: Colorimetry of Fluorescent Materials. Eugene Allen, Chairman

Three committee members - Franc Grum, Gunter Wyszecski, and Wally Foster - compared results which they had obtained on the measurement of spectral radiance factor of a piece of polyester tricot, dope-dyed with optical brightener. The reason for using this particular material is that we had previously experienced difficulty with non-reproducibility of a sample of cotton dyed with brightener, and we were advised that the dope-dyed material would be much better in this respect. The instruments used, as well as the techniques, were different in the three cases, and in view of this disparity of method, the agreement obtained among the three was quite encouraging.

We decided that the next step would be to specify as closely as we could the four most important variables in this determination - sample variation,

reference standard, light source, and geometry. Although the cooperating committee members will still continue to use different instruments, the same physical sample will be measured by all, and the light source and reference standard will be very closely controlled. We will determine if this will produce even closer agreement.

We hope that the ultimate result will be not a single specific method to be used for this determination, but rather a clear explanation as to the effect of the various variables on the results.

Subcommittee on Problem 21: Standard Practice for Visual Examination of Small Color Differences. Sam Huey, Chairman

The June 12, 1967, meeting of Problem 21 was honored to have many of the CIE guests present.

The chairman stated that the present method was approved by the members of the committee and was given to the Problems Committee Chairman, Ronald Derby.

Those present were critical of the present method used by lamp manufacturers for computing Conformity index. The criticism centered around the fact that the spectro-radiometry data were not reliable. The accuracy of the data depends on the instrument and method used. There is also a lack of good radiance standards. It was pointed out that many lamp manufacturers state that their lamps meet the required Conformity index and spectral specification outlined in the method.

The chairman stated that he had viewed many of these lamps side by side when they were operating and visually the character of the light was not the same. They all claimed, however, to meet the specification of the method.

It was felt that some sort of policing was necessary for the lamp manufacturers so that their claims would be more reliable.

Knowledge of the spectral characteristics of the lamps is not enough. The reflecting surface, diffusing glass, and surround all affect the type of light that is admitted from the units. This will be noted as an addition to the present method.

Those present were in favor of deleting the names of any manufacturer from the method.

Even though the title of the method states that it is for the examination of small color differences, there were those who thought a paragraph should be included in the introduction to state that it was for critical color matching and not color inspection. A reference on how the color rendering index shall be calculated will be included, even though it was felt that the present method of calculation was not satisfactory.

Inasmuch as there is a need in industry for a standardized procedure for visual examination for small color differences, those in attendance were in favor of requesting the Inter-Society Color Council to publish the method with the corrections suggested at the meeting as an interim method.

When a more satisfactory method for computing Conformity index is available and the lamp manufacturers have claims which are reliable, the method can be revised to take advantage of any new knowledge or improvements.

Subcommittee on Problem 22: Procedures and Material Standards for Accurate Color Measurement. Fred W. Billmeyer, Jr., Chairman

The major activity of Subcommittee 22 during the past year has been the operation of Round-Robin II, "Rigorous Calibration and Operating Procedure for the General Electric Spectrophotometer." Over a dozen laboratories have participated, and the data are being analysed. More results are being gathered, both in the United States and overseas.

Instructions for Round-Robins III, involving other spectrophotometers, and IV, involving color-difference measurement with colorimeters, have been drafted, and it is anticipated that these efforts can be activated in 1967.

Subcommittee on Problem 24: Catalog of Color Measuring Instruments. Ruth Johnston, Chairman

The Committee met at 9:30 A.M. with forty-eight members and guests registered. The chairman reviewed the scope and activities of the preceding year. Members who had been assigned the task of preparing the information on specific instruments were asked to report. Eight reports were presented. Five persons were not present and did not send reports. These people will be contacted. The group agreed that a goal of the year 1967 should be set for the publication of the first part of the report covering American instruments. In order to accomplish this, it was agreed that a small group of members would get together in the summer to put the material together.

A preliminary introduction prepared by the Chairman was then submitted for criticism. It was agreed that the check lists for sample and measurement characteristics should be included. It was suggested that a check list for problem characteristics also be included. Summary tables of the salient design features of the spectrophotometers, colorimeters, abridged spectrophotometers, and data reduction devices, including color difference computers, integrators, digital readouts, special slide rules, and color difference charts, would be included. This section will now be revised and enlarged to incorporate the suggestions made.

Dr. Billmeyer reported on the Board's recommendations for publishing the report and on the proper procedure to be followed.

A spirited discussion was held concerning the degree of editorialization that could be properly included to make the report useful but still impartial. There is no doubt that the editorial committee is faced with a difficult task in this area. The material prepared by the committee concerning each instrument will be sent to the respective manufacturer for clearance before the report is issued.

Future work of the committee was discussed. Mr. Booker has prepared material on the radiometers for inclusion as a separate section of the report. Mr. Marciniak volunteered to send requests to foreign manufacturers for information on instruments. Mr. Vining volunteered to handle Canadian instruments.

A deadline of July 12 for all reports to be in was established. The meeting adjourned at noon.

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

Color activities of the American Artists
Professional League. We have two items:

- (1) At the Annual Dinner of the American Artists Professional League, 150 members from about 20 states listened to Ralph M. Evans give his paper on "The Perception of Color." The audience, composed of painters in oil, watercolor, casein and acrylics, (with some sculptors mixed in) were unanimous in their opinion that this is an important and useful contribution. We are all grateful to Eastman Kodak and particularly to Ralph Evans.
- (2) Over the past five years we have been trying to persuade several companies to develop an oil based pen, ink, or ink marker.

Our purpose at first was merely to provide a better tool for detailing oil on oil. Trees, boat rigging, hair in the portrait, pine needles, etc. all are very clumsy and difficult when rendered with a brush.

Brushes slide off sideways, they wiggle out of control, and get off the straight and narrow path. They squash, - they are very, very exasperating. We needed a pen!

The Chairman of our Technical Committee, Dr. Robert L. Feller (Mellon Institute, Pittsburgh) approached the problem from another angle entirely: Lightfastness. All of the water-based markers were fugitive in the colors. They look great at first, but short exposure to light makes them fade out and even disappear. Some research and development is urgently needed. Who will do it?

All of a sudden one appears from Japan: "The Illustrator" fine line marker. It differs from the others in two respects: (1) it has an oil base, and (2) it is permanent and lightfast. (Commercial Ball Pen Co., 30 West 32nd St., New York)

Up to now they only have black, blue, red and green, but they hope to have a complete line of colors in the near future. We are testing them over oil paintings, watercolor, gouache, and acrylics, and will report more fully later on.

We consider this something of a break-through, - for detailing is vastly simplified due to the nature of both the instrument and the ink medium.

The important thing is that the ink bonds with an underpainting of oil pigments, and they are permanent.

AMERICAN ASSOCIATION OF
TEXTILE CHEMISTS AND COLORISTS DELEGATES
ROLAND E. DERBY, JR., CHAIRMAN

No report.

AMERICAN CERAMIC
SOCIETY, INC., DELEGATES.
HENRY D. BIXBY, CHAIRMAN

No report.

AMERICAN INSTITUTE
OF ARCHITECTS DELEGATES.
WALDRON FAULKNER, CHAIRMAN

No report.

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

The A.I.D. wishes to report that its many exhibitions open to the public, decorating shows, museum exhibits, and restoration work throughout the country, continue to be a major influence in Color and Design. Some

of these which you may wish to visit while in New York include: The Cooper Union Museum, 4 East 7th Street; Mrs. Carll Tucker's Mansion, 737 Park Avenue; and the Gracie Mansion, East End Avenue and 87th Street.

Another area of vital interest is that of education: sponsoring the newly formed Interior Design Education Council and stimulating seminars on post-graduate and professional levels. There is great emphasis on the study and use of color, with consideration of all aspects in which color plays a vital role: psychologically, visually, and aesthetically. This is particularly important since many A.I.D. members are involved in the design of public projects, such as senior citizens developments, schools, hospitals, motels, etc., where color is not an individual choice but a fundamental part of the environmental and design concept.

The influence of this exposure of use of color, both Traditional and Contemporary, in great volume, makes it difficult to enumerate at this time any specific direction.

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

No report.

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

Psychologists continue to be extremely active in the investigation of color vision. Particular emphasis this year is found in the use of computer averaging of electrical responses to stimulation for human subjects.

The method of averaging responses to repeated stimulations in order to eliminate random components in the neuroelectric signal and to obtain a true evoked response has been known for years. Only recently, however, due to the availability of small computers that are specifically programmed for this technique, has it been widely used. This year a number of investigations of evoked responses, recorded both from the eye (ERG) and the cortex (EEG), to colored stimuli have appeared.

Two of our APA delegates, Lorrin Riggs and William Biersdorf, as well as many other psychologists, have been particularly active in the field. While it is still too early to make a general assessment of the technique, a number of very interesting facts have emerged thus far. For example, direct comparisons of ERG's and EEG's from the same stimulation show that the ERG is much more dominated by scotopic functions and the EEG by photopic. With computer averaging to enhance the signal/noise ratio, however, cone functioning can be obtained even in the ERG.

At the University of Pennsylvania, Doctors Hurvich and Jameson continue their interesting psychophysical studies of human color vision. They are currently working on the Bezold-Brücke phenomenon at different retinal locations, on unique spectral loci, and on increment thresholds.

At the University of Rochester, Boynton and co-workers have a wide variety of color vision interests, including color vision in the squirrel and macaque monkeys, the receptor systems in human color vision, temporal variations on color mechanisms, chromatic contrast adaptive color shifts, and the effectiveness of mixtures of spectral stimuli.

A preliminary summary of Helson's study on the pleasantness of colors for objects and backgrounds appears in the 1965 Annual Report of the Illuminating Engineering Research Institute. The final report will be published in Illuminating Engineering soon. Dr. Helson, incidentally, will be on leave of absence from Kansas State University next year and will work at York University in Toronto, Canada.

At Columbia, Graham and coworkers continue to study the intricate problem of color contrast and to pursue their interest in the vision of color-defective individuals. The latest is an extensive measurement of a number of visual functions for an incomplete achromat.

At the Submarine Medical Research Laboratory we have completed a number of studies of the color appearance of brief, small stimuli presented both foveally and peripherally to determine the extent of the tritanopic effect in color-normal individuals. Induced color or simultaneous color contrast in a deuteranopic subject has been measured. Our study of the visibility and color appearance of various colored paints, both fluorescent and nonfluorescent, under-water continues.

Our delegates have contributed to a number of new books pertinent to color vision. Dr. Boynton's chapter entitled, "Vision" in J. B. Sidowski (Ed.) Experimental Methods and Instrumentation in Psychology (McGraw-Hill, 1966) is particularly informative on methods, techniques, and apparatus used in visual experiments. Boynton has another article "Vision and the Eye" in the Encyclopedia of Physics (Reinhold Publishing Corporation 1966) p. 766.

Hurvich and Jameson are authors of several chapters in European publications. "Theorie der Farbwahrnehmung" appears in Handbuch der Psychologie (Verlag für Psychologie, Hogrefe 1966) pp. 131-160. Two other papers will be found in Internationale Farbtagung Luzern 1965. V. I. Göttingen Musterschmidt-Verlag, 1966. These are "Threshold and Supra-Threshold Relations in Vision" by D. Jameson, pp. 128-136, and "The Indispensability of a Bimodal Black-White Color Vision Process" by Hurvich, pp. 167-172.

The following publications have also been contributed by APA delegates:

M. Akita and C. H. Graham, Maintaining an absolute test hue in the presence of different background colors and luminance ratios. Vision Res. 6 315-323 (1966).

W. R. Biersdorf, Incremental thresholds and the human electroretinogram. Proceedings of the 4th ISCCERG Symposium (JJO Vol. 10 Supplement, Tokyo 1966) pp. 191-197.

- W. R. Biersdorf, A. M. Granda and H. F. Lawson, Incremental thresholds for colored and white lights in the human electroretinogram. *J. Comp. & Physiol. Psychol.* 61 No. 1, 102-109 (1966).
- R. M. Boynton, Vision and the eye. In Besancon, R. M. (Ed.), Encyclopedia of Physics, Reinhold Publishing Corp., 766 (1966).
- R. M. Boynton, S. R. Das, and Jean Gardiner, Interactions between photopic mechanisms revealed by mixing conditioning fields. *J. Opt. Soc. Am.* 56, 1775 (1966).
- R. M. Boynton and S. R. Das, Visual adaptation: increased efficiency resulting from spectrally-distributed mixtures of stimuli. *Science*, 154, 1581 (1966).
- R. M. Chapman, Light wavelength and energy preferences of the bullfrog: evidence of color vision. *J. Comp. & Physiol. Psychol.* 61, No. 3, 429-435 (1966).
- M. M. Connors, Effect of wavelength and bandwidth of red light on recovery of dark adaptation. *J. Opt. Soc. Am.* 56, 111-115 (1966).
- A. M. Granda and W. R. Biersdorf, The spectral sensitivity of the human electroretinogram during the temporal course of dark-adaptation. *Vision Res.* 6, 507-516 (1966).
- E. P. Johnson, L. A. Riggs, and Amy M. L. Schick, Photopic retinal potentials evoked by phase alternation of a barred pattern. In H. M. Burian and J. H. Jacobson (Eds.) Clinical Electoretinography (Pergamon Press, 1966) pp. 75-91.
- S. M. Luria, Color Vision, *Physics Today*, 19 34-41 (1966).
- T. Oyama and Y. Hsia, Compensatory hue shift in simultaneous color contrast as a function of separation between inducing and test fields. *J. exp. Psychol.* 71, 405-413 (1966).
- L. A. Riggs, The "looks" of Helmholtz. *Percept. & Psychophysics*, 2, No. 1-13 (1967).
- L. A. Riggs, E. P. Johnson, and Amy M. L. Schick, Electrical responses of the human eye to changes in wavelength of the stimulating light. *J. Opt. Soc. Am.* 56, No. 11, 1621-1627 (1966).
- I. M. Siegel, C. H. Graham, H. Ripps, and Y. Hsia, Analysis of photopic and scotopic function in an incomplete achromat. *J. Opt. Soc. Am.* 56, 699-704 (1966).
- H. Scheibner, Adaptive color shifts. *J. Opt. Soc. Am.* 56, 938 (1966).
- H. Scheibner, On colours of the same appearance. *Optica Acta*, 13, 205 (1966).
- C. Sternheim and R. M. Boynton. The uniqueness of perceived hues investigated by a continuous judgmental technique. *J. Exptl. Psychol.*, 72, 770 (1966).

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

No report.

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

As machines replace people and mass
production becomes a universal way
of life, we find that color trends
of the United States are pacing the

rest of the world. They spread rapidly east and west, north and south, and
those who travel the globe return to complain they saw nothing new!

The most receptive market to which a major part of merchandising is currently
directed - the youth market - knows not the former world of nature's own
colors. They were born and raised in a man-made world injected with man-
conceived colorings. To them, this potentially painted environment is reality.
Their universe rotates on a color wheel and they take color for granted.
Color styling and color trends evolve from this chromatic base, building and
developing logically from one season to the next.

Activities of The Color Association have changed considerably. Color trends
are influenced not by fashion, but by our economic world of man-made products.

Volume production, which requires greatly accelerated working programs,
necessitated advancing our forecast schedules still further, with Fall 1968
colors issued the end of June. As the scope of requests for color information
widens, we are continually surprised at the border line areas which are af-
fected by this mushrooming use of color. A soap manufacturer finds that
bright, accent colors rather than delicate skin-toned soaps coordinate best
with current bathroom tones. Synthetic-fiber wigs, in exuberant pinks,
oranges and greens ride the color wave; lipsticks come in yellow, green,
purple, and shoes are dancing bright. From office equipment to garbage pails,
manufacturers want to know "what's new in color?"

So it is that no one area sets color trends. Each contributes its share of
influence. Since it is our total environment, rather than segregated parts,
which has the strongest impact, members in increasing numbers come for special
consultations. They are interested in knowing developments in other fields
and how these developments will affect their products.

In addition to our forecasts, our work includes assisting industries in co-
ordinating their promotional colors, developing color standards for the
government, and serving as a source of standard colors for all industries.

COLORMARKETING GROUP DELEGATES.
LOUIS A. GRAHAM, CHAIRMAN

No report.

DRY COLOR MANUFACTURERS'
ASSOCIATION DELEGATES.
MAX SALTZMAN, CHAIRMAN

No report.

FEDERATION OF SOCIETIES FOR
PAINT TECHNOLOGY DELEGATES.
S. L. DAVIDSON, CHAIRMAN

No report.

FOLDING PAPER BOX ASSOCIATION
OF AMERICA DELEGATES.
RALPH M. MALCOLM, CHAIRMAN

No report.

GRAPHIC ARTS TECHNICAL
FOUNDATION DELEGATES.
ERIC W. HARSLEM, CHAIRMAN

No report.

REPORT FROM THE GRAVURE TECHNICAL
ASSOCIATION, INC. DELEGATES.
OSCAR SMIEL, CHAIRMAN

The G.T.A. is planning a new visual tone scale to be printed in each of the four process colors used in gravure, namely, Yellow, Red, Blue

and Black. This scale is used to check out progressive proofs and gravure positives to see that the tone values of the positives represent the reflection values of the printed progressive proof for each respective color. It will be printed in each of the inks represented by Groups I, II, III and IV.

The ink standards for the publishing industry have been revised as follows: Group I is, and has been for years, the standard ink for supplement printing; Group II is the new standard for Family Circle, Woman's Day, Dell Publications, and MacFadden-Bartell Publications; Group III is the standard for Seventeen, T. V. Guide and Ingenue; and Group IV is the standard for Good Housekeeping and Popular Mechanics. It has taken years to get magazines printed by gravure to standardize their ink requirements and we still have a long way to go. However, progress has been made as of last October (1966), when many of the magazines agreed to adopt the II, III, and IV Groups of inks and their respective hues.

The new hues for Group II inks indicate a change to more of a cyan blue, magenta shade of red, and cleaner yellow than heretofore. Previously, the warmer blue and more orangey red of Group IV were used by these publications.

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

During the year 1966, the following papers on color appeared in ILLUMINATING ENGINEERING, the technical journal of the Illuminating Engineering Society.

1. Color in Theatre and Television Lighting
2. Review of Color Preference Studies, IERI Project 48
3. Color Rendering Index, Simple Empirical Method for Measuring

In February 1966, a number of IES members attended the special technical conference of the Council, entitled "Instrumental Approaches to Colorant Formulation," held in Williamsburg, Virginia, and a report on said meeting was submitted by the IES representative attending.

Since the Commission Internationale De L'Eclairage (CIE) is holding their quadrennial meeting in Washington, D. C., beginning June 19 through June 28, all those delegates interested in color from abroad have been invited to the 1967 Annual Meeting of I.S.C.C., and I am sure that many members of the I.S.C.C. will be attending the CIE meeting in Washington, where they will be particularly interested in Committee E 1.3.1, Colorimetry, and E 1.3.2, Color Rendering.

REPORT FROM THE INDUSTRIAL
DESIGNERS' SOCIETY OF AMERICA
DELEGATES. R. SPILMAN, CHAIRMAN

A polling of the I.D.S.A. membership provided a variety of opinion concerning the Use of Color in Products, Interiors, Contract Interiors and

Furniture. Because so many of the opinions expressed are totally interesting and informative, I have submitted our Society report as a compilation of members' responses to our request, verbatim.

Last year we tried to separate the members' responses to color use into the separate categories, but there are so many interrelated statements on the use of color in products, interiors and furniture, that I have elected to synthesize respondents' input and submit it under their individual by-line.

In summation, I would suggest that the whole color situation is volatile. It seems to be varying from area to area and from product to environment. There is a strong trend toward more decoration and a tendency to - When in doubt, use wood grains.

DAMON WOODS, DIRECTOR, INTERIOR DESIGN, FORD MOTOR COMPANY

PRODUCT - "The big news colorwise around Ford this year, is the strong demand for Ivy Green. Both metallic and non-metallic versions are out-selling blue for the first time in years. Black interior usage continues to increase, probably acting as a foil for the exterior colors which exhibit a trend toward stronger chroma."

GORDON E. OBRIG, CONSULTING DESIGNER

CONTRACT - INTERIORS - "Offices - off white, pumpkin, brick red, coffee brown, cobalt blue, brown walnut; textures in solid colors.

"Hotels - oyster white, bronze gold, clear soft yellow, brown-black, indigo blue, yellow-green, deep tobacco brown, brick reds."

FURNITURE - "Brown oak, brown-gray ash, brown mahogany, cordovan brown, and black lacquer."

LEON GORDON MILLER, LEON GORDON MILLER AND ASSOCIATES, INC.

"Leaders of business and industry are developing an awareness of the importance of color in production, clerical, and merchandising facilities. The efficiency of working personnel and the merchandizing of products are greatly affected by the color and light of their environment. Color is being used as a working tool, not purely as aesthetics. The major discovery by men of business and industry is that within the basic characteristics of color required to fulfill a need, there is a large area for personal choice."

DAVE CHAPMAN, DAVE CHAPMAN, GOLDSMITH & YAMASAKI, INC.

PRODUCT - "Activities: Product Design, Packaging, etc. We find a move away from contemporary toward a traditional-oriented idiom in design; thus, a decrease in the metallics and pure bold colors; a move toward softer, wood tones, etc. - more pattern."

WILLIAM GOLDSMITH, DAVE CHAPMAN, GOLDSMITH & YAMASAKI, INC.

HOME FURNISHINGS - "New color combinations inspired and led by the 'mod' fashions of our times and providing attention-getting and unique approaches in packaging, graphics and products, especially in the home decorating field, which will probably be around for several years, at least. Some of these mod colors will be established as 'staples', as has the blue and green combination, 'new' only a few years ago. Collateral to this, black and white has achieved considerable favor in many applications where color formerly was used."

INTERIORS - "In architecture and in interiors, there continues to be a strong trend for 'natural' colors, i.e. wood tones, and 'material finish colors,' i.e. steel greys, copper browns, etc. and subdued earth tones. These provide a mellowness and agelessness, and often a neutral background for use of 'explosive' and bright colors as accents. Also, texture and tactile quality is being combined with color as an 'integral finish.'"

PRODUCTS - "Lastly, the use of color in plastic and vinyls is more often 'backing up' the colors and hues of the interior materials, i.e. they look like the woods and metals which are used in the same interiors, on the same furniture and hardware, etc."

HENRY DREYFUSS, HENRY DREYFUSS & ASSOCIATES

PRODUCT - "Because of our interest in mass produced products as well as things used by a great number of people (airplanes, etc.), we remain reasonably conservative about colors, staying with the standard established neutrals so they will work in various environments and satisfy many people. These neutrals in turn become standards for us. Even when we have suggested to our clients that they offer a selection of more intense colors on some particular products, we find the public invariably choose the neutrals."

TUCKER P. MADAWICK, EXECUTIVE VICE PRESIDENT,
MANAGER INDUSTRIAL DESIGN, RCA SALES CORP.

PRODUCT (Radios) - "Sharp, purer colors continue to rise in consumer electronics, especially in supporting roles, to an ever increasing variety of neutral foils - - such as off-whites, putty, and warm, light beiges. Yellow-greens and strong chromatic blues are increasingly becoming basic and certain reds, in particular, red purples, near magentas and orange-reds, are pushing upward, undoubtedly being assisted by the current 'MOD YOUTH' syndrome."

T.V. - "In the case of wood finishes, as applied to our color and stereo line, the warm toast values will continue through 1968-69. Opaque and translucent colors are gaining in their application to fine furniture pieces, but their scale is minimum when applied to the overall picture."

GEORGE A. BECK, GEORGE A BECK ASSOCIATES

CONTRACT INTERIORS - "Lincoln Bank - English oak panelling, aluminum baseboard, Verde antique Vermont marble vault, carpet-amber hand-loomed

wool. Walnut desks. Walnut & teak chairs, leather upholstery in tan & rose madder. Teller counter - English oak panelling w/aluminum pegs & trim, black cast aluminum bases, black colorlith countertop w/teller work areas in natural Palomino Parkwood & amber Plexiglass dividers. Safe deposit area - teak panelling, beige vinyl walls, chairs, gold vinyl on teak. Executive areas - Partitions off-white, dark natural burlap, natural Comark sheet cork, walnut cabinet work."

INTERIOR - "Secretarial pools, gold burlap walls, oak doors, white frames & baseboards. Metal desks, mist green, w/beige scrim plastic laminate tops. Steno chairs, bamboo coverings; files, bamboo color; carpet, ice blue/green wool."

PRODUCT - "Electronic hand tool, a consumer & technical product, colors: Marbon ABS plastic in metallic blue w/white trigger & transformer, blue nameplate. Colors chosen for broad customer acceptability with the desired effect of quality line but not expensive."

BENJAMIN E. WERREMEYER, HENRY P. GLASS ASSOCIATES, INDUSTRIAL DESIGN

HOME FURNISHING - "We are in the midst of the 'MOD' fad, in which anything goes, come hell or high water. I can only hope that sanity sets in soon, since the eye can take only so much of this."

"Contract Furnishings will continue at their high and low color taste levels with no foreseeable changes."

PRODUCT - "Consumer Products, institutional equipment, mobile homes, etc. - no changes foreseen."

J. O. REINECKE, REINECKE & ASSOCIATES, INDUSTRIAL DESIGNERS

PROGRAMS - "Large scale color coordination programs that place products, packages and all other visual elements under strict control are being developed by several companies. And, in general designers appear to be reinforcing color selection with more conscientious planning."

"Bright colors in a neutral environment or contrasted with black continue to gain in popularity."

C. M. GANTZ, HEAD, INDUSTRIAL DESIGN SECTION, THE HOOVER COMPANY

PRODUCTS - "General trends in majors seem to indicate strong emphasis on wood-related tones to blend with furnishings. Coppertones and various avocado shades are the rule."

"This trend appears to be extended into small appliances with wood grains and warm, bright greens, golds, and oranges. Neutrals seem to be warm grays, beiges, and whites."

"The character of these shades vary from bright decorative display colors to paler tints for bath and bedrooms."

WINSTON H. SUTTER, MANAGER, TEXTILE DIVISION, JENS RISOM TEXTILES

"Our color experience relates to upholstery fabrics used primarily in non-residential interiors - offices, libraries, banks, hospitals, etc. In 1966, after two years development time, we introduced an upholstery fabric called CHROMA 1 in 65 carefully styled colors and ranging the spectrum. We developed a CHROMA COLOR WHEEL derived from the Munsell notation system with 16 different color group categories. Each of the 65 colors was numbered to relate to its specific color group. A study of yardage sales by color group for a one-year period show that five of the 16 color groups account for over 77% of the total yardage sold, and that two of these color groups accounted for 50%. The attached printed Color Wheel (Ed. note: Changed to tabular form for convenience in reproduction.) shows the percentage of sales by color group. Based on previous annual studies of sales by color, we find no discernible trend away from these past stalwarts - yellowish-reds (clay etruscan); reddish-yellows (persimmon, amber, honey, maize, mustard, tobacco, burnt orange); yellowish-greens (olive, moss, forest); blues (a full-bodies blue-blue, navy, royal); and black."

CHROMA 1

<u>Color</u>	<u>Percent Sales</u>
Red	3.20
Yellowish-Red	26.00
Reddish-Yellow	24.00
Yellow	1.75
Greenish-Yellow	4.33
Yellowish-Green	10.50
Green	2.37
Bluish-Green	2.44
Greenish-Blue	3.15
Blue	9.00
Purplish-Blue	1.33
Bluish-Purple	.48
Purple	2.56
Reddish-Purple	.34
Purplish-Red	.37
White and Off-White	1.25
Black	6.93

THEODORE G. CLEMENT, INDUSTRIAL DESIGN, EASTMAN KODAK COMPANY

PRODUCT - "In the Commercial Products Division of Eastman Kodak Company, future product planning will continue to adhere closely to the decor of contemporary office interiors, as far as color is concerned. About half of our current output carries stainless steel trim with walnut vinyl-clad removable panels and work surfaces of light Beige Formica or equivalent. Control panels and name plate areas will continue in accent colors of Swedish Red, Copenhagen Blue and, more recently, off-White.

"Business machines will be dominantly Light Beige with medium Warm Grey as the secondary color and accents in off-primaries for control panels and name areas. All painted surfaces will be textured.

"The use of wood grains on processing equipment is not entirely aesthetic. We have learned that they are less susceptible to staining from processing solutions at the hands of careless operators, than painted surfaces. All hospital X-Ray processors are now walnut vinyl-clad and many have aluminum hex-cell cores as a safeguard against warpage from the warm vaporous atmosphere inside."

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

The past year has seen still
further acceptance of the
AAAA-MPA specifications for
Standard Four-Color Process

Proofing Inks for wet letterpress magazine printing first issued by NAPIM in September, 1964. AAAA-MPA is not planning to extend the use of these same hues to four-color web offset printing and has requested the Ink Association to recommend standard specifications for these inks. This work is now underway and it is expected that it will be completed before the end of the summer.

With the advent and growth of electrostatic proofing methods using liquid toners on zinc oxide coated paper, the industry has become involved with the development of toners of the proper color, and electrostatic methods are in the development stage for printing with dry toners from gravure cylinders or plates. Still another electrostatic development, pioneered by Gravure Research Institute, makes use of electrostatic charges to assist in the release of conventional gravure inks from gravure cylinders.

The Ink Association is considering a program for printing ink colorant analysis by instrumentation with the long range goal of developing computerized methods of instrumental color matching. Neither the Kubelka-Munk formulas nor modifications of them up to this time have proved satisfactory for printing inks for a variety of reasons.

Harold Stanley, a graduate student at Lehigh University, has completed his masters thesis on "The Effect of Particle Size on the Color of Quinacridone Red, An Organic Pigment."

The American Ink Maker for June, 1966 carried a full report covering the ISCC Conference on instrumental approaches to color formulation.

NPIRI is working on the application of the Mie equations to dilute suspensions of pigment agglomerates. This work currently is being done with carbon black.

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

No report.

NATIONAL SOCIETY OF INTERIOR
DESIGNERS, INC. DELEGATES.
C. JAMES HEWLETT, CHAIRMAN

No report.

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

Color interests continue to be well represented at meetings of the Optical Society of America in spite of the increasing attention being

given to newer fields of optical interests - lasers and radiometry, holography, atmospheric and space optics.

At the October 1966 meeting, held in San Francisco, John Schleiter and Jack Kuder gave a paper on automatic processing of spectrophotometric data, the Ives Medal address by George Wald was on blue-blindness of the central fovea, there were several papers on physiological optics, and at the Friday afternoon session six papers were presented.

The program of the April meeting, held in Columbus, Ohio, was opened with an invited paper on color by Dr. Judd. This was the fourth progress report of the OSA committee on uniform color scales. The color session that followed consisted of seven contributed papers. There were two invited papers on stereopsis (Angela Little has been discussing color stereopsis examples in recent numbers of Color Engineering). One of the papers was by three men working at Berkeley (Barlow, Blakemore, and Pettigrew); the other was by Julesz, at Bell Telephone Laboratories. A versatile spectrophotometer was described at another session, and there were two sessions on physiological optics in which two of the papers were concerned with color subjects.

On Thursday evening during this spring meeting, eleven technical groups met for general discussion on specialized topics, and for the first time color was included as one of the subjects. The color group was well attended in spite of a conflicting session on vision. Discussion lasted until about 10:30 p.m. and covered a wide range of subjects, including rather extended discussion of two of the papers that had been presented at regular sessions of the society. The feeling was expressed that there is a need within the society for such a group to meet quite regularly. Those attending the meeting, and other interested members, will be notified of a similar meeting to be planned for the October meeting in Detroit, at which time - if interest continues to warrant it - a more permanent chairman will be selected to lead the group.

Two meetings of the OSA uniform color scales committee have been held since our last report, one in August 1966 in Ottawa, at the National Research Council, the other in March at the National Bureau of Standards in Gaithersburg, Maryland. The report made to the society by Dr. Judd at the April meeting, which will be published, covers the progress made in recent months.

Research papers on color and vision continue to find the Journal of the Optical Society one of the most useful places for publication. An index to 1966 papers will be found in volume 56 of JOSA, author index on pages 1798-1807, subject index, pages 1808-1827. A 65-page history of the first 50 years of the Optical Society, 1916-1966, appears in the March number of the journal.

Attention of ISCC members is called to the fall meeting of the society, to be held in Detroit, October 11-13, 1967. One of the invited speakers is Prof. Marcel G. J. Minnaert, who will speak on Unusual Optical Phenomena in the Landscape. He is the well-known author of The Nature of Light and Colour in the Open Air (available in a Dover paperback translation). He is the famous

authority on the why and how of shadows, reflections, rainbows, mirages, and over 100 other phenomena of light and color. Any ISCC member who may be interested to hear him would be welcome at the meeting.

For 1967, representatives to the ISCC from the OSA consist of 10 delegates (Bellamy, Foss, Fry, Granville, Hardy, Hunter*, Ingle, Judd, MacAdam*, Nickerson*) and the OSA secretary, Mary E. Warga, ex officio. (* Voting member.)

PACKAGE DESIGNERS' COUNCIL
DELEGATES. KARL FINK,
CHAIRMAN

No report.

RESEARCH AND ENGINEERING COUNCIL
OF THE GRAPHIC ARTS INDUSTRY, INC.
DELEGATES. WILLIAM E. WARD, III,
CHAIRMAN

No report.

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.

The most interesting problem 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.

There has also been a continuing interest with the newer quartz iodide and xenon light sources, both for taking and projecting pictures as well as for making prints.

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

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

No report.

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

The activities in "color" of the Society of Plastics Engineers, Inc. have been spearheaded by the Coloring and Finishing of Plastics Professional

Activities Group under the direction of Mr. Robert Zabel, chairman.

In addition to active participation by SPE members in the Williamsburg Conference, the following special "color" programs were presented:-

- 1 - A joint ISCC - SPE panel discussion was held at the annual National Technical Conference in Montreal on March 8, 1967, under the direction of Dr. F. W. Billmeyer, Jr. Dr. Roland Derby, chairman of the ISCC Problems Committee, and several of his subcommittee chairmen explained the work of ISCC.

- 2 - Three papers on color and pigment problems in plastics were also presented at this Annual National Technical Conference.
- 3 - A regional technical conference, COLORING OF PLASTICS III, jointly sponsored by the Palisades Section of SPE and Cofin-PAG was held on June 10, 1966, in New York City. Dr. F. W. Billmeyer, Jr., presented a review to SPE of the Williamsburg Conference at this time as part of program.

Two changes in personnel of Cofin-PAG must be noted. Dr. F. W. Billmeyer, Jr., has relinquished his post as Chairman of the SPE Delegation to ISCC in accordance with ISCC By-Laws (Dr. Billmeyer is President-Elect of ISCC). Miss Ruth Johnston's resignation as secretary was accepted with regret. Mis Johnston resigned because of the pressure of other business.

The following articles on color and color problems appeared in 1966 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, page 56.
- b) Coloring Systems for Foamed Plastics: by Martin C. Miller: January, page 44.
- c) Economic Advantages of In-Plant Dry Coloring of Impact Styrene: by M. Harris: February, page 84.
- d) ISCC Instrumental Colorant Formulation Conference in Summary: by F. W. Billmeyer, Jr.: October, page 43.
- e) SPE - ISCC Color Panel at Montreal Antec: by F. W. Billmeyer, Jr.: August, page 42.

TANNERS' COUNCIL OF
AMERICA, INC. DELEGATES.
RUTH H. KERR FRIES, CHAIRMAN

No report.

TECHNICAL ASSOCIATION OF THE
GRAPHIC ARTS DELEGATES.
H. BRENT ARCHER, CHAIRMAN

No report.

REPORT FROM THE TECHNICAL
ASSOCIATION OF THE PULP AND
PAPER INDUSTRY DELEGATES.
V. N. DeFELICE, CHAIRMAN

Most of the TAPPI effort related to color was carried on by the Optical Methods Committee of the Testing Division, (Chairman, Vincent N. DeFelice). This committee will hold a technical session on Optical

Methods at the annual TAPPI Testing Conference at Chicago on Wednesday Sept. 27 at 2:00 p.m., which will include a paper on color scales. The Committee meets twice a year, with work carried on by sub-committees throughout the year. Members of the committee also act in an advisory capacity to the American Delegation to the International Standards Organization in respect to matters which fall within the scope of the Committee.

Papers published in Tappi, the official publication of TAPPI, which related to color and other optical properties were as follows:

1. Trosset, Stanley W., Jr. "A Method of Storage for Maintaining Brightness and Color of White Standard Samples," Tappi vol. 49, no. 4: 61A-65A (April, 1966)
2. Roeher, Walter W. "Measurement and Reduction of Ink Strikethrough in Newsprint." Tappi vol. 49 no. 6: 255-259 (June, 1966)
3. Hillend, W. J. "Opacity Problems in Printing Papers: Kubelka-Munk Theory Gives Good, Quick Answers." Tappi vol. 49, no. 7: 41A-47A (July, 1966)
4. Ramsay, Howard L. "Simplified Calculation for Predicting Optical Properties of Coated Board." Tappi vol. 49, no. 12: 116A-118A (December, 1966).

In addition, the following Routine Control Methods, based on the work of the Optical Methods Committee, was published:

1. R. C. 332 "Specification and Ranking of Whites and Near Whites." Tappi vol. 45, no. 9: 167A-168A (September, 1966).

REPRINTS ENCLOSED
WITH THIS ISSUE

A paper from the Williamsburg conference:

"Industrial Use of Instrumentation and Computation for Color Matching and Control" by Hugh R. Davidson and Henry Hemmendinger. Color Engineering, May-June 1966.

"Edge-Loss Errors in Reflectance and Transmittance Measurement of Translucent Materials" by J. T. Atkins and F. W. Billmeyer, Jr. Materials Research & Standards, Vol. 6, No. 10, Nov. 1966.

LIST OF ARTICLES ON
COLOR RECEIVED BY
NEWS LETTER

"Color by Numbers," Reproduction Methods for Business and Industry, 5, No. 12, pp. 22-25, 43 (December 1965).

"Color Discrimination in the Cat," J. A. Sechzer and J. L. Brown, Science 144, pp. 427-429 (1964).

"Color Interchemical Fair Theme," American Ink Maker, XLII, No. 7, pp. 34, 58-59 (July 1964).

"A Color Matching Approach to the Tinting Strength of White Pigments," Parker B. Mitton, Off. Digest, 37, No. 480, pp. 43-56 (January 1965).

"Color Measurement and Tolerances," David L. MacAdam, Official Digest, 37, No. 491, pp. 1489-1531 (December 1965).

"Color Specification and Control," *Reproduction Methods for Business and Industry*, 5, No. 12, pp. 26-30, 36-37 (December 1965).

"Color Strength and Shade of Dye" (Proposed Revision of Suggested Method T626), *TAPPI*, 48, No. 8, pp. 152A-154A (August 1965).

"Color Tolerances," Therese R. Commerford, *Lab Notes*, 5, No. 3, pp. 11-28, (December 1964).

"Color Vision Deficiency in Primary School Children," Gilbert F. Shearron, Ed.D., *The Sight-Saving Review*, pp. 148-150 (Fall 1965).

"Colorant Needs in Industry," Robert S. Foster, *Color Engineering*, 3, No. 4, pp. 21-22 (July-August 1965).

"Colour and Adaptive Colouration in Marine Life," H. R. Haefelfinger, *Palette*, No. 21, pp. 3-11 (1965).

"The Colour Difference Meter," E. L. McFadin, *British Ink Maker*, 7, No. 4, pp. 218, 219 (August 1965).

"Colour in Medieval Wood Carvings," Ernst Murbach, *Palette*, No. 20, pp. 11-19 (1965).

"Colour in Woven Design Today," K. G. Ponting, *J. Soc. Dyers and Colorists*, 81, No. 12, pp. 540-544 (December 1965).

"Correlation of Visual Luster with Measured Reflectance of Cotton Fabrics," Truman L. Ward and Ruth R. Benerito, *Tex. Res. Jour.*, 35, No. 3, pp. 271-279 (March 1965).

"Design Trends in Wallpaper in Their Influence on Pigment Usage," R. E. Grime, *J. Soc. Dyers and Colorists*, 81, No. 12, pp. 553-555 (December 1965).

"Determination of Absolute Values of Total and Spectral Radiant Intensities of Tungsten Lamps," *Photo. Sci. & Eng.*, 9, No. 3, pp. 190-196 (May-June 1965).

"Determining the Hiding Power of Colored Coatings," H. G. Volz, *Farbe Lack* (in German), 71, No. 9, pp. 725-734 (September 1965); *Paintindia*, 15, No. 9, p. 31 (December 1965).

"A Deuteranomalous Artist," R. W. Pickford, *British Journal Psychol.*, 55, No. 4, pp. 469-476 (1964).

"Development of Colour Strength during the Grinding of Pigments," D. Von Pigenot (Papers presented at the VII F.A.T.I.P.E.C. Congress, Vichy, 1964, 249-62, in German).

"Developments in Spectrophotometry and Papermaking," J. A. Van Den Akker, *Tappi*, 48, No. 2, p. 57A (February 1965).

"Digital Computer Color Matching," E. Allen, *Am. Dyestuff Reprtr.*, 54, No. 10, pp. 57-63 (May 1965).

"Effect of Exposure Time on Induced Color," Jo Ann S. Kinney, J. Opt. Soc. Amer., 55, pp. 731-736 (1965).

"Effects of Ultraviolet Radiation on Color and Infrared Spectra of Azo Compounds," E. R. Champlin and R. L. Fyans, Am. Dyestuff Reprtr., 54, No. 24, pp. 50-57 (November 1965).

"Encycl. of Sci. & Technol.," Color Vision; Color; Black; Grey; White; L. A. Riggs, McGraw Hill, New York (1960).

"Equipment and Techniques for Measurement and Characterization of Paper Reflectance Variation," Clarence L. Jones and A. Bowman Budinger, Tappi, 48, No. 1, pp. 54-59 (January 1965).

"Evaluation of Pigments for Printing Inks," S. S. Malhotra, Paintindia, 14, No. 11 (February 1965).

"Evaluation of Whiteness Using Relative Spectral Radiance Measurements," Franc Grum and John M. Patek, Tappi, 48, No. 6, pp. 357-362 (June 1965).

"Factors Affecting the Quality of Projected Images: Levels of Veiling," C. J. Bartleson, Photo. Sci. & Eng., 2, No. 3, pp. 179-183 (May-June 1965).

"The First Year's Experience with Instrumental Match Prediction," T. L. Dawson, A. N. Derbyshire, and D. R. Lemin, J. Soc. Dyers and Colorists, 81, No. 7, pp. 306-314 (July 1965).

"How the Chemist and Physicist Assist the Practical Dyer," H. H. Sumner, J. Soc. Dyers and Colorists, 81, No. 5, pp. 193-200 (May 1965).

"The Influence of Colour in Printed Textile Design," J. H. Hollingworth, J. Soc. Dyers and Colorists, 81, No. 12, pp. 535-539 (December 1965).

"Inorganic Pigments--Present and Future," William G. Huckle, Color Engineering, 3, No. 4, pp. 23-27, 38 (July-August 1965).

"Instrumental Color Specification: Role of the Dye Manufacturer," Joseph P. Neary, Tappi, 48, No. 2, p. 61A (February 1965).

"Instrumental Color Specifications as They Pertain to the Paper Manufacturer," Rolland S. Marsh, Tappi, 48, No. 2, p. 59A (February 1965).

"Lighting Needs for Older Eyes," C. L. Crouch, The Sight-Saving Review, XXXV, No. 4, pp. 213-215 (Winter 1965).

"Light Transmittance of Pigmented Films as an Index of Hiding Power," C. I. Gandhi and G. C. Williams, Off. Digest, 37, pp. 1111-1140 (Sept. 1965).

"Low Temperature Storage of Color Standards Panels," S. J. Huey, Color Eng., 3, No. 5, pp. 24-30 (September-October 1965).

"Low Vision Services," Margaret Gnade, The Sight-Saving Review, XXXV, No. 4, p. 216 (Winter 1965).

"Measurement of Opacity in Fibers," H. Brody and R. G. Quynn, Tex. Res. Jour., 35, No. 6, pp. 524-529 (June 1965).

"Meeting the Paper Industry's Requirements for Color Instrumentation," Richard S. Hunter, Tappi, 48, No. 2, pp. 63A-65A (February 1965).

"A New Colour-Matching Computer," A. E. Cutler, J. Soc. Dyers and Colorists, 81, No. 12, pp. 601-608 (December 1965).

"New Development Adds Yellow-Green to Phthalocyanine Spectrum," Robert E. Brouillard and Vellney Tullsen, Am. Paint J., 44, No. 1, pp. 42, 46, 48, 50 (1959).

"Novel Tests of Color Vision in Suspected Dichromats," H. Scheibner and E. J. Rinalducci, J. Opt. Soc. Amer., 55, p. 609(A) (1965).

"Phenomenological Theory of Light Scattering and Light Absorbing Media." Part II: "Possibilities of Determining the Constants Experimentally," H. Volz (Papers presented at the VII F.A.T.I.P.E.C. Congress, Vichy, 1964, 194-201 in German).

"Quantitative Estimates of Saturation," J. W. Onley, C. L. Klingberg, M. J. Dainoff, & G. B. Rollman, J. Opt. Soc. Amer., 53, 487 (1963).

"Le vert n'est pas la complémentaire du rouge," Cyril Ouvaroff, Couleurs, No. 60, 1965, 21-26.

"Vision des faux violets et leur utilisation en signalisation maritime," P. Blaise and M. Laffin, Couleurs, No. 60, 1965, 27-36.

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