

Inter-Society Color Council *Newsletter*

NUMBER 214

September-October 1971

ANNUAL MEETING, 1972

Preliminary Announcement

At the Fall meeting of the Board of Directors, John T. Smith, Jr., Program Chairman for the 1972 Annual Meeting, presented the following tentative plans. The banquet speaker will be Dr. Walter Clark, retired from Eastman Kodak Co. Detailed arrangements for this talk are being set up by A. L. Sorem, ASP Delegate. The following speakers and topics are to form the basis for both the Monday Forum and the Tuesday Symposium, the exact split yet to be established: Anthony Salerno, U.S. Geological Survey, "Color in Ortho Photography"; Richard Underwood, NASA (arranged by Dr. Gilruth), "Color Photography from Space"; Dr. Frank Webber, "The Interpretation of Color Photography"; Dr. Harold Rib, "Color Measurement of Color Photographs"; Dr. Ed Yost, "Multiband Photography in Color"; and Sheldon Phillips, "Color Underwater Photography."

Meeting dates for 1972 are Monday, March 20, and Tuesday, March 21, with the banquet scheduled for Monday evening instead of Tuesday as in previous years.

FALL BOARD MEETING

The ISCC Board of Directors met in New York City on Oct. 4, 1971. Present for all or part of the meeting were R. M. Hanes, President; R. S. Hunter, Vice-President; F. W. Billmeyer, Secretary; S. L. Davidson, R. L. Feller, G. B. Gardner, and R. Spilman, Directors; R. E. Phipps, assistant to the Treasurer; R. W. Burnham, Publications Committee; R. E. Derby, Jr., Problems Committee; M. Wilson, Arrangements Committee; W. J. Kiernan, President's Advisory Committee; C. J. Bartleson, AIC Liaison Committee; and C. Rohlfsing, K. L. Kelly, and J. T. Smith, Jr. Of the officers and Directors, only W. B. Reese was absent, being abroad at the time.

Major items of business were as follows:

A report by John T. Smith, Jr. on plans for the 1972 Annual Meeting (see lead article of this issue of the *N.* for details). The Board expressed its pleasure at having the annual meeting program so well outlined at such an early date.

Approval of the applications for Individual Membership and a report by C. J. Bartleson on arrangements for the second quadrennial meeting of the AIC. (Both of these items are treated in separate articles in this issue of the *N.*)

Report by Kenneth L. Kelly, Chairman of the Nominating Committee (I. A. Balinkin and W. N. Hale, Jr., members) on the selection of candidates for officers and directors for 1972-1974. The Board approved Mr. Kelly's report and discharged his Committee with thanks for prompt and effective service. The report of the Nominating Committee will be mailed in the near future to all voting delegates.

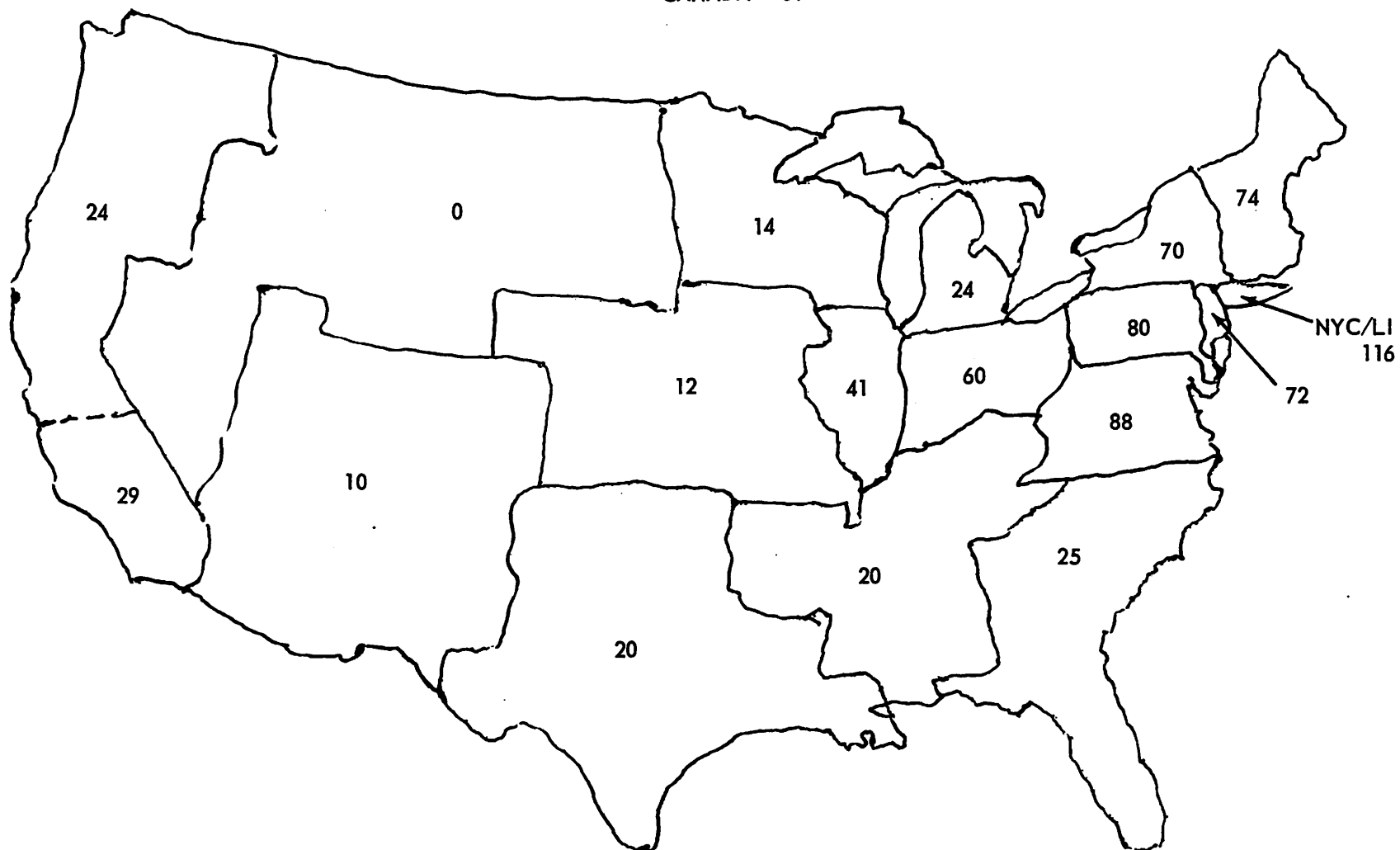
Cooper-Hewitt Museum Liaison Committee report by Christian Rohlfsing, Chairman, and W. J. Kiernan. (Calvin S. Hathaway, the third member of this *ad hoc* committee, contributed to the report but could not be present.) The Board approved the report and a statement of scope for a new Standing Committee, to be called the Cooper-Hewitt Museum Liaison Committee, noting that while this project had started under the Information Bureau, it had now reached a magnitude warranting independent status. Mr. Rohlfsing accepted the chairmanship of the new Committee.

Appointment of S. L. Davidson, Director, as Chairman of the Information Bureau, with responsibility for reviewing the scope of the Bureau, recommending possible changes, and recommending appointment of other members to this Standing Committee.

Report by the Secretary, Fred W. Billmeyer, Jr. on the printing of the new membership list and on a quick geographical survey of ISCC membership. The new list will be distributed to members in the near future. The geographical survey showed clearly the preponderance of members in the east coast area, particularly from New York to Washington. Fifty-four percent of the membership is located in the New England and Middle Atlantic area, about 15 percent in the North Central area, nearly 5 percent in the Southeast, and nearly 6 percent along the West Coast. Canada accounts for about 3-1/2 percent and other foreign countries for nearly 7 percent.

FOREIGN - 62

CANADA - 31



ISCC MEMBERSHIP - 1971
GEOGRAPHICAL DISTRIBUTION

RWB 10/1/71

The Treasurer's Report, presented by R. E. Phipps, listed 122 individual members delinquent in payment of their 1971 dues. After a second notice and a reasonable time allowance for response, it was agreed that those who do not respond must be dropped from membership. Other schedules of the report, dealing with various aspects of liquidity, expenses, and income, led to Board action raising the registration fee for the Annual Meeting to \$10.00 and requiring the full cost of the banquet meal to be charged to attendees in order to increase Meeting income.

Discussion concerning revision of the By-Laws for the purpose of preserving the Council's tax-exempt status led to the following resolution: "It is the intent of the Inter-Society Color Council to amend its By-Laws to conform to the present statutes of the Internal Revenue Service regarding tax-exempt foundations." A committee will be appointed to consider this matter and other possible revision of the By-Laws.

The report of the first Macbeth Award Committee (Dorothy Nickerson, Chairman; R. L. Feller, Leo M. Hurvich, W. T. Wintringham, and John A. C. Yule, members) was read and approved, with thanks for prompt and effective service. The formal announcement of the recipient and other publicity will be handled by the Secretary. The Committee will proceed to prepare the report to be given at the presentation ceremony during the 1972 Annual Meeting. Ray Spilman reported that the prototype symbol of the award has been virtually completed by Prof. R. E. Redmann and his students in Industrial Design at the University of Bridgeport.

The report of the Publications Committee (R. W. Burnham, Chairman; William M. Benson, Ruth M. Johnston, Robert T. Kintz, Milton L. Pearson, and Herbert J. Zeller, Jr.) contained four recommendations for Board action:

1. That Rochester Institute of Technology be permitted to handle the distribution and sale of the Proceedings of the last Williamsburg Conference (beyond the distribution to all ISCC members) to help defray their expenses for binding, etc.
2. That ISCC charge for use of the mailing list and for inclusion of inserts to the Newsletter at advertising rates.
3. That publications of Problems Sub-committees and Conferences, and other official ISCC reports, be channeled through the Publications Committee for uniformity of editorial policy, and to assure ordering reprints at the time of publication.
4. That this committee be authorized to examine ways and means to arrange for the translation of key or major articles in the foreign literature dealing with color (possibly employ foreign members through AIC, etc.).

Recommendations #1 and #3 were approved by the Board without qualification, and #4 was approved with the proviso that the Publications Committee interact with the Information Bureau in this matter. After considerable discussion concerning #2, the Board adopted the following statement with respect to advertising: "It is the policy of this Board that the Newsletter shall contain only newsworthy material. No advertising shall be contained in the Newsletter nor circulated with it." With respect to use of the mailing list, the Board requested the Treasurer's office to make a recommendation regarding both usage and charges therefor.

The Board approved a suggestion by Midge Wilson that the Newsletter carry regularly a request for contributions of historical color material to the Council or, through it, to the Cooper-Hewitt Museum. The notice, as subsequently prepared, will be as follows:

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

Roland E. Derby reported that the Problems Sub-committees appeared to be operating smoothly, with several planning to hold fall meetings. A report is expected soon from the Subcommittee for Problem 25, Strength of Colorants.

The next meeting of the Board will be held in Williamsburg, Va., on Sunday, February 6, 1972.

R. M. Hanes

HURVICH-JAMESON AWARD

Dorothea Jameson and Leo Hurvich from the University of Pennsylvania were recipients of the Howard Crosby Warren Medal, awarded by the Society of Experimental Psychologists at their 1971 meeting in Boulder, Colorado. The award in this case is given for "outstanding research in psychology," specifically for their quantification of the opponent-colors theory with which many ISCC members are familiar.

THE INTER-SOCIETY COLOR COUNCIL COOPER-HEWITT MUSEUM LIAISON COMMITTEE

Objective: To promote color education by collaborative association between the Inter-Society Color Council and the Cooper-Hewitt Museum of Decorative Arts and Design. A committee shall be empowered to carry out this objective, provided that any commitment to the expenditure of Council funds shall require prior approval of the ISCC Board of Directors.

Scope: The Committee in order to achieve its educational objectives shall be governed by, but not necessarily limited to, the following:

1. Solicit gifts to the Museum and its associated Library, of artistic, scientific, and industrial, objects and publications dealing with color, and through the contemplated data bank retrieval facilities of the Museum and other museums make these available to students of color and design.
2. Solicit the help of ISCC member-body delegations, societies, and their industrial members for their guiding assistance to the Museum in order to demonstrate the role of color in their particular fields of interest.
3. Solicit individuals and corporate entities for support and advice in demonstrating the real and potential relations of color to the problems of society.
4. Promote the efforts of the Museum to provide for the study of color by assisting in the organization of educational study courses.

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

FIRST ANNOUNCEMENT

2nd AIC Congress, 'Colour 73' --
York, England

The second conference of the International Colour Association will be held in York, Great Britain, from 2nd to 6th July 1973. The venue will be the University of York, a modern campus about two miles from the centre of the city.

There is ample and excellent living accommodation available on the University Campus, so that delegates will be able to meet informally throughout the Conference. A very small amount of hotel accommodation has also been reserved in the City of York.

It is proposed to hold 'Single Session' meetings in the mornings, at which invited lecturers will survey various aspects of colour, to be followed by general discussion. In the afternoons, 'Parallel Sessions' will be arranged at which contributed papers on more specialized aspects of colour will be read and discussed. A call for papers will be made in the first circular which is to be prepared and circulated early in 1972.

York was for a long time the second city in England, and has many ancient and historic buildings. The Minster Church is famous for its stained glass windows. The surrounding country is some of the most lovely in Britain, with many places of great interest and charm. The industrial north is within an easy distance for those wanting to study British industry. An evening social programme and a programme for the ladies will be arranged.

The organizing committee, set up by The Colour Group (Great Britain), will function under a secretariat headed by Professor W. D. Wright. Further inquiries should be addressed to:

Professor W. D. Wright
(AIC Colour 73)
Applied Optics Section
Imperial College
LONDON SW7 2BZ
England

ISCC TECHNICAL CONFERENCE

Fluorescence and the Colorimetry of Fluorescent Materials

The Inter-Society Color Council is sponsoring a Conference on Fluorescence and the Colorimetry of Fluorescent Materials to be held in Williamsburg, Virginia on February 6-9, 1972 under the co-chairmanship of Franc Grum and Eugene Allen.

The main object of the Conference is to point out the problems connected with the measurement and evaluation of materials containing fluorescent additives. Eight invited papers will be presented by well-known authors from here and abroad who are working with these problems.

The papers will cover a fairly large segment of the field. Discussed will be the contribution of fluorescent

whitening agents to whiteness of papers, textiles, paints and printing inks.

Whiteness is said to be like justice, everyone is sure he knows what it is but as soon as he tries to tell someone else what he knows, he gets all confused.

This topic will be covered extensively.

There will be four rather basic papers, one an introduction to the general problem, the second on the measurement of fluorescent samples, the third on special topics such as the separation of reflected and fluorescent light and the determination of quantum efficiency and the fourth on applications of fluorescence to light fastness and photodegradation. Three of the papers will deal with practical applications to textiles, paper and printing inks. One paper will deal with the use of fluorescence in art and design.

After each paper, time for discussion will be reserved and a panel of experts on the particular field covered will be available to help answer the questions which may arise. The panel will also discuss light sources, fluorescent minerals and solid state materials in general.

Some time will be devoted to demonstrations and exhibits to help illustrate the concepts involved.

The Conference will follow the format of the previous Williamsburg Symposiums, starting with a reception Sunday afternoon, February 6, at 5:00 p.m. and ending at noon on Wednesday, February 9 including a luncheon on Tuesday. The technical sessions will be as follows: two papers in the mornings and one paper in the evenings with the afternoon free for informal discussion and recreation.

The list of speakers includes:

Herbert Aach, Queens College

Eugene Allen, Lehigh University

Ernest Ganz, Ciba, Basle, Switzerland

Franc Grum, Eastman Kodak Company

Henry Hemmendinger

Gunter Wyszecki, National Research Council of Canada

Akesson Stenius, Swedish Forest Products, Stockholm, Sweden

Richard Ward, Day-Glo Color Corporation

The Conference will be held at the Williamsburg Conference Center, Williamsburg, Virginia, and will be restricted to 100 people. Accommodations are

available at the Williamsburg Lodge. Rates vary from \$17 to \$21 per day for single occupancy and \$20 to \$24 per day for double. Due to the recreational and cultural facilities of the area, registrants may wish to include their families in their travel plans and are encouraged to do so.

Those desiring to attend the conference should fill in the information requested on a registration blank and return with a \$45 check (plus \$5 to include members of the registrant's family to the reception and luncheon) payable to the Inter-Society Color Council. Mail the form and check to Milton Pearson, Graphic Arts Research Center, Rochester Institute of Technology, 1 Lomb Memorial Drive, Rochester, New York 14623. The telephone number is (716) 464-2789, and may be used for inquiries or cancellations. Registrations will not be taken by telephone. Each registration form must be accompanied by the appropriate fee, which will not be refundable after December 15, 1971.

Conference Committee

Co-Chairmen

Franc Grum
Research Laboratories
Eastman Kodak Company
Rochester, N.Y. 14650

Eugene Allen
Lehigh University
Bethlehem, Pa. 18015

Arrangements

Milton L. Pearson
Technology Supervisor
Graphic Arts Research Center
Rochester Institute of Technology
1 Lomb Memorial Drive
Rochester, New York 14623

COLOR IN NATURE

The Field Museum of Natural History in Chicago had an interesting color exhibit recently.

Color in Nature, an exhibit of broad scope, examined the nature and variety of color in the physical and living world around us, and how it functions in plants and animals in their struggle for survival, reproduction, and evolution. It focused on the many roles of color, as in mimicry, camouflage, warning, sexual recognition and selection, energy channeling, and vitamin production, using specimens from the Museum's huge collections.

What was behind the Museum's presentation?

It started as one item among many in a list of suggested 1971 exhibits assembled early in 1970 by Solomon Smith, the Museum's coordinator of temporary exhibits. It emerged as one of the four selected by the Museum's ten-man exhibit committee -- composed of the director, chairmen of the four divisions (anthropology, botany, geology, zoology), chairman of the education department, planning and development officer, building superintendent, business manager, and chairman of the exhibition department.

It was among those chosen because color, as one of the fundamental dimensions of nature, is also one of the main dimensions of the Museum's collections. We know that the evolutionary function of color in plants and animals is often a critical aspect of their total character. We are aware of color in inanimate nature, but little more than some physical facts about how it is produced are understood.

The choice and execution of the Color in Nature exhibit demonstrates two exciting modern ideas in operation.

One is about the nature of learning, and one is about the art of design.

Old ideas about both learning and design usually involved static facts or objects or pieces. New ideas about both involve a sense of dynamic flow. For instance, knowledge was often thought of as accumulation of facts -- orderly, but in an essentially encyclopedic kind of order. "Furniture of the mind" was a favorite metaphor, but it did not mean the kind of comfortable furniture that invites one to slouch in it with shoes off. Knowledge is now more often thought of as systems and subsystems of relationships with which we interact. Unless "pieces" of information can be assimilated into patterns, little "learning" occurs.

Similarly, the old concept of design was based on arrangement of static elements around an axis, a kind of "middle," so as to produce a sense of equilibrium or symmetry. Design was often thought of as decoration for its own sake, to satisfy an esthetic appetite. Design is now more often thought of as a means to improve the effectiveness of communication and the flow of information.

Both of these new ideas are rooted in the fast, complex flow of modern industrial "mass" society. And both ideas represent challenge within the walls of a natural history museum as much as in the "outside world." A natural history museum is now an essential part of the mass education framework necessary to support a modern society. It must certainly continue to develop further its capacity to generate new knowledge and understanding through research, but its unique responsibility -- different from that of all other institutions in our society -- is to make knowledge about our natural world concrete, accessible, and understandable to everyone. A museum

is truly the most public of all educational institutions. The challenge is to educate by conveying understanding of the patterns of these complex, dynamic interrelationships.

The design of nature is a dynamic flow with many dimensions. Our designs for explaining it in exhibits must flow too and must combine as much concrete demonstration as possible with only as much abstract explanation in words as necessary. The whole must create a synthesis of visual appeal to both the emotions (by its interest) and the mind (by its logic).

To attempt to achieve such a grand goal, exhibit designers must think first, work later. They must thoroughly understand the information content and all the interrelationships in order to find the "storyline" pattern around which they can build to satisfy the three fundamental design principles -- function, flow, and form.

In the case of Color in Nature, the Museum's first sizable interdisciplinary exhibit, the several "storylines" worked up by each of the scientific staff concerned had to be woven together. The exhibit was probably the most comprehensive assemblage of information about color in nature that has yet been attempted anywhere.

The composite result drew upon all the new forms of visual communication technique, which newspapers, magazines, television, and even packaging have, in fact, pioneered and learned to exploit for the purpose of mass selling to a mass society. Our purpose was to transmit information by means of every appropriate visual mode simultaneously, and to do it simply, clearly, and fast. This purpose can be achieved only by design, good "information design" -- which doesn't just happen by accident. Sure formulas, smart gimmicks, short-lived fads like "cadillac tail fins" or novelty type faces have no place. The principles of information design being developed today are a response to a need of modern society. They aim always and above all for comprehension.

From Field Museum of Natural History Bulletin,
April 1971

REPORT FOR 1971

CIE E-1.3.1 Committee on Colorimetry

After much exchange of correspondence and a special meeting, attended by almost all of the members concerned with formulas for evaluation of color differences, held 1-3 September 1971 in Driebergen, Netherlands, under the auspices of the Association

Internationale de Couleur (AIC), the CIE Committee E-1.3.1 held an all-day pre-congress meeting jointly with E-1.3.2 on 7 September in the new Engineering Chemistry Building of the University of Barcelona. Intensive discussions occurred, concerning evaluation of degree of metamerism, standard sources for colorimetry, chromatic adaptation, colorimetric terminology, whiteness formulae, color-difference formulae, and gloss. The committee agreed to add to its program of study the topic of color constancy, which is related to chromatic adaptation, and, like the latter, should be considered in evaluation of the color-rendering qualities of light sources and in the evaluation of metamerism of reflecting materials. The committee also agreed to undertake studies of the evaluation and specification of gloss, which has an important effect on the perception of colors of materials and should be included in all specifications of reflecting materials.

The first technical session of the 17th Congress of the CIE, held in the Palacio de las Naciones, in Barcelona, 8 September, was chaired by Dr. Gunter Wyszecki, Director of the Secretariat for Committee E-1.3.1, and included the formal report of Dr. Wyszecki concerning the work of the Colorimetry Committee. The most concrete proposal was contained in the report of his subcommittee on degree of metamerism, which ultimately led to the action of the committee (on the next to the last day of the congress) to recommend adoption of a "Special Metamerism Index," for change of spectral distributions of illuminants. That is the only proposal of Committee E-1.3.1 that will come to the National Committees for approval under the three-months rule.

In essence, the Special Index of Metamerism is the color difference under a test light source between two samples that have different spectral reflectances but which are perfectly matched under a reference light source. CIE Source D₆₅ (daylight) is preferred as the reference source. Although CIE Source A (tungsten light) is preferred as the test source, the spectral distributions of several fluorescent lamps (having different color temperatures) are included in the recommendation, for use when more appropriate. Any other light source may be used, as occasion demands. The metamerism index should always be supplemented by statement of the reference and test sources assumed in the calculations. The decision whether the two samples are matched under the reference source, and the determination of their colors under the test source should be made by calculations from their spectrophotometric curves, by use of either the CIE 1931 standard observer for colorimetry, or the 1964 supplementary observer for 10° fields. The observer assumed should be stated with each report of metamerism index. Finally, the formula for color difference recommended by the CIE at the date of the determination should be used. Currently, this is the formula for color difference adopted by the CIE in 1964.

Extensive and intensive discussions occurred both at Driebergen and Barcelona concerning the advisability of replacing the formula for color difference adopted by the CIE in 1964. This change would involve not only the new proposed Special Index of Metamerism, but also the Color Rendering Index, already part of the CIE recommendations, and evaluations of color differences for all other purposes.

Dozens of different formulas for color difference are currently in use, each preferred in some active school, laboratory, industry, or country. The CIE 1964 formula has not gained the general acceptance that is desired for CIE recommendations, so the effort is continuing to establish its more general use or to find a formula that will be generally acceptable. The comparative tests of the 1964 formula and three others, set up as a working program by E-1.3.1 in 1967, have led to about 200 publications, but the committee found that they are not conclusive and in most cases are not responsive to the problem. The working program was reiterated and made more specific. Workers in the field are urged to provide information suitable as a basis for definitive action by the committee at a later Congress.

Most specifically, the committee agreed "In this work, the color differences are often judged on the basis of acceptabilities in some commercial context and not on pure perceptibility. Future works should be directed to perceptibility, because acceptability may vary significantly from one application to another." The committee further agreed to pool "existing data on threshold or subthreshold color differences (mainly data on color-matching variances) . . . to produce an agreed set of data representing the variance of color matching for observers having normal color vision."

The committee also recommended that "Because revisions and improvements are expected in color-difference formulae, the units used for differences evaluated by the CIE 1964 color-difference formula should always be denoted as 'CIE 1964 color-difference units.'"

Working programs were established for Color Terminology and Whiteness. The latter will consist of round-robin judgments of the whiteness of three groups of eight samples each. The samples within each group will be very similar to each other and judgments within each group will be by the method of pair comparisons. The samples in different groups will be rather different from each other, so as to include bluish whites, greenish whites, and even pinkish whites as well as the more familiar yellowish whites, in the study. The ratio-judgment method will be used to compare the whitenesses of samples in the different groups. This is a very thoroughly planned and prepared study of an old, baffling, and important problem.

The Study of chromatic adaptation will be continued

with the addition of consideration of color constancy.

A study of the problems and methods of evaluating and specifying gloss, especially in its relation to color appearance and specification will be undertaken.

The Colorimetry Committee E-1.3.1 will assist Committee E-2.2 in the revision of a document the latter has prepared on the spectral reflectance of lighting materials. This was the subject of lengthy and vigorous discussions during the Barcelona Congress.

The U.S. Technical Committee on Colorimetry has established the practice of meeting twice a year during the national meetings of the Optical Society of America. Greatly increased activity and participation by many new American workers in the field are

noted. Increased support of those worthy activities and workers, by the companies and other organizations with which they are associated, is urgently solicited. The time between Congresses is very short, the problems are many, and the decisions needed are difficult.

David L. MacAdam, Chairman
U.S. Technical Committee E-1.3.1

BRITISH COLOUR GROUP

Report of the Summer Visit to Courtaulds Limited Braintree and Bocking, in July 1971

The scene this year of the Group visit was to two of the spinning and weaving mills of the Courtauld group in Essex.

On arrival at the Braintree mill, the group was welcomed by Dr. Morton, which was appropriate since it was to him that the Group owed their thanks for the original idea of the visit and doubtless for much of its organisation. He explained how the Group would firstly see the processing of the incoming fibre into yarn, and then the weaving and finally its finishing into dyed cloth.

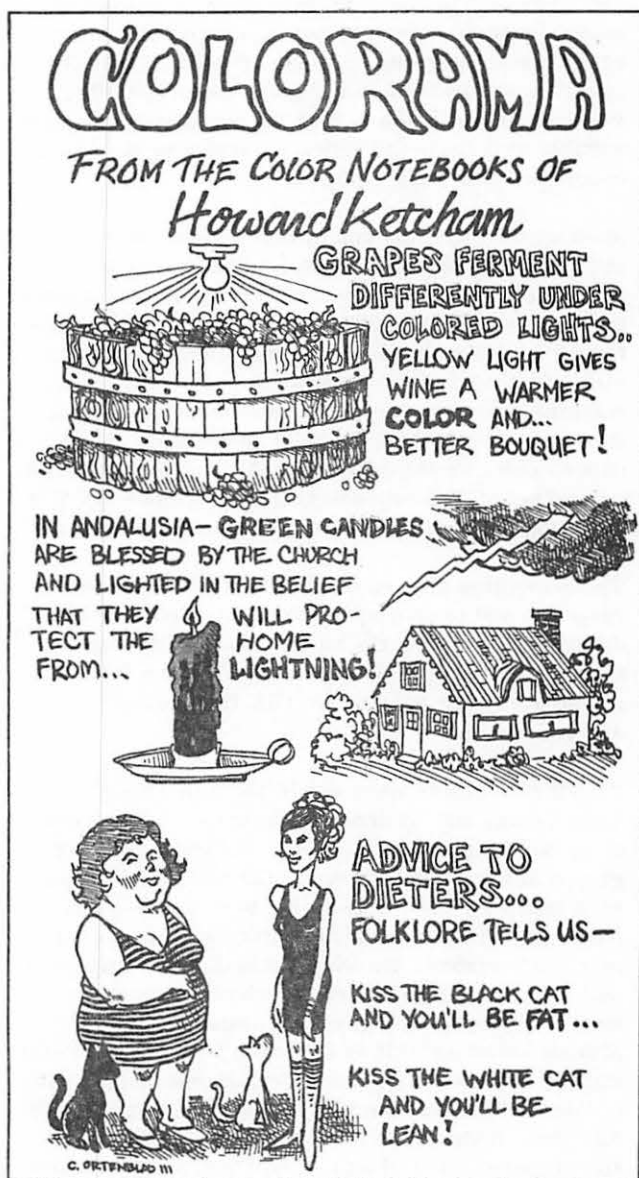
The group split up into parties and set off to various parts of the mills.

The basic fibres are received by the Braintree mill from Courtaulds own fibre plants, and also from other companies, at Braintree only synthetic and cellulosic types are used.

The first step is to rewind the fibre onto bobbins as a preliminary step before it is twisted to form the yarn. Twisting is done to various specifications and is carried out on numerous noisy, very fast machines, many of which were designed and built by Courtaulds. Twists are classified as either 'S' or 'Z' and by the number of twists per inch. For certain applications, e.g. crepe material, fibres of different types are twisted together to make the yarn; the different shrink rates then give the contoured effect to the cloth.

Yarn which has a very high twist, readily becomes tangled unless it has been steam set after twisting and this process was seen in operation.

Some fibre is purchased in the coloured form, but in general production is from white yarn, the cloth being subsequently dyed. The reasons for this are that the number of variations, and the vagaries of the market are such that it would be uneconomic to manufacture a wide range of coloured fibres.



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Having spun the yarn, it is wound on to a 'Beam' in readiness for weaving. Each of the many thousands of ends must be kept in order and finally threaded through a series of metal loops, this being done either automatically or semi-automatically depending upon the type of weaving involved.

The Braintree mill is probably the most advanced water jet loom mill in Europe. Water jet looms have no shuttle; they utilize a very powerful jet of water to take the thread across the warp. This jet of water is sufficiently powerful to puncture a piece of card, also to damage a finger if anyone is careless enough to put it in the way.

Water jet looms are capable of very high speeds since no mechanical stopping and starting of the shuttle is necessary. The normal manning rate of 30 looms per operator is possible, and productivity can be very high. There are, however, problems and at present only mass production type cloths are produced on water jet looms. The material is also meeting some sales resistance, since it does not have a selvedge.

After weaving the cloth is of course wet and so it must be dried; it is then inspected visually and any faults detected are fed back to the weaving section within as short a time as possible to prevent wastage.

A short journey, and a very good lunch later, took the group to the Bocking mill where the cloth is finally converted. This presented a much more colourful picture since the main operation was dyeing.

Three types of dyeing are practised; the majority of material undergoes jig dyeing in which rolls of cloth are fed through a dye liquor approximately 12 times until the right depth of shade is obtained. Winch dyeing is similar to jig dyeing except that the material is run through a bigger tank in the form of a hank of material which is dropped down and lifted up through the liquor. The third process is purely for such materials as terylene which will only take dyes properly under steam and pressure; this is termed 'Beam' dyeing.

The dyes for all these processes are formulated in the Laboratory to match the customers pattern, experimental dyeing facilities being available. The formulation is then put directly in to production and checks are carried out after each pass of the cloth. Adjustment of formulation can then be carried out if necessary.

Initial formulations are determined by use of the Pretema instrument to obtain tri-stimulus values in illuminants A and C; adjustments are also made by the same method. Visual matching is still, of course, employed and is carried out under BS 950 part I, artificial daylight.

It was said that the instrumental system was proving

a great asset. It had been found excellent for making the large steps towards a match, but it was still found that experienced colour matchers were needed to get 'the last little bit.' It was also found that the instrument could handle much better the three dimensional moves, whereas the colourist is at his best if only one direction is involved.

Nearly all the dyeing at Bocking is carried out using Cyan, Magenta and Yellow shade dyes which obviously simplify the instrumental application.

A visit was also made to the Laboratory. Comprehensive cloth identification and test facilities were seen including the obvious washing, lightfast, rub testing, tensile testing and seam strength testing. Where else would one expect to find a row of washing machines and an ironing board in a Laboratory?

Certain cloths are further processed by embossing and calendering and also by coating with resin prior to hydraulic pressing. This latter process starts with a light thin fabric and produces something which is quite remarkably different. Other finishes were the subject of continual experiment.

It was towards the end of this part of the visit that the group stood and admired a very large coil of cloth, some three feet across. When viewed from the end, this presented quite a remarkable sight; the coil contained several lengths of cloth of different shades and these presented themselves as a series of rings of colour of very deep shade, accentuated by the texture of the cloth viewed from the end-on position.

One of the most noticeable things about the visit in general was the tremendous complexity of modern fibres and cloths. It was also seen how dependent upon fashion, the demands for the various types of material could be.

As well as being of direct interest to colour instrumentalists, the visit was, from a technical and non-technical point of view, very worthwhile to the many disciplines represented by the group.

M.E.W.

LIGHTING RESEARCH AND TECHNOLOGY

A recent communication from The Illuminating Engineering Society of Great Britain was a reminder of their new publication "Lighting Research and Technology," initiated in 1969. It is published quarterly and subscriptions may be obtained for £7.50 per year. (Because of the floating dollar, we have not translated from English to American.) The journal contains papers presented to the IES, written contributions by specialists, scientific and technical articles, research notes, reviews, and

abstracts of articles published elsewhere. ISCC members who are interested may write to:

The Illuminating Engineering Society
York House
Westminster Bridge Road
London, SE1 7UN 01-928 7110

IN THE NEWS -- RIGHT OR WRONG (Ed.)

Lime-Yellow, Not Red

Shade of Difference in Fire Truck Color

ST. LOUIS (UPI) -- The head of a company that makes fire engines feels they should be horsepower of another color.

The color red has been associated with fire trucks for years and years, but Don Alvin says he has now learned red is not particularly good for high visibility.

Alvin is president of Ward LaFrance, of Elmira, N.Y., which produces various types of fire engines and other kinds of fire fighting equipment.

"Red is one of the least visible colors in the spectrum," Alvin says. "It is not particularly visible during the day and the eye is 'red-blind' at night."

Tops in visibility is lime-yellow, according to Alvin, who says researchers found it "a real eye-catcher." Yellow and white also are better than red, he adds.

He concedes many fire chiefs hesitate to buy trucks not painted red.

Says Alvin:

"We'll tell a chief that he really doesn't want a red fire truck and he'll say, 'What do you mean I don't want a red truck; I always buy a red truck.'"

Pittsburgh Press
September 23, 1971

RENSSELAER WORK CITED FOR TUTORIAL VALUE

The paper "Current American Practice in Color Measurement," contributed by the Rensselaer Color Measurement Laboratory, is one of seven documents selected for outstanding tutorial value in the field of color science. Authored by Prof. Fred W. Billmeyer,

Jr., in charge of Rensselaer's Color Science and Technology program, the paper is based on the results of an international Advanced Research Conference on Color Measurement held at Rensselaer, and was first published in Applied Optics, Vol. 8, pp. 737-750, in 1968.

The seven papers of which Dr. Billmeyer's is one have been reprinted as "Colorimetry-Selected Reprints," a project of the Optical Society of America's Committee on Resource Letters. This 100-page booklet was produced by the American Association of Physics Teachers for distribution to physics teachers and students. Copies may be purchased from the American Institute of Physics, Dept. BN, 335 E. 45th Street, New York, New York 10017.

Papers in "Colorimetry-Selected Reprints" in addition to the Rensselaer article are "On the Theory of Compound Colours," by James Clerk Maxwell, originally published in 1860; "A Maxwell Triangle Yielding Uniform Color Scales" by D. B. Judd, 1935; "The Breakdown of a Colour Match with High Intensities of Adaptation," by W. D. Wright, 1936; "Specification of Small Chromaticity Differences," by D. L. MacAdam, 1943; "The Basic Data of Colour Matching," the 18th Thomas Young Oration, by W. S. Stiles, 1955; and "The Measurement of Brightness and Color" (1966) and "Optical Resource Letter on Colorimetry" (1969) both by G. Wyszecki. The selection of articles was made by Dr. Wyszecki.

Dr. Billmeyer's paper "Current American Practice in Color Measurement" was also selected by the Color and Appearance Division of the Society of Plastics Engineers as a paper of outstanding interest to their membership, and was reprinted in the Spring 1971 issue of the SPE Color and Appearance Division Newsletter.

COLOR EDUCATION

Kollmorgen Announces Schedule for Color Courses for 1972

The practical training course, "Color and the Behavior of Colorants," will be presented several times during the year 1972 at Attleboro, Mass. and Charlotte, N.C. Courses are scheduled for the weeks of January 24, June 12, and September 18, 1972 at the Color Systems Division plant in Attleboro, Mass. and for the weeks of February 21, May 22, and November 13 at the new Kollmorgen Technical Center in Charlotte, N.C.

This one-week course includes basic information on color theory, color measurement, and colorant formulation, but emphasis is placed on reducing the theory to practice in industrial operations. Labora-

tory exercises provide experience in applying the theories described in the lectures to the solution of typical industrial color problems. Included in the course are discussions of methods for describing and measuring color and of the factors which affect the measurements; color differences, specifications and tolerances; color and colorant mixture theories and the techniques for using them successfully, and perceptual and appearance aspects which affect the application of instrumental techniques.

Registration is limited to a small group so that participants can receive individual attention. A previous knowledge of color or a formal advanced education is not a prerequisite for the course.

The course is presented by members of the Kollmorgen Corporation professional staff including Hugh Davidson, Ruth Johnston, Elaine Keller and James Davidson, head of the new Kollmorgen Technical Center in Charlotte.

For further information contact Miss Ruth M. Johnston, Director of Applications Services, Color Systems Division, 67 Mechanic St., Attleboro, Mass. 02703. Telephone 617-222-3880. For further information on courses to be given in Charlotte, N.C., contact Dr. James G. Davidson, manager, Kollmorgen Technical Center, Dixie River Road, Charlotte, N.C. 28210. Telephone 704-394-3131.

Clemson University -- Special Topics in Color Science

Program

Monday, December 6, 1971

Morning

"New Ideas, New Instruments, and Recent Developments"

Prof. Frederick T. Simon

Morning and Afternoon

"Illuminants and Sources for Colorimetry"

Dr. Gunter Wyszecki

"Dye Standardization"

Dr. Edwin I. Stearns

Tuesday, December 7, 1971

Morning

"Metamerism, Understanding and Use"

Dr. Gunter Wyszecki

Afternoon

"Color Metrics and Better Use"

Prof. Frederick T. Simon

Evening

Social and Banquet

Wednesday, December 8, 1971

Morning

"Color Formulation Program Needs"

Dr. Edwin I. Stearns

"Fluorescence as a Phenomenon and a Problem"

Prof. Frederick T. Simon

For information contact:

Wm. C. Laffoday

Professional Development, 124 Sirrine Hall

Clemson University

Clemson, South Carolina 29631

Lehigh University -- Special Course in Color Theory, Measurements, and Formulation

A special one-week course in color theory, measurement, and formulation will be held at Lehigh University starting January 24 (1972).

Titled "Color and the Formulation of Colorants," the course will be directed by Dr. Eugene Allen, research professor of chemistry at Lehigh, assisted by members of the professional staff of the Kollmorgen Corporation's color systems division from Attleboro, Mass. Kollmorgen will also supply equipment for the course.

The course is sponsored by the Center for Surface and Coatings Research (CSCR) at Lehigh and will be held in the University's Jennie H. Sinclair Conference Center in Sinclair Memorial Laboratory.

The course will be of interest to supervisors, technicians, and scientists engaged in either production or control of color or colored goods.

Basic information on color will be provided, with emphasis being placed on reducing the theory of color to practice in industrial operations. Laboratory exercises will provide experience in applying the theories described in the lectures to the solution of typical industrial color problems.

Included in the course will be discussions of methods for describing and measuring color and factors which affect measurement; color definitions, specifications and tolerances, color and colorant mixture theories and the techniques for using them successfully in various industries; and perceptual and appearance aspects which affect the application of instrumental techniques.

Registration is limited to a small group so that participants may receive individual attention. Previous knowledge of color or a formal advanced education is not a prerequisite.

For further information, contact Dr. Allen, CSCR, Lehigh, Bethlehem, Pa. 18015 (215-691-7000, Ext. 666).

COLOR AND HUNTING

Of the approximately 17 million licensed and non-licensed hunters, 850,000 cannot distinguish color properly -- a dangerous threat to fellow hunters.

What is the safest color for a hunter to wear? Research indicates that "hunter orange" is the only satisfactory color under all weather and lighting conditions. Hunter orange is a daylight fluorescent orange with a dominant wavelength 595-605 nm, a purity of not less than 85% and a luminance factor of not less than 40%. Imitations not meeting these standards are dangerous and have cost at least one hunter his life.

Red is no longer recommended because red cloth may not be seen by hunters having deficient color vision and because it becomes difficult to see in poor light and disappears at dusk.

TWENTY-SIX FIRMS JOIN GATF DURING THE THIRD QUARTER

Twenty-six graphic communications firms became members of the Graphic Arts Technical Foundation during the third quarter of 1971.

The new firms include: Mark-Burton, Inc., Boston, Mass.; Rycoline Solvent & Chemical Co., Chicago, Ill.; Graphic Rotary Manufacturing Corp., Bombay, India; R. I. Lithograph Corp., Pawtucket, R.I.; Schiele Faierson Co., Inc., Chicago, Ill.; Pacific Rotaprinting Co., Berkeley, Calif.; Typographic Service, Inc., Philadelphia, Pa.; Methodist Publishing House, Nashville, Tenn.; Southwestern Typographics, Inc., Dallas, Tex.; The Science Press, Ephrata, Pa.; Finch, Pruyn & Co., Inc., Glens Falls, N.Y.; and Carmelo & Bauermann, Inc., Rizal, Philippines.

Also, Graphic Arts Manufacturing Co., Houston, Tex.; Fisher-Harrison Corp., Greensboro, N.C.; Johnson Printing Co., Inc., Minneapolis, Minn.; McGrew Color Graphics, Kansas City, Mo.; National Label Co., Lafayette Hill, Pa.; Whittet & Shepperson, Richmond, Va.; and Logan Square Typographers, Inc.; Chicago, Ill.

Others are: Capitol Engraving Co., Nashville, Tenn.; Morohoshi Printing Ink Co., Ltd., Yokohama, Japan; Southam-Nicholson, Vancouver, British Columbia, Canada; Folding Carton Division, Westvaco, Newark, Del.; Island Paper Mills, New Westminster, British Columbia, Canada; and Baker Perkins Printing Machines, Oak Brook, Ill.

Company membership in GATF is open to all firms interested in the promotion and performance of graphic communications research and education. Contributing membership is open to all employees of GATF-member firms and to all full-time graphic communications teachers and students.

AMERICAN DYE MANUFACTURERS INSTITUTE MEETING

Highlight of the recent annual meeting of the American Dye Manufacturers Institute, Inc. at Absecon, New Jersey, was the announcement of a research program with four leading universities. The program, now in its early stages, was designed to develop information on the effect of dyes in the environment.

"In initiating programs with four of the leading universities in the ecology field, we feel we have taken some important first steps, not only for our industry but for all industry," said Robert F. Stevens, newly-elected President of the A.D. M.I. "Equally important as is the data which this distinguished group is gathering, is the fact that the Institute initiated the study. We are proud of that and of the enthusiastic cooperation received from all our members."

Main features of the meeting were reports on the program plans and timetable from each of the four Professors from the Universities which have been given a year's grant by the A.D.M.I. for a study of different aspects of the effect of dyes on the environment. Each of the speakers reported that students, particularly in graduate fields, are participating in the study under the direction of experienced professors in the universities.

Asked about student participation in the endeavor, Harry Clapham, Chairman of the Ecology Committee for the Institute, commented: "The involvement of these young people will help to train future workers in this important field and to point up to them the importance of factual data in developing any neces-

sary corrective action in the field of ecology. We think it particularly farsighted of our selected researchers to include outstanding members of their student body."

Speakers from the Universities were: Dr. Joseph Hunter, Rutgers University; Dr. C. P. Leslie Grady, Jr., Purdue University; Professor Henry A. Rutherford, North Carolina State University; and Dr. James C. Lamb III, University of North Carolina.

C. ERLE KLINE, JR. MEMORIAL SCHOLARSHIP ESTABLISHED THROUGH NSTF

A scholarship fund in memory of C. Erle (Bud) Kline, Jr., president, Capitol Printing Ink Co., Inc., Washington, D.C., has been established by family and friends through the National Scholarship Trust Fund, an affiliate of the Graphic Arts Technical Foundation.

Mr. Kline, who died suddenly in Buffalo, N.Y., on September 14, 1971, had been a member of the GATF Board of Directors since 1965 and a member of its Executive Committee since 1967. He also served as chairman of the Foundation's Research Committee, Technical Advisory Committee and Research Steering Committee.

In addition, Mr. Kline served as a member of the executive committee, Research & Engineering Council of the Graphic Arts Industry, Inc., and as a member of the National Association of Printing Ink Manufacturers.

SUNCURE SYSTEM

The Suncure System of curing printing inks, coatings, and adhesives in milliseconds is described in a new brochure being offered by Sun Chemical Corporation. The four-page brochure discusses the concept, advantages, and potential of this extraordinary method of adapting ultraviolet energy to serve the needs of the graphic arts industry. A brief description of the curing unit is included as well as illustrations indicating how units can be placed on offset printing equipment. The brochure itself was printed and dried by the Suncure process.

Available from: Clifford Coppinger, Sun Chemical Corporation, 631 Central Avenue, Carlstadt, N.J. 07072.

APPLICANTS APPROVED FOR INDIVIDUAL MEMBERSHIP

Board of Directors Meeting, October 4, 1971

Applicant	Member-Bodies and Interests
Mr. Jerry G. Alert 4717 Beechwood Rd. Cincinnati, Ohio 45244	ACHs, GATF, GTA, SPE, TAGA -- Color Measurements of Printing papers, grained materials and high-pressure laminates. Metameric pairs under specific lighting conditions as related to decorative patterns. Color range tolerance.
Mr. Gorow Baba Optical Instrument Div. Naka Works, Hitachi Ltd. 882 Ichige Katsuta, Ibaraki, Japan	Colorimetry, Glossimetry and Goniophotometry. Colorant Formulation.
Mr. Camille Brouillet 10470 D'Auteuil Montreal 357, P.Q. Canada	GATF -- Quality impression of colored ink over colored paper. Instruments for quality control in graphic communications.
Miss Mary R. Dean 732 Glenwood Ave. Buffalo, N.Y. 14211	ACHS -- Color standardization of dyes.
Mr. Alessandro De Gregori Via Circo 12 Milan, Italy 20123	Color semantics in products and environments. Particular interest: office machines and related consumer products.
Mrs. Marlette F. Diocades General Electric Co. Finish Systems Laboratory Appliance Park AP 35-1117 Louisville, Ky. 40225	FSPT -- Color formulation and measurements.
Mr. A. Allen Dizik, F.A.I.D. 9009 Beverley Blvd. Los Angeles, Cal. 90048	AIID -- Use in interior environments. Color as used to eliminate fear, emotional changes, personality changes -- to prevent crime and to create happiness, etc.
Mr. Jack Donnelly, Jr. Manager of Advertising and Sales Promotion Westvaco 299 Park Ave. New York, N.Y. 10017	GATF, TAPPI -- *The subtle use of color dyes in the styling of fine, white printing papers. *Maximizing color fidelity in sheet-fed and web offset printing. *Research into the physical phenomena of fluorescence.

Mr. Jean Berthold Ducharme St. Hyacinthe P.Q., Canada	AATCC -- Quality Control. Formula prediction.	Mr. Carl W. Maynard, Jr. E. I. duPont de Nemours & Co., Inc. Jackson Laboratory, P.O. Box 525 Wilmington, Del. 19899	AATCC -- Improved commercial dyes. Literature of dye chemistry.
Miss Sue Fuller 44 East 63rd St. New York, N.Y. 10021	SPE -- Permanency of color in new media as used by artists, my own work in textile fibers, and monofilaments embedded in plastic; lighting as it affects color and the more intelligent use of the largess of industry by artists as art.	Mr. Richard Nanfeldt 2326 Hawthorne Dr. Yorktown Hts., N.Y. 10598	SPE -- Color conc. -- thermoplastics.
Mr. Thomas J. Gray 4732 St. Clair Ave. Cleveland, Ohio 44103	GATF, NPVLA -- After being engaged in sale of daylight fluorescent pigments for 12 years, I am now in charge of technical development for Day-Glo Color Corp.	Mr. Dennis Osmer 31 Arcadian Way Paramus, N.J. 07652	Computerized color matching and automated quality control and investigation of new colorants.
Mr. Ed Heist 2530 Gulf Life Tower Jacksonville, Fla. 32207	AIID, NSID.	Mr. Morton Satin Ogilvie Flour Mills Co. P.O. Box 6089 Montreal, Quebec Canada	IFT -- All aspects of colour relative to science and industry, in particular foods.
Mr. Douglas Irish c/o The Paint Research Foundation Waldegrave Rd. Teddington, Middlesex, England	Colour Measurement, Formulation and Control.	Mr. Peter M. Stronczek 26 Amherst Rd. Ronkonkoma, N.Y. 11779	ACHS -- Color matching, color control. Always had interest in all fields of color. Have found color a fascinating subject.
Mr. David Isaacs 17441 Parker Dr. Tustin, Cal.	AATCC -- Instrumentation for the measurement and analysis of color data. (Beckman)	Mr. Erwin C. Spettel Sun Chemical Corp. Pigments Div. 4526 Chickering Ave. Cincinnati, Ohio 45232	FSPT -- Measurement and applications.
Mr. George R. Jensen Box 1320 Salt Lake City, Utah 84110	FSPT -- Production and standards control.	Mrs. Carol Summer Color Engineering 825 So. Barrington Ave. Los Angeles, Cal. 90049	Assistant to publisher, Color Engineering.
Mr. William W. Kilborn 30 Braemar Ave. Toronto 7 Ontario, Canada	AIID -- Colours and their psychological effect on people in our three-dimensional environment; particularly interiors of commercial buildings.	Dr. Heinz Terstiege Bundesanstalt für Materialprüfung Unter den Eichen 87 Berlin 45, Germany	OSA -- All problems of color measurement, color vision, color reproduction and color rendering.
Mrs. Joy Turner Luke Box 18, Route 1 Sperryville, Va. 22740	1. Keeping up with the latest knowledge on color problems. 2. Using such knowledge to uncover uses of color in painting which still offer opportunity for exploration. Making more comprehensive knowledge of color available to beginning painters.	Dr. William H. Venable, Jr. B308 Metrology National Bureau of Standards Washington, D.C. 20234	OSA (applying) -- The physical aspects of the measurement of color and in the development of standards, measurement techniques, and instrumentation for the communication of accurate quantitative color information.
Mr. Harry Lunden Pratt & Lambert, Inc. Box 22 Buffalo, N.Y. 14240	CMG, NPVLA -- Noting color trends, application of same to our product lines in paints and chemical coatings.	Mrs. Bonnie K. Swenholt Eastman Kodak Co. Photographic Technology Div., Bldg. 69 -- Kodak Park, Rochester, N.Y. 14650	Research in Color Perception, Colorimetry, and Spectrophotometry.

The following information was received from new member-body delegates. These are not applicants for individual membership.

Mr. Albert O. Halse
(AIA)
280 Prospect Ave.
Hackensack, N.Y. 07601

AIA, AIID -- All aspects of the use of color in architecture and interior design (both built-in materials and furniture and equipment).

Mr. W. Kirkwood
Kelley (DCMA)
Glidden-Durkee Div.
SCM Corporation
3901 Hawkins Point Rd.
Baltimore, Md. 21226

CMG, DCMA -- Application of color in plastic.

Mr. Joseph Pisetznier
(DCMA)
6801 Shore Rd.
Brooklyn, N.Y. 11220

DCMA, NPVLA -- Application of pigments.

ENCLOSURE

Diano Corporation bulletin on the DIANOLITE.

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Research Laboratories, Bldg. 81
Rochester, N.Y. 14650

Other Correspondence to Secretary:

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Department of Chemistry
Rensselaer Polytechnic Institute
Troy, N.Y. 12181