Inter-Society Color Council *Newsletter*

NUMBER 211
March-April 1971

REMARKS IN OBSERVANCE OF ISCC'S ANNUAL MEETING

by Dorothy Nickerson, at the 1971 Annual Dinner

Tonight marks the 40th annual meeting of the Inter-Society Color Council. We have a full program, yet I would like to recall for you some sense of the early days and of the men whose dedication and foresight made it possible for us to reach this 40th year still adhering to the Aims and Purposes they established.

Plenty of hard and sometimes frustrating work was involved in getting the group finally organized, for there were considerable differences in background and opinion. But all agreed that there were important color problems to be answered, and all were dedicated both to finding the answers and to providing a means for disseminating the resulting information.

Hoping to find the answer to a concrete problem, Prof. Gathercoal in 1930 arranged for a meeting and color exhibit out of which the Council grew. At that meeting twelve persons were named as an "Organization Committee of the National Color Convention." Farnum and Munsell were elected officers, and Bittinger and Paul chairmen of committees on "Purposes and Objects" and on "Constitution and By-laws." Priest, who attended the meeting, preferred to work separately on the problem. L. A. Jones, as president of the Optical Society, had an active part in guiding the direction and shape in which the Council finally developed. These are the men who seem most clearly responsible for the birth and early growth of this Council.

During the past few weeks I have quite immersed myself in old Council correspondence and reports, for I have in my possession the early files of Prof. Gathercoal, our first Chairman, covering the organization and early years of the Council, those in which its future course was firmly established. It has been an exciting experience to open a folder and find there a story confirmed, or a report long lost -- it has brought back memories of events partially, sometimes totally, forgotten. As a consequence, I found that it would take far more time than is available tonight to give you any substantial history of those early days. I propose, therefore, to limit myself to introducing you briefly to the men just named. All but Dr. Farnum have been named Honorary Members of this Council; all but Mr. Munsell are deceased.

(At this point slides were projected showing portraits of Prof. Gathercoal, Mr. Priest, Dr. Jones, and of Mr. Munsell in a 25th anniversary group-picture taken in 1956 of all living past presidents except Rea Paul. Photographs of the others were not available but were requested from anyone in the audience who might be able to locate them.)

Edmund Norris Gathercoal, professor of Pharmacognosy, University of Illinois School of Pharmacy, became interested in the problem of color names in the U.S. Pharmacopoeia and National Formulary in 1921 when confronted with the term "blackish-white" in preparing the 10th revision, published in 1925. For study in connection with future revisions the 1927 U.S.P. Board of Trustees appropriated research funds.

Prof. Gathercoal initiated correspondence with a number of specialists and soon found the problem one of concern in many other sciences and industries. Consequently he arranged a meeting and color exhibit at the May 13-14, 1930 U.S.P. Convention, held in the Willard Hotel in Washington, D.C. Everyone interested was invited to participate. A 90-page printed circular presented the problem and listed exhibits from a wide variety of sources. ("Color Names in the United States Pharmacopoeia and in the Arts, Sciences, and Industries," Supplement to the Circulars of the Committee of Revision, U.S. Pharmacopoeia, 1920-30.)

IMPORTANT OMISSION

In the last issue of the Newsletter, No. 210, January-February, 1971, a Letter to the Editor by Don F. Hill was published on page 6. Following that letter was a significant reply which I had solicited from Professor Harry Helson. In the process of publication, Professor Helson's name was omitted at the end of the letter. May I suggest that you insert his name after his letter in Issue No. 210. My apologies to Professor Helson for this serious error of omission.

Ed.

Edmund Norris Gathercoal

Prof. Gathercoal was a member of the 12-man committee named at this meeting to organize "A National Color Convention." As his files show, he was tireless during the next few years in helping to organize what finally became the Inter-Society Color Council.

Although absent from the organization meeting held September 21, 1931, he was named its first chairman, and was formally elected at the first annual meeting, December 29, 1931.

We owe Prof. Gathercoal much gratitude, for without his unflagging purpose, his good judgment, and calm appraisal of conflicting proposals, the organization proposed in those early days might have died aborning.

Royal Bailey Farnum, Rhode Island School of Design, a leader in the field of art education, was unanimously named chairman of the 12-man committee appointed at the Washington 1930 meeting. By early September he had hoped to call his committee to approve a constitution and a statement of aims and objectives, and to make plans for the next step. However, a meeting called for Nov. 19 was postponed until Dec. 5, then again, when N.B.S. declined to send its two members, Judd and Appel, to the meeting.

Meanwhile, both Priest and Jones were in touch with Dr. Farnum and his committee regarding their views of how a color group might best be organized. In order to follow developments, and not conflict with proposals that might be made at a meeting which the O.S.A. called for February 26, 1931, the Farnum committee met the evening of February 25 (in Mrs. Rorke's office), then again following the O.S.A. meeting to study the results of its proceedings. These were favorably reviewed, some members being active in both groups, Paul and Munsell in particular.

The Farnum committee was disbanded about a year later after distributing a letter to those who had been present at the 1930 meeting in Washington, telling them of the I.S.C.C., and urging all interested persons to associate themselves with the new organization since fundamentally it met the objectives of the committee appointed at the 1930 meeting.

It was a considerable loss to the Council that Dr. Farnum, though personally interested, was not able to lead any national organization of art educators into membership in the newly created Inter-Society Color Council.

Alex. E. O. Munsell, son of Prof. Albert H. Munsell originator of the Munsell Color System, in 1930 still associated with the Munsell Color Company, was actively interested in supporting education in the color field. He became secretary-treasurer of the 12-man committee appointed in Washington. He was a close associate of Priest, and a member of the Optical Society. With Paul, he helped in great measure to coordinate the efforts of the several groups working toward development of what each thought would be the most useful form of color group.

On formation of the I.S.C.C. Mr. Munsell was elected its first treasurer, and in 1933 he followed Gathercoal as its second Chairman. To force a change in the articles of organization and procedure in order to provide more scope for individual activity, he resigned as chairman in 1933, continuing however to remain active in committee work. Until the next election, held in late 1935 under revised articles, L. A. Jones served as Acting-Chairman.

By the mid-30s Mr. Munsell's chief interests turned from color to other fields, yet he has remained an individual member of the I.S.C.C. to this day.

Charles Bittinger, artist, attended the May 1930 Washington meeting as a representative of the Optical Society. As a member of the 12-man organizing committee appointed at that meeting, he was made chairman of a committee on Purposes and Objects. By early July he had a 7-point statement in the hands of his committee members, Gathercoal and Judd, one that the files show was highly approved by Prof. Gathercoal, though he made a few minor suggestions.

Mr. Bittinger attended organizing and early meetings of the I.S.C.C. as a representative of the National Academy of Design. He was elected to serve as Counsellor through the first two terms. (See Newsletter 210, 1971, for obituary.)

M. Rea Paul, Research Laboratories, National Lead Company, co-author of the Maerz & Paul Dictionary of Color, attended the Washington meeting in 1930 and became chairman of the sub-committee on Constitution and By-laws. By early October a draft that included provision for both Organization and Individual members was ready to submit to the full committee. But they never had a chance to approve it, for meetings called for Nov. 19, then Dec. 5 were both postponed.

Meanwhile both Priest and Jones had developed ideas of how they would like to see this new color organization go. Paul listened sympathetically to all groups, and was a major influence, with Munsell, in coordinating the efforts of all concerned. When formation of an Inter-Society Color Council was proposed at a meeting called by the Optical Society on February 26, 1931, Paul became secretary and was subsequently elected to fill that post for the first two terms, leaving it to become chairman in 1936, after he and Dr. Jones had completed revision of the Articles of Organization and Procedure, under which the Council functioned from 1935 until it was necessary for legal reasons to adjust them at the time of incorporation in 1961.

Rea Paul was responsible for many Council ideas, among them its Newsletter. Issues 1 through 10 were put out through his office. He remained chairman of ASTM delegates 1931 through 1959.

I believe the last time I saw Rea Paul was at our 25th annual meeting, 1956, when he came in just too late to have his picture included with those of all other living past chairmen. He died in January of 1970. (See Newsletter 206 for obituary.)

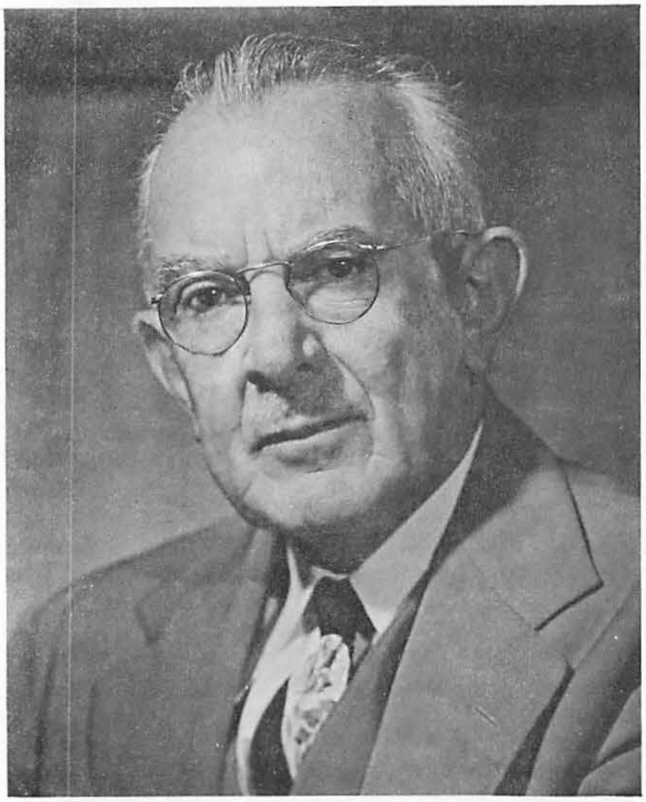
Irwin G. Priest, chief of colorimetry at the National Bureau of Standards, attended the Washington meeting as chairman of an Optical Society delegation. Although he declined membership on the organizing committee, he was seriously concerned, and probably in the best over-all position to provide useful advice. In early October, in answer to many requests, he outlined his own views relative to the proposed organization. He thought a general color council could serve a useful purpose to provide counsel, discussion, cooperation, joint meetings of member societies -- but not to settle or make pronouncements independent of member societies, but to coordinate activities and provide a common forum for exchange of ideas. He thought a voluntary organization of individuals would be without unity of purpose, would only cause confusion, and serve little purpose. His memorandum was widely distributed by the Bureau of Standards to industrial corporations and a few specialists with a letter asking advice relative to the desirability of attempting to organize a group such as was tentatively proposed as a result of the Washington meeting. Analysis of replies indicated considerable interest in the council type of organization, and almost as much opposition for a society of individuals.

Irwin G. Priest

Both Priest and Troland (who was chiefly responsible for the O.S.A. 1922 Colorimetry Committee Report) were present at the February 26, 1931 meeting called by the Optical Society. At the time of the September 1931 I.S.C.C. organization meeting Priest was in England attending the very important CIE meetings. On the return trip he suffered a heart attack from which he never fully recovered. His death, and that of Troland, occurred in 1932. The Council was thus deprived of the further advice and leadership that had been expected from these two men.

Loyd A. Jones, chief physicist, Eastman Kodak Research Laboratories, in 1930 president of the Optical Society, received a report at the October 1930 meeting of the O.S.A. Executive Council from delegates (Bittinger, Judd, Priest) who had represented the O.S.A. at the Washington color meeting. After considerable discussion the O.S.A. Council concluded that the need for better organization of those interested in the description and specification of color could best be met by formation of a joint council consisting of officially designated representatives of national societies and associations with an interest in color. Dr. Jones was instructed to write Prof. Gathercoal explaining the O.S.A. position.

The O.S.A. followed up by calling a preliminary conference for February 26, 1931 on organizing an Inter-Society Committee on Color Specification. This meeting, held in New York at the Museum of Science



Loyd A. Jones

and Industry, L. A. Jones, acting-chairman, M. Rea Paul, secretary, was attended by 30 representatives of 13 national associations, and 17 individuals. It resulted in agreement on formation of an Inter-Society Color Council, with requests to be sent to national associations interested in color to appoint delegates to an organizing meeting.

This organizing meeting was called by Dr. Jones for September 21, 1931, at the Museum of Science and Industry. Minutes show that 19 delegates, representing 14 national associations, attended. Officers and counsellors were elected to serve until adoption of a constitution and by-laws, the executive committee to serve as a committee on constitution and by-laws, with instructions to provide for more than one class of membership.

Chairman Gathercoal called the first annual meeting for December 29, 1931. Articles of Organization and Procedure were unanimously adopted, with Aims and Purposes stated essentially as they are today. Officers and counsellors named in September were officially elected: Gathercoal, chairman, L. A. Jones, vice-chairman.

(In 1933 Dr. Jones arranged for a joint meeting of the I.S.C.C. and the O.S.A. Colorimetry Committee, of which he had become chairman.)

In 1933 Dr. Jones became acting-Chairman of the I.S.C.C. and served through 1935 until the Articles, which had been the cause of Mr. Munsell's resignation as chairman, could be revised. The needed revisions, prepared by Paul and Jones, were unanimously adopted at the 4th annual meeting, 1935.

As a fitting conclusion to this bit of history, I would like to recall for you the AIMS and PURPOSES of the Inter-Society Color Council -- something that each of these men named kept in mind, and that we, as members, should not forget. The aims and purposes are:

"to stimulate and coordinate the work being done by various societies, organizations and associations leading to the standardization, description and specification of color by the various societies, organizations and associations, and to promote the practical application of these results to the color problems arising in science, art and industry."

April, 1971

NORMAN MACBETH -- GODLOVE AWARD WINNER

by George Gardner, at the 1971 Annual Dinner

In 1956 the Inter-Society Color Council accepted a fund established by Mrs. I. H. Godlove to provide a Godlove Award in memory of Dr. I. H. Godlove, Editor of the Newsletter for sixteen years and a former president of the council. The Godlove Award is presented biennially to the person selected by the Godlove Award Committee for outstanding contributions to the knowledge of color in science, art, and industry. The contribution to color may be direct; it may be in the active practical stimulation of the application of color; or it may be an outstanding dissemination of knowledge in color by writing or lecturing.

The committee for this, the eighth award, consisted of Roland E. Derby, Jr., William J. Kiernan, Edwin I. Stearns, Midge Wilson, and George Gardner as chairman.

This committee unanimously recommended that the award be presented to Norman Macbeth, Chairman of the Board of the Kollmorgen Corporation, for his outstanding contributions to the application of scientific results in the field of lighting as it affects color.

We often forget in our studies of color and its ramifications that color starts with illumination and that the standardization and specification of illuminants are just as important as the spectrophotometry of objects as such.

Through the efforts of Norman Macbeth, standardized illuminants for color matching in industry, as first proposed by Norman Macbeth, Sr., have been developed and improved for a wide variety of applications in science and industry. While his contribution of standardized light sources to answer color-matching and color inspection problems in industry has been outstanding, even more important has been his unusual ability to convince industry during the past 30 years of the necessity for their use in color-matching situations.

Early in his career Norman Macbeth developed, in conjunction with Miss Dorothy Nickerson, the first large-scale high-intensity reproduction of north-sky daylight for the examination of agricultural products, eventually resulting in standards for cotton classing. In the case of cotton classing, it was determined that 7500 degrees Kelvin was superior to the then Illuminant "C" (thought to be correct) at 6500 degrees Kelvin.

Later he developed the first commercial high-efficiency lighting unit for cotton classing that employed combinations of daylight fluorescent, blue fluorescent, and incandescent lamps, subsequently used for many color evaluation lighting problems. Later he achieved a two-step process, namely a combination of blue and daylight fluorescent into one tube and still later the improvement of this combination with incandescent to give a superior color-rendering index and spectral power distribution curve. Finally he produced the present Macbeth Tube, which does not require incandescent at all. Today this work is recognized internationally as providing the standard for cotton classing.

Another example of the application of scientific results to color problems occurred during the war years. The Farnsworth Lantern was developed in conjunction with the late Commander Dean Farnsworth during the early part of World War II, employing confusion colors for deuteranopes and protonopes to be used in the administration of a color-blindness test that could not be learned. It was used as a go -- no go test for color blindness of United States Navy personnel.

During the war he was recommended to become the general manager of Hellige, Inc. where there was an urgent need to develop color standards to determine water purity and also to develop visual color comparators for various medical evaluations. He eventually became president of Hellige, Inc. and served in this capacity from 1942 to 1945.

His contributions have been equally significant in several other fields such as in the Graphic Arts, where back and front lighting for viewing color transparencies and prints has long been a problem, in the medical and dental lighting field, as well as lighting for the color examination of diamonds.

As the chairman of The Illuminating Engineering Society delegation from September 1940 to April 1970, Norman Macbeth led an active delegation and on three separate occasions organized symposia that were held jointly between the Illuminating Engineering Society and the Inter-Society Color Council.

He has been an invaluable member of several technical committees of the Council. As a member of Problem 13, The Illuminant in Textile Color Matching, he not only took an active part in planning the work, but developed and supplied to the committee much of the instrumentation and portable equipment necessary to carry out the tests in several cooperating textile mills. He was long an active member of the IES Color Rendering subcommittee.

He is presently active with both national and international committee groups to obtain increasingly better information on color and spectral quality of daylight with a view to obtaining better target standards for international use. This work is aimed at the eventual replacement of CIE Illuminant "C" for colorimetry with a better standard for a daylight substitute, better both theoretically and practically.

He is a member of the USNC-CIE Colorimetry Committee (E-1.3.1) and the USNC-CIE Color Rendering Committee (E-1.3.3). Indeed his personal contacts with the European committee members between sessions has helped considerably in coordinating and developing the work of these committees. He has also been active in this country in obtaining more and better information on the color and spectral characteristics of daylight so that target standards may be improved.

He is a trustee of the Munsell Color Foundation and Chairman of its Finance Committee as well as ex officio member of the ISCC President's Advisory Committee.

We have outlined some of the work of Norman Macbeth in the field of color and lighting. We would also submit that we are tonight honoring a man well known for his keen business ability and sound financial practices, which, it should be noted, he shared with the Inter-Society Color Council during his thirty years as treasurer and director. These qualities have enabled him to pursue a vision he has long had of establishing a strong research organization to serve the needs of science and industry in fields related to color and lighting, leading to improved practices in such fields as photography, graphic arts, and television, to name a few. Many men have a vision of what they would like to accomplish by research, but few have had the ability to make this vision possible for themselves as a part of their own organization. We are happy that so much of this rare gift has been used within the family of color interests.

For contributions to the understanding, measurement, and specification of color and color-rendering properties of materials and sources, the duly constituted committee of this Inter-Society Color Council has chosen Mr. Norman Macbeth for The Godlove Award for 1971.

RESPONSE OF GODLOVE AWARD WINNER NORMAN MACBETH

I wish to express my thanks to the Godlove Award Committee and the Officers and Directors of the Inter-Society Color Council for this great honor. I can frankly state that this was probably the greatest surprise of my life as it was inconceivable to me that I would receive the Godlove Award. I started to determine what basis the Committee had for offering me this award but have decided, after much study, to leave well enough alone, and simply accept this great honor with deep appreciation.

A letter from George Gardner notifying me of the Award, suggested that it might be of interest to provide some background on the gradual development and acceptance of artificial daylighting.

In accordance with George Gardner's suggestions, I wrote an abbreviated review of daylighting development and acceptance only to discover such brevity consumed 30 minutes therefore what follows are merely some memorable experiences during the period of my efforts in this field.

When I started in business in 1936 people were interested in electric daylight but didn't believe it was a good substitute for natural daylight. To some extent, their attitude was psychologically negative in that they did not feel there was a possibility of doing precision color matching under artificial daylight, and there were many real reasons for this statement.

Having just been through the great depression, it was almost impossible to sell a one dollar bill for a dollar. Thus daylighting equipment had been made to sell at extremely low prices and the design of such equipment made necessary the omission of some of the prerequisites for good artificial daylighting conditions, such as the diffusion of the illuminant, the area of the illuminant and the surround conditions.

A few months after starting work I received a letter from Dorothy Nickerson indicating there was a requirement for artificial daylighting at the U.S. Department of Agriculture. I promptly went to Washington to meet with Miss Nickerson. She had been expecting to meet my father, but instead she met a novice who had just gone into business.

Even though Miss Nickerson has been primarily identified with artificial daylighting as related to cotton classing, the first visit concerned the grading of grain. We pooled many ideas and decided on a large area of illumination to simulate a natural skylight, to be built in a room where no natural daylight existed, with neutral walls and adequate diffusion of the illumination. Having designed this lighting laboratory, we were successful in obtaining the necessary funds from the U.S. Department of Agriculture to proceed with its installation.

Our first goal was to achieve a close approximation of illuminant C in color temperature, and hopefully to obtain 40 or 50 footcandles of artificial daylight over a large area. Surprisingly, the level of illumination, when the installation was turned on, was more than double that for which we had designed. This increase proved an advantage since most natural cotton classing skylights had high levels of light and the limiting factor was the tremendous wattage required to produce this illumination.

Cotton was classed under this skylight by the chief classers of the U.S. Department of Agriculture, Messrs. Slade and Buffington, and where they agreed that cotton could be classed under this illumination, they found it less satisfactory to the natural skylight which was only one room away. We learned the reason. The light appeared too pink and also was too low in color temperature. We determined this by noting the pinkness in the white of the cotton and also by their advising us they could not see the yellow spots in the cotton as easily as they could under the natural skylight.

Daylight glass is manufactured from large melts, producing from 100 to 200 pieces per melt. Each melt has a slightly different color, ranging in pink to green, and each piece of glass which is pressed has a slightly different thickness. If the glass is thicker, it produces a higher color temperature. Conversely, if the glass is thinner, it produces a lower color temperature. For many years we had been grading the glass, both as to pinkness and greenness, and as to transmission which is directly related to thickness of the glass.

A plan was evolved to bring several series of glasses to Washington, gradually moving the glass from the pink series that was used in the original installation to a more green glass, and at the same time increasing the color temperature in 100 degree steps. Where the original installation technically plotted on the pink side of the black body radiator, as did Abbott-Gibson daylight, a theoretical rather than a measured daylight, the final selection was a glass which plotted on the green side of the black body radiator, and had a color temperature of approximately 7400 degrees Kelvin.

With this daylight, the classers declared they could class cotton equally well as if under an ideal natural skylight. From these experiments conducted visually, evolved a standard daylight for the classification of agricultural products, particularly cotton, but also including tobacco, fruits, vegetables and grain.

Commercial adaptations of this large laboratory were made in the form of self-contained lighting units, simulating natural skylights, and were tested successfully in the field. These tests proved the tremendous variation of natural north daylight, since reports from Bakersfield, California indicated that the electric skylight was too yellow compared to their natural skylight, where the air was always clear; and with complaints from other offices that the skylight was too blue in locations where the atmospheric conditions were conducive to low color temperature.

Smaller modules of the cotton classing skylight were then developed for industrial color matching. Once again, the customer was the arbitrator and in the process of determining what daylight was most acceptable to the average commercial color matcher, similar visual experiments to those with cotton classers, using various daylight glasses, were also conducted. Regularly the same conclusions that were reached for cotton classing were reached in the industrial complex.

Problem Committee 13 of the Inter-Society Color Council was established, again confirming the results of the work done for agriculture and industry.

In 1939 the first daylight fluorescent tube was announced, a lamp having over 15% of its total energy in the mercury emission lines in the visible portion of the spectrum. The balance of the visible energy came from a continuum caused by the excitation of the fluorescent phosphors by the ultra violet energy developed by the mercury source of the fluorescent lamp.

The announcement of this daylight fluorescent lamp brought with it claims of "Real Artificial Daylight." By using the modern method of color rendering index, it is now evident that these were very poor reproductions of natural daylight, and it was quite obvious to all qualified observers.

As a result of the joint effort of Macbeth, General Electric, the U.S. Department of Agriculture, and others, combinations were developed which would produce what visually appeared to be a better match to daylight than a single fluorescent tube alone.

The first such combination involved a fixture which used three 40-watt daylight fluorescent tubes, two 20-watt blue fluorescent tubes (to raise the color temperature), and four 25-watt silver bowl incandescent lamps which lowered the color temperature to a lesser degree but provided more red energy, since sufficient red was missing in the early fluorescent tubes. This fixture was named "The Examolite" and was for less precise color evaluation and grading, and was the first efficient, daylight source which made possible rooms of light for color grading and classification.

Some of the improvements resulting from "The Examolite" were the combination of the blue tubes and the daylight tubes into a single, special tube known as Macbeth Examolite Tube so that four tubes of the same color could be used in the fixtures rather than the mixture of daylight and blue, as originally evolved. This combination was developed by Charles W. Jerome of Sylvania who subsequently suggested that with the use of germanium phosphors he could produce a special Macbeth Examolite Tube that would not require the addition of any incandescent light in a fixture. Thus a high color rendering index fluorescent tube was developed.

It cannot be stressed too strongly -- the accuracy of the visual evaluation of the color of light. For many years we were forced to provide lighting units which did not seem to match the theoretical Abbott-Gibson data. We suspected that the theoretical Abbott-Gibson data were wrong, but, it was not until 1964 when two papers were published that we were sure. A paper by H. R. Condit and Franc Grum entitled "Spectral Energy Distribution of Daylight" was published in the Journal of the Optical Society of America in July 1964, followed by the second paper, published in the same journal in August 1964, by Deane B. Judd, David L. MacAdam and Gunter Wyszecki, entitled "Spectral Distribution of Typical Daylight as a Function of Correlated Color Temperature," both indicating that over the years the "Users' Choice" of daylight plotted on the green side of the black body radiator was in fact a match to the majority of measured natural north daylight, thus confirming finally the customers' visual preference and requirement through actual instrument measurement.

From the beginning, color matching equipment has been designed to incorporate two sources of illumination, daylight and incandescent light. Since the introduction of fluorescent light, a new parameter became involved.

Many colorists have noted that even when most colors match under daylight and artificial light, occasionally there will be a metameric mismatch under cool white fluorescent lamps. Thus at this time a new recommendation is made that a third source be introduced in color matching skylights, namely a minus red light in the form of a standard cool white fluorescent lamp. At this date, from the point of view of visual color matching, using these three sources of illumination one can generally preclude manufacturing colored materials which would become a mismatch under the normal qualities of illumination in which we live -- daylight, fluorescent light and incandescent light.

Because of the fluorescence problems, black light bulbs were incorporated in color matching skylights to produce fluorescence. Once again in 1954 visual approximation was the basis for the amount of ultra violet added in an artificial skylight to match a natural daylight. I am pleased to report the eye succeeded again since we have now instrumentally measured the ultra violet radiation in an artificial skylight, equipped with black light bulbs, which was selected on a visual match basis, and find that approximately the right amount of black light was installed when compared to the measured ultra violet in natural daylight for equal levels of illumination.

For a look at one possibility for the future: I am pleased to announce, for the first time, the development, at Macbeth Research Laboratories, known as negative filtering which perhaps might also be called reflective correction for spectral emission.

I should like to project three slides. The first slide illustrates a typical spectral power distribution for a fluorescent lamp of moderate to high quality. In the graph of relative energy versus wavelength you will note that the six principal emission lines are clearly identified.

The second slide illustrates, schematically, a series of interference layers which are used to transmit energy at wavelengths corresponding to the mercury vapor emission lines into light traps which are labeled "reflector substrate." You will note that the lamp labeled "A" in cross section is positioned in such a way that it is impossible for energy to travel directly from the lamp to a task area. All energy radiated by the lamp must undergo at least one reflection in the complex reflector illustrated. The upper reflector consists of a prime reflector layer and a secondary transmission layer which operates on four of the six emission lines in such a way as to transmit them to the absorbing substrate.

Consequently, all the energy which finds its way out of this illumination module contains spectral energy at wavelengths corresponding to the phosphor emission continuum and has attenuated energy at the wavelengths corresponding to the emission lines.

The third slide shows in red the modified spectral power distribution compared with the unmodified distribution shown in yellow. Please note that considerable attenuation of the spectral emission lines has occurred without seriously altering the shape of the phosphor emission continuum. The net result is an improvement in color rendering capabilities of a fluorescent lamp which will, of course, involve designing special fluorescent lamps for use with such a negative filtering concept.

Since approximately 15% of the radiation from a fluorescent lamp is in the mercury lines, the continuum emission of the phosphor has been modified to take this mercury emission into account. This negative filtering concept has been invented and reduced to practice by Mr. Bruce Norton of the Macbeth Research Laboratories and is announced here for the first time. A patent has been applied for on this invention.

My contribution to the development of daylighting has been to understand and determine the requirements of the commercial and industrial complex, and to translate these requirements into useful products. This simple statement spans a large gap requiring sophisticated technology input which was undertaken by many friends and associates without whose help the job could not have been done.

Therefore, I would like to express my sincere appreciation to Dorothy Nickerson, Deane Judd, Chuck Jerome, Gunter Wyszecki, Warren Reese, Jim Bartleson, Ralph Evans, Bruce Norton and many others who have contributed so extensively to the technology I have used. I accept the Godlove Award with thanks to all of them.

As a final comment, I should like to say that the Inter-Society Color Council, for me, has been the area which has made possible most of the accomplishments which I have just described and I recommend to the many new members that they will find this Council a most open and friendly forum which will be an invaluable aid to their future success.

I again wish to thank the Godlove Award Committee and the Officers and Directors for presenting me with the Godlove Award in 1971.

ANNUAL MEETING -- SPECIAL EVENTS

Seminar -- Artists' and Artisans' Colorants

On Monday afternoon, April 19, during the Annual Meeting, there was a seminar on "Artists and Artisans Colorants: Yesterday and Today." The forum was led off by Miss Rita J. Adrosko, Curator in the Division of Textiles, Museum of History and Technology, Smithsonian Institution. Miss Adrosko described the technique of weaving tapestries, which became a major art form in the time before Chevreul and the appearance of modern dyestuffs. The author of "Natural Dyes in America," Miss Adrosko illustrated her talk with pictures of the indigo, madder, and weld plants that supplied important dyestuffs in the past. Her plants looked a bit anemic, she said, for they were grown in the polluted atmosphere of the Baltimore-Washington area. (Of course, it could have been the slides. Ed.)

Norman Anderson of Ciba-Geigy, Chemicals and Dyestuffs Division, followed with a description of some of the colorant systems used in modern textiles and carpet yarns. One item of particular interest was his description of a transfer printing of dyes, printed first on a paper support and later transfered onto modern textiles.

Dr. Robert L. Feller, of the National Gallery of Art Research Project, Carnegie-Mellon University, chairman of the session, spoke on the efforts that are being made to find better modern pigments for the artist from among the excellent colorants on the market. He described the search of one contemporary artist who wished to have lightfast yarns for her own very personal "geometric constructions" in colored fibers. The artist, Miss Sue Fuller, whose work is to be found in many American collections, including the National Collection of Fine Arts, was introduced at the close of the lecture.

Herb Aach, Associate Professor of Fine Arts at Queen's College, closed the session with a description and exhibition of prints made with fluorescent pigments. Mr. Aach, who has recently written on the subject of these new materials in the international journal "Leonardo," showed the work of a number of New York artists.

Monday afternoon's meeting was closed by Mr. Carl J. Allen of the Large Lamp Division, General Electric Company, who demonstrated the new "molecular arc" lamp that emits a continuous spectrum which promises to have wide applications.

Lecture -- Color Communication in Packaging Lithography

Following the business meeting on April 20, Mr. Manuel de Torres, of the Metro Lithograving Company, Moonachie, New Jersey, spoke on "Color Communication in Packaging Lithography." Mr. de Torres' company has been highly successful in supplying color lithography for packaging of many types, particularly for the packages used in modern supermarkets. His company has gone so far as to construct a supermarket area in its own plant where on-the-spot studies can be made regarding the sales appeal of various package designs. Mr. de Torres stressed particularly the problem of judging the suitability of color under the conditions in which it would be displayed at the time that the consumer would contemplate its purchase. He drew attention to the variability of illumination in supermarkets as compared to the excellent standards normally used to judge photo transparencies and photolithographic reproductions.

Banquet Speaker -- "Color is a Shady Lady"

The principal speaker at the banquet on Tuesday evening was Dr. H. Lester Cooke, Curator of Painting at the National Gallery of Art, Washington, D.C. Dr. Cooke started off his lecture by reminding us of the iconographic meaning of color, symbolism that played an important role in western culture up until the time that Newton provided a more rational and scientific explanation for the origin of color. He went on to show that artists often saw their work in an entirely different light than we currently see them. The appearance of their work in their own eyes may have differed from what we currently see in museums, both in the spectral quality and in intensity of the light. At the close of Dr. Cooke's lecture, Mr. Frank Wright, President of the American Artists Professional League, presented Dr. Cooke with an honorary scroll which AAPL had awarded to Dr. Cooke for his outstanding contribution in his book "Painting Lessons from the Great Masters." There had not been an earlier opportunity to present Dr. Cooke with the commemorative scroll and Mr. Wright and the ISCC took this occasion to confer this recognition on Dr. Cooke.

R. L. Feller, Program Co-Chairman

Editor's Note: Considerable assistance in the planning and execution of the program was given by Max Saltzman.

ANNUAL MEETING SYMPOSIUM -- OPTIMUM REPRODUCTION OF COLOR

While the Tuesday afternoon symposium was billed as a review of the Williamsburg Symposium, it turned out to be something different. Some of the content was new. The tone was less technical and slanted toward a broader audience.

Unfortunately some of the speakers were unable to participate. John Yule of Rochester Institute of Technology, co-chairman of the Williamsburg Symposium, accepted my invitation to fill the hole left in the program.

John said that the job of a printer is different than the job of a photographer. The photographer must make a good picture, but the printer must make many "reproductions" of the photograph. In this sense the printer's role is easier to define. It is possible to devise color scanners to make almost any transformation between a photograph and a print. but we do not know enough about what makes a "good" reproduction to write an explicit set of instructions for the scanner.

John has started a project at RIT to measure originals brought to the printer, and good reproductions to find out if a set of consistent principles can be found. To accomplish this he had to convert a color densitometer to a colorimeter because devices to measure small spots on color transparencies were not available.

Although he has not yet measured many reproductions, some observations are beginning to emerge. We have always thought that the larger color gamut of originals posed a problem for printers. How should the gamut (saturation) be compressed? John found few originals which had non-reproducible saturation. He did observe that when the relative saturation of colors was not correctly reproduced, the reproduction was often less satisfactory. He proposed a saturation reproduction scale as well as a tone reproduction scale.

Stanley Quinn of Canadian Broadcasting Corporation TV was not on the Williamsburg Symposium. This was not evident at the Annual Meeting Symposium. He said that the criterion by which color television is evaluated is a colorimetric match. He said that he realized that the dim surround viewing conditions for TV required an increase in contrast but that colorimetric matching was the only objective criterion available. Although the criterion is simple, its achievement is not. One must use complex techniques to guarantee that TV cameras generate identical signals when photographing a scene. Going from one set of lighting conditions to another, such as indoor to outdoor, causes problems. None of these are as serious as the difficulty of balancing live scenes with video tape or color movies.

Intercontinental color TV broadcasting is causing difficulties because of the incompatibility of the various color TV systems. As I understand it, the American, British, French and German systems are all incompatible, requiring complex computers to convert.

Committees are studying the various problems, including setting of the controls on home TV sets by repairmen. Even if the stations solve their problems, home viewers may not get good color, either because of poor receiving conditions or because the TV set is not properly adjusted. I found one of Mr. Quinn's comments very interesting -- ". . . color difference noticeability does not correspond to objectionability." I agree. I hope his committee soon develops an index of "objectionability."

While Miss Klute and Mrs. Swenholt could not participate directly, they did contribute. I talked at length with Bonnie Swenholt, finding out what she would have said if she were present. Much of what I said was an attempt to pass her thoughts on to the ISCC audience. This endeavor was greatly aided by the excellent illustrations and beautifully artistic photographs produced by Miss Klute and Mrs. Swenholt. They helped me communicate what I think is a most important point: that the photograph is not a substitute for a scene, but a new object in its own right. The photographer must be aware of the visual phenomena which permit a person at the scene to "see" the true situation: size and location of objects, the "real" colors of objects, the direction and quality of illumination, etc. The visual clues at the scene are often more influential than they are in the photograph, and the photographer must help his viewer by making the clues of vision in the photograph.

There are many factors which make it impossible to measure the stimuli from a complex scene and predict appearance. These include psychophysical factors such as simultaneous contrast, spreading effect, etc. and psychological factors such as discounting the light source.

It is as though we know that objects have a fixed and invariant color which is a fixed property of each object. We learn to "see" that color under variable and sometimes difficult viewing conditions. We come to associate certain colors with certain objects; for instance, skin color, sky color, grass or foliage color. Bartleson has shown that we carry some of these colors around in our memory.

All of these comments illustrate that, whether we talk of painting, photography, television or movies, seeing colors of objects and reproductions of objects is much more complex than we, at first, imagine. It is a fascinating subject, and one which will provide me with entertaining moments for years to come.

W. L. Rhodes,
Program Co-Chairman

HAROLD LLOYD DIES IN HOLLYWOOD

We note with regret the death of the film actor Harold Lloyd on March 8, 1971 of cancer, at his home in Beverly Hills. He was 77 years old, born on April 20, 1893 in Burchard, Nebraska, Harold Clayton Lloyd. He had been an individual member of the ISCC for many years.

In 1947 Mr. Lloyd attended the special color meetings arranged with the cooperation of ISCC members for the Centenary International Philatelic Exhibition, New York, May 17-25, 1947, and it was there that several ISCC members met him. He was introduced to the group by Carl Foss who had met him through the interest Mr. Lloyd had in the color laboratory of the Interchemical Corporation. It was hard at the time for the ISCC secretary to believe that his interest in color was of more than passing interest, but he soon had her fully persuaded by mentioning his long-standing acquaintance and friendship with Harriet Taylor who had been in charge of Munsell materials with the Favor, Ruhl Company in Chicago back in the twenties! He said that even in those early days color had fascinated him and that in the 20's and early 30's he often stopped by to see Miss Taylor to purchase art materials and chat with her about "what was new" in the color field.

In 1948 when the ISCC arranged a color symposium for a meeting of the SMPE in Santa Monica, Mr. Lloyd was on the east coast. Yet he was kind enough to arrange for his secretary to spend an entire day with several ISCC members -- Carl Foss, Isay Balinkin, Dorothy Nickerson -- to drive them around, show them what they wanted to see in Hollywood (particularly a color set at Warner Brothers studios, and a visit to the Walt Disney color studio and laboratory), lunch at the Beverly Hills Club, then a visit to Harold Lloyd's quite magnificent home -- a really memorable day! It was then that we heard of his interest in combining colors of all the materials he would get, by laying them out in small sketches, usually on 3 x 5 cards. These he filed away for his own amusement -- keeping them practically under lock and key. This interest in painting must have developed, for a number of years later his friends were so impressed by his abstract color paintings that they persuaded him to have a one-man show in Beverly Hills. Somewhere, buried in a past Newsletter, there is an item about this show, held not too many years ago.

We are sorry to lose another old friend. The papers tell us that his wife, Mildred, died in August, 1969, and that he is survived by a son, two daughters, and three grandchildren.

D.N.

INTER-SOCIETY COLOR COUNCIL -- MEMBER BODY RESPONSE TO SURVEY

The Vice President of the ISCC has responsibility for liaison with the member bodies of the ISCC. Last November I mailed a letter and questionnaire to the chairman of each of the 30 member bodies of the ISCC. There has been an unusually good return on this questionnaire. All but three of the member bodies have replied.

Some of the answers given by the member bodies to the questions posed are shown below:

Approximate membership of your organization:

Responses reflected a range from 100 to 140,000 (some did not answer this question).

In which of the following color areas is your society interested:

Color Science and Technology

Physics of Color -- 18
Psychophysics of Color -- 17
Psychology of Color -- 16
Physiology of Color -- 12
Color Measurement -- 21
Color Control & Color Tolerance in Production -- 16
Formulating Colors by Instrument and Computer -- 16

Color in Commerce and Art

Color in Outdoor Environment and Building Design -- 12
Color in Consumer Product Design -- 13
Surveys and Analyses of Product Colors -- 13
Color in Art -- 12

Publications of member body:

Nearly all had some sort of publication -- monthly, semi-annual, annual. (Some merely checked the column.)

Number of meetings each year:

All had at least one meeting per year; most had more.

Are these open to ISCC members:

Yes -- 20; No -- 3; Generally -- 3; Not answered -- 1

Names of committees and/or groups dealing with color or appearance:

21 had some type(s) of committee; 6 did not have any.

Prepare and issue standard practices or specifications relating to color:

Yes -- 9; No -- 17; Jointly -- 1

In addition to the specific bits of information given in response to the foregoing questions, almost all the member bodies spoke of their desire to participate more actively in projects which involve cooperation with other member bodies. When it came to the Problems Committees, the work on Problem 30, Color in the Building Industry, had by far the broadest indication of interest from the member bodies.

Valuable information was furnished by the member body chairmen. The ISCC Board of Directors is grateful for the cooperation which has been given on this effort.

Richard S. Hunter, Vice President
March 8, 1971

THE COLOR OF SOUND

Consider the matter of synesthesia. As usually defined these days, synesthesia is the perception of an effect by one of the five senses when another of the senses is stimulated, particularly the perception of visual effects in response to aural (usually musical) information. An older generation used the word "synaesthesia" as the generic term and called color responses to sound stimuli "chromaesthesia" or "color hearing."

Even today some physiologists say that synesthesia does not exist as an objective phenomenon, preferring to relegate it to the purview of psychologists (or even parapsychologists). Still, music teachers, doctors, and clinical researchers have been statisticizing and describing synesthetic reactions for well over a century. Some have written detailed accounts of individual cases; others have theorized on the neurological principles by which one sense might interact with another; still others have tested sizable samplings of university students or other handy subject groups to determine the extent of synesthetic response.

Their methods of inquiry -- and their results -- vary widely. Some researchers have claimed that as much as sixty per cent of the population (or even ninety per cent if definitions are made loose enough) experience some sort of synesthetic reaction; others have put the figure as low as nine per cent. A median value might be fifteen to twenty per cent. Some have asserted that synesthetic response tends to be strongest among children or young adults. Some take olfactory responses as important; others limit themselves to color hearing. Some would allow any sort of associative response as synesthetic, even if the subject goes no further than mentioning the color blue when listening to the blues. Others concentrate on color responses that are both abstract and detailed.

But it is when specific reactions are classified and described that the most striking discrepancies appear. Given the same musical stimulation, some subjects will see images that relate to a song's text or other extramusical associations. Others will receive a vague, over-all color impression. ("I see that number as a sort of blue-green.") Still others will see specific, and specifically-colored, abstract shapes that change with the music. And so on. If one color predominates in the response of one subject, another subject may specify a radically different color. And while a particular piece of music may elicit the same response from a given "synesthete" even after an interval of several months, another may describe a very different response on second hearing.

On the basis of published studies, then, it would appear impossible to describe any single "system" governing the way in which sounds are transmuted into colors by human sensibilities. But that has not stopped a great many people from trying. Aristotle drew the basic parallel (in De Sensu et sensili) between musical chords and harmonious combinations of colors. But most authors who have followed his lead have lapsed into relative oblivion. Only the concept -- the presence -- persists.

Extracted with permission from High Fidelity, March, 1971.

COLOUR GROUP (GREAT BRITAIN)

Because of the postal strike in Great Britain, there was a long delay in getting information from the Colour Group. We hope to make up for lost time in this issue. We are especially grateful to them for use of their up-to-date and comprehensive bibliographies. We have assembled their July to December, 1970, issues, and they are included with this Newsletter as an insert. The typing was contributed by the Derby Company, and the reproduction by the Kollmorgen Corporation.

Report on the Seventy-third Meeting of the Colour Group Held in December, 1970

A joint meeting of the London Section of the Society of Dyers and Colorists and the Colour Group was held on Friday 11th December 1970 when Mr. R. Booth presented a lecture entitled "Metamerism, Colour Constancy and Related Problems."

Mr. Booth commenced by defining a pair of metamers as two samples which match under certain conditions but have different spectral reflectance curves. This definition should hold under all conditions whereas the common one restricts the illumination to daylight and tungsten light and it is possible to find pairs of samples which match under both these illuminants but mismatch under others. Colour constancy, he defined as occurring when a sample gives a similar appearance to the eye under different conditions. It is therefore possible to have metameric or non-metameric matches with high or low constancy. While a metameric match has the advantage that a wide range of suitable dyes can be used, it has the disadvantages that the degree of mismatch depends on the illumination, and also the colorist does not see the matches as stable ones.

There are various types of metamerism due to differences in the illumination, observer, size of the field of view, geometry of illumination and viewing and instruments. If metamerism is present, matches cannot be made by colorimeters but the spectral reflectances have to be measured, which means that the colours for the samples when illuminated by any source can be calculated.

Various colour difference equations have been suggested as a means of measuring metamerism but results won't agree with subjective judgments unless allowance for adaptation is made in the calculations.

Burnham developed a method for predicting the appearance of a sample when adapted to an illuminant if its appearance under another illuminant is known, the sources being S_C and S_A. The difference, ΔE, between the corrected chromaticities for a pair of samples is a measure of the degree of metamerism and this method seems to work. It is therefore possible to set tolerances on ΔE which leads the way to matching by computer.

The degree of colour constancy can be calculated in a similar manner but simultaneous contrast of the sample with the background has to be taken into account and this is difficult to do accurately.

Instrumental match prediction depends firstly on measuring the pattern and its substrate, secondly on selecting a number of dyes, and thirdly determining the amounts of these dyes required to make a match. When this was first tried the computer failed to make a match so it was then asked to select by an iterative process, three combinations of dyes which gave the closest matches. The final combination was selected taking economic consideration into account as well as the degrees of metamerism and colour constancy.

M.B.H.

Report of the Seventy-fourth Meeting of the Colour Group held in January, 1971

The meeting of the Colour Group on 6th January 1971, the fifth of the session, was given to papers dealing with colour vision outside the fovea, in which the experimental variables had been reduced by using observers whose colour vision was defective.

Dr. D. A. Palmer's paper "Colour matches which include equality of scotopic luminance" described experiments in which mixtures of, for example, yellow and blue light were matched to a third green stimulus over a range of brightness. If Grassmann's Laws applied exactly, a single ratio would apply, but a family of curves were plotted, passing through a common intersection -- a unique match. Twenty observers carried out many such matches, all leading to a similar point. This leads to a theorem "that three or more stimuli may be arranged to produce two spectrally different lights whose luminosities will match by direct comparison, within the precision of observation, at all levels. For three stimuli the match is unique, with suitably controlled conditions of observation."

Matching of colour and luminosity at all levels would need five stimuli, but deuteranopes can use only four. It was found that observers made stable matches at photopic, but not at mesopic levels. Further work might lead to four new colour-matching functions of complicated shape.

In the course of discussion, related work by Dr. P. W. Trezona was mentioned, since she had made four-colour matches in a different way, also leading to unique matches for retinal illuminations between 0.2 and 80 Trolands.

Refs. D. A. Palmer (i) Proc AIC Congress (Stockholm) 1969, published by Musterschmidt, Göttingen, 1970. (ii) Vision Research 10, 1970 pp 563-573. P. W. Trezona. Vision Research, 10, 1970, pp 317-332.

The second paper by Dr. K. H. Ruddock on "Some aspects of defective colour vision" approached a similar topic as related to the organization of the visual system. We may regard dichromats as missing one information channel, and experimental methods are more sensitive than for normal trichromats.

His results of matches to spectrum colours were shown, comparing matches at 10 and 40 degrees, demonstrating the desaturating effect in peripheral vision. When a mixture of blue and red light was matched to the colours of the spectrum, plotting Log B/R against retinal illumination gave a complex family of curves for different wavelengths. It was possible to deduce another set of graphs in which the matching wavelength at the fovea was plotted against illumination for each parafoveal wavelength. These converged on to what must be interpreted as a neutral point, at 500 nm for a deuteranope and at 490 nm for a protanope. (A fourth observer, however, produced different results.)

The curves with neutral points may be interpreted by supposing that one cone pigment is missing and the rod contribution is equivalent to a neutral stimulus. That is, one channel deals with luminance and the others with ratios R/G and B/G. This was shown diagramatically to explain the data for all but the fourth observer.

By using the effect of small-field tritanopia it was possible to test this model of colour-vision, since one would then expect only the luminance and R/G channels to operate. It was shown that if Stiles' π functions were used with logarithmic processing (the log of the ratio $\pi_5'\pi_4'$) then good agreement was obtained with W. D. Wright's experimental data.

Report on the Seventy-fifth Meeting of the Colour Group Held in February, 1971

The sixth meeting of the 1970-71 session, on 3rd February, 1971 first heard a talk by Mr. M. H. Wilson on Colour in Therapy. This was, to a great extent, related to his own experience in using colour in a home-school for sub-normal and seriously disturbed children. In the most obvious way, it is desired to make the surroundings as pleasant as possible but each individual's preferences in say, colours of walls, cannot be met simultaneously. At least, disturbing colours like dark green can be avoided, while the use of lighter pinks and yellows will usually be preferable.

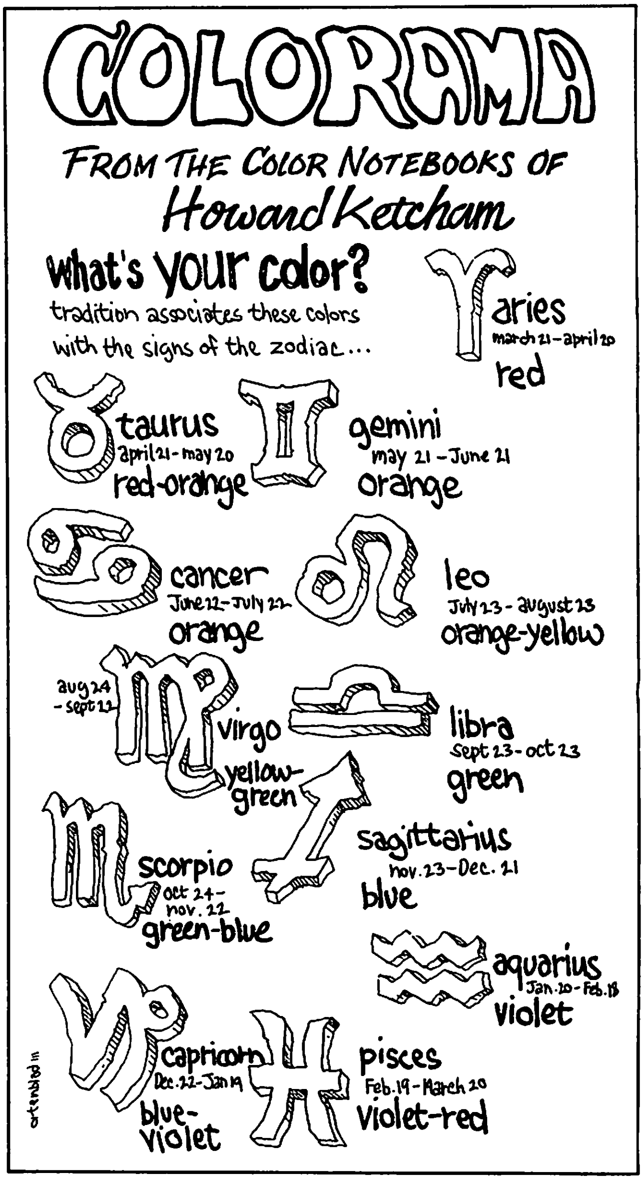
These children have no capability for abstract reasoning, so that it is found that the older ones can best be taught co-ordination of hand and eye in painting by copying examples. The use of even colour washes and of clear space on the paper was shown. The discipline of using materials is learnt and the children are proud of their work. If "free expression" is encouraged in painting, the results can be often interpreted as expressing the nature of the child's mental state, and examples of this were shown, related to the artists' experiences at the time.

Very backward ones may still react to coloured luminous shapes which can be produced in slowly-varying ways in a room arranged for this kind of therapy. Children who cannot concentrate at all may be at rest for the only time of the day with a particular pattern that they like, while an otherwise inaccessible child will react to an intense green and to a strong red/green contrast. There seem to be no invariable rules for this; a combination that pleases one child may have no reaction (or a different one) for another.

Coloured light is used in another interesting way to light the inside of a small swimming pool from just below the surface. The walls are tiled in dark grey so that anything in the pool appears brilliantly lit. Children otherwise awkward in their movements become aware of their limbs and learn to control them better. The use of blue light tends to calm the over-active, while the pink lights seem to stimulate the more timid. There seems no doubt that colour has a valuable therapeutic function and that the polarities -- light/dark, red/green and so on -- are appreciated at this mental level.

Miss Marjorie Hayward then spoke on Colour Psychology: a Current Approach. She began by outlining the antique attitudes to man and his environment; the four elements associated with the four humours into which people might be divided and the colours which were felt to symbolise them. (A contributor from the audience later added astrological associations to these.) By comparison, today's attitudes to colour are far less precisely formulated.

The chemistry of colour in industry as applied to paints and dyes is very well developed but our ability to use these possibilities is far less advanced. We are constantly forced into making choices of colour; her experience in taking part in courses for people in the colour-using trades had shown a great demand for more understanding of what these choices involved. The response to colour was an emotional one, shown by the use of "feeling" words when talking about them. Personal responses were often contradicted by other people's reaction, often apparently unrelated to their own experiences. To a great extent she found links with Mr. Wilson's cases, and similarly classified colours into the stimulating (yellow), powerful (red), moderate (green) and tranquil (blue).



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In the general discussion, the links between the two papers were apparent. Doubts were expressed about the existence of a meaningful theory of colour psychology, and analogies drawn between the emotional impact of sight and hearing, both dependent on an individual's total history.

D.W.K.

Report on the Seventy-sixth Meeting of the Colour Group Held in March, 1971

The seventh Colour Group meeting of the 1970-71 session heard two papers linked by their common interest in surface texture and colour.

Mr. D. L. Medd gave a liberally illustrated talk on "Colour in Architecture," in which he described a specific piece of work -- a new Middle School building on the outskirts of Bradford. This is the first school building in the U.K. specifically designed for the 9-13 year old age group, and colour was a part of the planning of the school as a place of life and character in which to live. School children at this stage are at the most impressionable age and one should try to bestow the best possible experiences by using colour in design in a way that is not solely decorative but expresses character.

Children here work together in groups of different sizes and 'flow through the space like water,' hence the school is designed in spaces rather than traditional classrooms and corridors. It is not isolated but connected with city and countryside, both being visible from the building and both rather hard, dour and dirty in appearance at times. The palette from which exterior colours were selected was, therefore, chosen to harmonize, using bluish (R-P) tile hanging and a darker warmer brick. Large panels were of similar red-purple and doors in blue and red. A very limited number of colours were used using the ideas of Gloag (Building Research Station) to organize them. Some extra variety appears because of the natural differences between tiles, and slides showed how successfully the school harmonizes with the surroundings.

When considering the interior it was necessary to include both building and furniture elements to achieve harmony, and a single palette included ready-made (factory-built) items and surfaces prepared on the site.

The use of space pervades the whole design, and the single-storey school is lit by daylight except for a few areas which needed permanent supplementary artificial light. Clear colours are used to link the building with the furniture, the whole palette being worked out well in advance of actual building. Small areas with different character demand different colours, while some colours were used as landmarks; a great variety of effect is possible with a limited palette. Because of the teaching methods to be expected, it is possible for furniture to be put anywhere, and the planning is such that this is possible while still leaving dimensions and surfaces in a proper relation. After dark, tungsten filament spotlights are used with cool fluorescent lighting, so arranged that the colour of the light sources is not seen directly but the lamps used to illuminate the light coloured surfaces used to take advantage of the daylight.

The paper on "Studies on Surface Texture by Goniospectrophotometry" presented by Mr. M. P. Wassall considered how the detailed appearance of surface texture (and colour) was explained by the polar diagrams of reflection. Glossy surfaces are recognized by highlights seen in them and under some lighting conditions can appear to be matt, so that textures of surfaces are often shown best by particular lighting geometries. The particular effects in velvet materials are difficult to show in colour reproducing systems since the characteristic appearance may be of very subtle colour differences in folds. Slides showed these effects and also how differences in roughness of magnesium oxide white surfaces could give chromaticity differences at some angles of illumination/viewing.

In general, reflection at the specular angle should give the colour of the illuminant while diffusion gives the colour of the material with more or less saturation and the same dominant wavelength for different angles. When examining some natural materials, however, the results are not precisely as predicted, perhaps because the surface structure is not known in sufficient detail. The iridescent and beautiful colours of the Morpho butterfly are obviously not due to pigments but are structural, and this structure has been investigated by using an electron microscope. The fine detail of the wings shows interleaving scales, each of which is seen (using a magnification of x 40,000) to have a complex three-dimensional structure of ribs and plates, forming diffraction gratings, backed with a light-absorbing melanin layer.

Spectrophotometric curves at different angles of incidence show the observed change of colour to shorter wavelengths at bigger angles as expected from an interference mechanism. A mathematical model of an eight-layer stack had been analysed and shown to give curves very similar to those measured, except at the red end of the spectrum. The fit of the calculated curves to the experimental data is not equally good at all angles, but the changes in peak wavelengths are predicted correctly. It seems that both diffraction and interference effects must take place, but an almost impossibly detailed knowledge of the structure would be required to give a complete explanation of these fascinating colours in nature.

D.W.K.

Report on the Seventy-seventh Meeting of the Colour Group Held in April, 1971

The eighth meeting of the Colour Group for the session was opened by the Chairman, Dr. R. A. Weale, in a brief introduction to the subject, Standard Conditions for the Assessment of Colour. He thought that the Colour Group might well look into these conditions from the point of view of future recommendations for this type of work. The difficulties were less in the judgment of small differences in colour than in the nature of the C.I.E. diagram, which did not take account of the variety of observers and the effects of the surroundings. All may be relevant in 'real' cases but not to the idealised Standard Observer. The effect of age and of differences in macular pigmentation could give results similar to metamerism, possibly changing the visual effect by an order of magnitude.

Mr. T. R. Bullett spoke on the applications to paint. These are in some ways special in that while the product is sold as a pot of paint, it is judged as the dry paint film after application, on a particular surface. This means that colour matching must be done on the film applied in the way it is intended to be used. He showed the difference in appearance of the same paint when flowed or sprayed on the same surface.

When matching to a standard, they used panels at least 4" across to give a reasonable (if undefied) angle of view and followed the methods of British Standard BS 3900. Natural daylight was not now reckoned to be sufficiently 'standard' and they used lighting to give about 3000 Lx uniformly over sample and standard. This could not always be achieved by the traditional North-facing open window. A portable viewing cabinet with fluorescent lamps for D 65 was shown, to follow the requirements of BS 950., part I. Metamerism arises between observers and due to the different spectral power distributions of the reflected light in sample & standard. It was usual for standards to use particularly long-lived pigments which might be unsuitable in the ordinary production paints, so this immediately gives metamerism. In spite of this, and that users may check under different lighting to the paint manufacturer, very close matches were asked for -- as little as 0.2 NBS units for car door panels. The use of metallic finishes also introduced geometric metamerism so that a match at one angle failed at others.

In the later discussion it was mentioned that three angles were used by one U.S. user, 0,+ 40,- 40. It was also mentioned that purely physical tests were quite practical during manufacture, once the limits had been established visually.

Mr. H. Smith then discussed the situation in the printing industry, where precise colour matching to an original transparency was often asked for but usually impossible. Mis-registration was the most serious defect in colour printing and the higher colour temperature of US practice was preferable, but they tried to conform to BS 950 Part II. However it was, initially, very difficult to get equipment to use for this, particularly since large areas were required to be illuminated for work in progress and the original Standard set unsuitable levels. Different transparency viewers and prints on different paper illustrated other problems. He wondered whether it would be better to introduce viewing systems now even if exact compliance with BS 950 was not obtained -- perhaps exact energy distributions need not be given for this work.

Mr. D. G. C. Thornley, speaking about the plastics industry, acknowledged that the previous speakers had described many of his own problems. He had found that his customers' ignorance of general ideas about colour was another one, which he illustrated graphically. His basic needs in colour matching were speed and sufficient accuracy for the customer to accept the material. Metamerism was always likely when a plastic item was only one of several components that their customer assembled, and it was in everyone's interests that viewing conditions were known and stated precisely. None the less he had to accept that most colour matchers use light from the window, although he felt BS 950 to be a good starting point in standardisation. They had specified a colour matching room, not a cabinet, since they thought they thought the entire surroundings part of the viewing situation (which provoked some of the audience). He also considered controlled illumination more important than an exact energy match for D 65.

Mr. I. Glasman then spoke from the viewpoint of the shopkeeper and his customer, particularly for clothing. He pointed out that the general requirements for textiles were the same as for the others and considered that BS 950 had profound effects on textile production. For the first time the user could be sure that each producer, whether of fabric, dye or yarn, would be examining his product in the same way. Artificial daylight allows control and process work to be done at all times, as now needed in a capital-intensive textile industry. Overseas suppliers could now be contacted with some assurance that the same methods of assessment were used. Metamerism was always a possibility, and was related to lighting in the store, since customers should not be disappointed when their goods were seen at home. It was also desirable that they should not feel that they needed to take goods to the daylight before buying them, so the colour control work always included store lighting. Current fashion trends highlight a quest for colour, colour harmony and matching and the logical approach of BS 950 was a great advance.

Many interesting points were made during the discussion that followed, which could well have carried on for more time than was available. Professional colour matchers did not always appreciate real differences could exist with others on metameric matches because of individual's different characteristics. Some account was given of the ways in which different matchers would use different angles in comparing samples that could be moved around. Some additional justification for the choice of rather high colour temperatures in the graphic arts industry was given in the separate, similar, choices of German and Japanese organizations, in spite of the attractive idea of a lower, compromise, temperature nearer that of tungsten lighting.

D.W.K.

JOURNAL OF THE COLOUR GROUP

In the Winter, 1970, issue of the J.C.G. there was a long article by W. D. Wright on the "Origins of the 1931 C.I.E. System." The article was based on a tape recording of a "very informal and highly personal account" of the C.I.E. System given to the Colour Group in 1969. The article was too long to reproduce here, but should be of interest to many ISCC members.

BOOK REVIEWS

Daylight and Its Spectrum

S. T. Henderson, American Elsevier Publishing Company, Inc., New York, 1970. Pp. x +277. Price $15.75.

Background material is presented in four introductory chapters. Ancient and mediaeval ideas are reviewed to show the rise of spectroscopy, and the progress from Galileo to Newton. One chapter describes the sun's physical characteristics. Two other chapters are concerned with the upper atmosphere and light scattering in the atmosphere. In a series of seven chapters, the author has "assembled most of the significant work of the last ninety years" concerning scientific work on daylight and its spectrum. These facts are presented generally in chronological order from a wide variety of sources, but in a highly coherent fashion.

Later chapters are concerned with standardized data on daylight, and less common forms of daylight such as eclipses and the moon. The uses of daylight are described for human vision, plants, animals, buildings, and in color matching, color rendering, and metamerism.

The final chapters are reserved for data on sources of artificial daylight. One Appendix is concerned with units and definitions, and a second Appendix gives a chronological index of contributions to knowledge in this area. There is a bibliography of 449 titles.

The scope of the book is, indeed, comprehensive and can certainly be recommended as a working reference and as a guide to the literature.

Robert W. Burnham

International Lighting Vocabulary, 3rd Edition

Published by Bureau Central de la CIE, 4 Av du Recteur Poincarè, 75 Paris 16^{o}, France. Available in USA from H. K. Hammond III, Secretary, U.S. National Committee, C.I.E., National Bureau of Standards, Washington, D.C. 20234, at $16.00 per copy. Checks should be made payable to "U.S. National Committee, CIE." 359 pages, paper bound.

This monumental work contains internationally accepted definitions for some 660 terms in the general fields of radiation and lighting, each in four languages: French, English, German and Russian. The terms only, but not the definitions, are also given in five other languages: Spanish, Italian, Dutch, Polish and Swedish. Synonyms are included to bring the total number of terms defined to nearly 900.

This volume is primarily the work of Committee E-1.1 (Definitions-Vocabulary) of the International Commission on Illumination (CIE), and Group 1/WG_p 45 of the International Electrotechnical Commission (IEC), with the cooperation of other CIE and IEC committees, various international organizations, including among others ISO/TC 12, the SUN Commission of the International Union of Pure and Applied Physics, the Association of Lighthouse Authorities, and many individuals throughout the world.

Units employed in the vocabulary are in the International System of Units (SI). The symbols for the units, quantities, etc., conform to the recommendations of international organizations (ISO/TC 12, CIE, IEC ((Publication 27)) SUN Commission). A few units, not belonging to the SI system, are quoted solely for information.

The definitions and symbols are consistent with those in USA Standard Nomenclature and Definitions for Illuminating Engineering, USA Z7.1 -- 1967 Revision of Z7.1 -- 1942, UDC 653.014.8:621.32, sponsored by the Illuminating Engineering Society and approved August 16, 1967, by the USA Standards Institute. Each volume contains some terms not included in the other.

The scope of the definitions in the International Lighting Vocabulary is indicated by the Section and Subsection headings. In each case the number in parends following the heading indicates the number of terms defined under that heading. Radiation, 1. Fundamental concepts (22), 2. Quantities (17), 3. Thermal radiation (16); Photometry quantities and units (28); Colorimetry: Fundamental concepts and quantities (54); Optical properties of matter (46); Eye and vision (65), Color rendering (7); Radiometric, photometric and colorimetric measurements (41), Physical receptors (20); The production of light (23); Lamps: 1. Incandescent lamps (9), Discharge lamps and arc lamps (29), Lamps of special types for special purposes (28); Components of lamps and auxiliary apparatus (57); Illuminating: General (45), Daylighting (7); Lighting fittings and their components (54), Projectors (9); Lighting for traffic and signalling 1. General terms (14), 2. Navigation (7), 3. Air-traffic (34), 4. Street-traffic (19), 5. Retroreflectors (12).

Preliminary remarks at the beginning of each section dealing with quantities and units explain some of the conventions used, and the applicability of some of the defined terms. Spelling in general follows English usage, rather than American, where the two differ.

Usefulness of the Vocabulary is greatly enhanced by nine indices, one in each of the nine languages.

This book should be in the reference library of every serious worker in the fields of color, lighting, radiometry, thermal radiation measurements and photometry. Use of the terms and symbols defined in this volume by all writers in these fields would greatly aid in the exchange of information.

J. C. Richmond, Institute for Basic Standards, National Bureau of Standards.

MEMBER-BODY DELEGATION CHAIRMEN

Here is a recent updated list of Delegation Chairmen. All addresses are in the present membership list as far as we know.

AAPL	Frank C. Wright	IES	Charles W. Jerome
AATCC	Roland E. Derby, Jr.	IDSA	Ray Spilman
ACeS	F. J. Von Tury	IFT	John Yeatman
AChS	Samuel M. Gerber	NAPIM	Lou Wurzburg
AIA	Waldron Faulkner	NPVLA	Everett Call
AIID	Beatrice West	NSID	Donald Waterman
AOCS	Wayne St. John	OSA	Dorothy Nickerson
APA	Jo Ann Kinney	PDC	Karl Fink
ASP	John T. Smith	PPC	Fred L. Bohlke
ASTM	George Ingle	SMPTE	W. T. Wintringham
CAUS	Midge Wilson	SPSE	C. J. Bartleson
CMG	Lou Graham	SPE	M. M. Gerson
DCMA	Max Saltzman	TAGA	W. L. Rhodes
FSPT	Ruth Johnston	TAPPI	Peter C. Hambaugh
GATF	William D. Schaeffer		
GTA	Oscar Smiel		

UPDATING OF 1968-69 LIST OF VOTING DELEGATES, MARCH 18, 1971

Add, delete and replace as necessary from the 1968-69 Membership List. Addresses not given are in that list. The Chairman is not indicated here, but shown above.

AAPL	Delete Allyn Cox. Add John Bartok, Box 447, 2 Beachmere Pl., Ogunquit, Me. 03907.
AATCC	No change.
ACeS	Delete Ralph Gibson. Add Alan J. Werner.
AChS	Samuel Gerber, Box 779B, Rd. 1, Martinville, N.J. 08836. Seymour Commanday. William B. Prescott, American Cyanamid Co., Bound Brook, N.J. 08805.
AIA	No change.
AIID	No change.
ACCS	Delete A. S. Payne. Delete Francis Scofield. Add Wayne St. John. Add Ronald C. Stillman.
APA	Add Sidney Stecher, Brandeis University, Dept. of Psychology, Waltham, Mass. 02154.
ASP	No change.
ASTM	Delete W. J. Kiernan. Add Sam J. Huey.
CAUS	Delete Carl S. Oldach. Add Ernest J. Chorneyei.
CMG	Delete Elizabeth Meehan. Delete Earl G. Ogier. Add Kenneth E. Froberg. Add Kenneth L. Kelly.
DCMA	Delete Raymond Thornton. Add Samuel Zuckerman.
FSPT	Delete Sam J. Huey. Add Richard G. Alexander.
GATF	Delete Eric W. Harslem. Delete Zenon Elyjiw. Add William D. Schaeffer, Res. Dir., Graphic Arts Technical Foundation, 4615 Forbes Ave., Pittsburgh, Pa. 15213. Add Frank L. Cox, Graphic Arts Technical Foundation, 4615 Forbes Ave., Pittsburgh, Pa. 15213.
GTA	Delete Carl Metash. Add William Milanese, Jr.
IES	No change.
IDSA	Delete Arthur Bec Var. Add Robert Redmann.
IFT	Delete Gordon Mackinney. Add Mrs. Angela Little.
NAPIM	Delete Robert Bassemir. Delete William D. Schaeffer. Add Alfred Di Bernardo. Add Richard Kline.
NPVLA	Delete K. W. Edmonds. Add Daniel Smith.
NSID	Delete Mrs. Dede Draper. Delete Mrs. Edith Gecker. Delete Ausbey E. Lee. Add Prof. Donald C. Waterman, 7398 Silverwood Dr., Manilus, N.Y. 13104. Add Charles Freeman, 390 Niagara St., Buffalo, N.Y. 14201. Add Torwald H. Torgensen.
OSA	Delete R. S. Hunter. Add Deane B. Judd.
PDC	No change.
PPC	Delete W. B. Leavens, Jr. Delete W. C. Harding. Add Fred L. Bohlke, Chairman, Lord Baltimore Press, 2000 Harrison Dr., Clinton, Iowa 52732. Add Frank Caldwell, Vice Chairman, Federal Paper Board Co., Inc., 75 Chestnut Ridge Rd., Montvale, N.J. 07645. Add Frank A. Renaud, F. N. Burt Co., Inc., 2345 Walden Ave., Buffalo, N.Y. 14225.
RECGAI	-- Delete, no longer member body.

SMPTE Delete Ralph M. Evans.
Add Warren B. Reese.
SPSE Delete Albert J. Derr.
Delete Lloyd E. Varden.
Add George B. Gardner.
Add Russell H. Gray.
SPE Delete W. N. Hale.
TCA -- Delete, no longer member body.
TAGA Delete H. Brent Archer.
Delete Frank Preucil.
Add Joseph McSweeney.
TAPPI Delete John Patek.
Add Peter C. Hambaugh, Bowaters Southern Paper Corp., Calhoun, Tenn. 37309.

INTER-SOCIETY COLOR COUNCIL BOARD OF DIRECTORS MEETING, APRIL 18, 1971

Applicants for Individual Membership

Applicant	Member-Bodies and Interests
Mr. David H. Alman 6-5 Georgian Terrace Troy, N.Y.	Ph.D. student, RPI.
Miss Ellen D. Campbell 31 Hawthorne Ave. Delmar, N.Y. 12054	Ph.D. student, RPI. Metallic paint films and other spectrogoniophotometric studies, turbid medium theory, and the relationship between instrumental and visual color matching.
Mr. Frank Cicha 7 Rockwood Dr. Newburgh, N.Y. 12550	GATF, GTA, SMPTE, SPSE. Marketing color control products.
Dr. James G. Davidson Color Systems Div. Kollmorgen Corp. 67 Mechanic St. Attleboro, Mass. 02723	FSPT, SPE. Instrument development, theoretical and experimental consideration of the color and appearance of metallic paint systems.
Dr. Stephen Day The Rensselaer Color Measurement Lab. Rensselaer Poly. Inst. Troy, N.Y. 12181	Research into the relationships between visual estimations of small color differences and physical measurements of such differences expressed by means of color difference equations.
Miss Krystyna Dobrowolska 2242 15th St. Troy, N.Y. 12180	Ph.D. student, RPI. Using of color measurement for testing properties of pigments for paint industry.
Prof. Howard T. Fisher Harvard University 1430 Mass. Ave. Cambridge, Mass. 02138	AIA. Research on the improved representation of color space, computer graphics as an aid to the understanding of color order systems, color as a quantitative analogue in communication.
Mr. Philip L. Flor 77 Executive Blvd. Elmsford, N.Y. 10523	New and improved organic pigments as well as novel applications of same.
Mr. Leon M. Gregg 101 Harbor Pwy. Clinton, Conn. 06413	OSA. Color specification, color difference. Reference standards (white or near white), application of computers to color difference specification. Color strength of pigments, problems of "metallics" in color specifications.
Mr. Robert Hillman 1460 Ferndale Highland Park, Ill. 60035	ASTM, CMG, NPVLA, SMPTE. I have a broad interest because of my position with the Sears Color Lab.
Mr. Marcus P. Klawieter, I.D.O. 121 Allan St., Apt. 1104 Oakville, Ontario, Can.	AIID. Interior design depends on the proper senses, sight pleasing to the eye, coarseness or smoothness to the touch, all of course controlled by the optics. The success depends on proper combinations.
Mr. Robert T. Marcus 176 Hoosick St. Troy, N.Y. 12180	Ph.D. student, RPI. Visual, psychometric, and instrumental measurement of color.
Mr. Keith McLaren ICI Dyestuffs Div. Manchester M93DA, England	Colour measurement and colour vision. (Transferred from Newsletter Only category.)
Miss Ruth Munn Chemistry Dept. Walker Lab Rensselaer Poly. Inst. Troy, N.Y. 12181	Ph.D. student, RPI. Using psychophysical responses, printing and reproduction processes, color difference metrics. Metallic paints and their visual appearance.
Mr. Daniel G. Phillips 6-3 Blatchford Dr. Troy, N.Y. 12180	Ph.D. student, RPI.
Mr. Francois Rabaud 5 Residence Boieldieu 92 Puteaux, France	To study the problem of metamerism so as to lead to a real color-coordination between different materials. I am preparing a doctor's degree in the University of Paris and I belong to the color group of the French National Museum of Science.

Dr. A. R. Robertson
National Research Coun.
Ottawa 7, Canada
K1A OS1

OSA. Spectrophotometry, Goniophotometry, Colorimetry, Color Difference Specification, Color-rendering.

Mr. Byron Smith
617 N. Centre St.
Cumberland, Md. 21502

AIID. Problems in design, coordinating and specifying manufactured products for building projects, and relating color to light.

Mr. Frank R. Spinelli
Cabot Corp.
Concord Rd.
Billerica, Mass. 01821

AChS, FSPT, OSA. Pigments technical service.

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

Miss Olga Bach (CMG)
c/o Parkwood Laminates Inc.
Industrial Ave.
Lowell, Mass. 01853

Color Styling, Color Marketing, Product Color Control, Color Reproduction.

Mr. John G. Baer (SMPTE)
20th Century-Fox Film Corp.
444 W. 56th St.
New York, N.Y. 10019

OSA, SPSE. The processing of color motion film; optical presentation of color motion picture film; electronic presentation of color motion picture film; electronic conversion of color film to tape and the reverse.

Miss Alice Josephine Gitter (ACeS)
Hi-Purity Materials Inc.
Engineered Materials Div.
Box 363, Church St. Sta.
New York, N.Y. 10008

ASTM. Ceramics.

Mr. Robert B. Hobbs (TAPPI)
7715 Old Chester Rd.
Bethesda, Md. 20034

AATCC, AChS, ASTM, GATF. Standards and quality control techniques for color of papers and inks.

Mr. Karl H. Norris (IFT)
ARS, USDA, P.I. Sta.
Beltsville, Md. 20705

Design and development of instruments to evaluate the quality of agricultural products.

Mr. Donald G. Orr (ASP)
6519 Haystack Rd.
Alexandria, Va. 22310

SPSE. Acquisition, display, and analysis of color information about the Earth and its environment through the use of color, multiband and specialized serial photography.

Mr. Frank A. Renaud (PPC)
P.O. Box 1089
Buffalo, N.Y. 14240

No information.

Dr. Clarence A. Seabright (ACeS)
17541 Daleview Dr.
Lakewood, Ohio 44107

AChS. Problems connected with use of ceramic colorants including metamerism, measurement of color difference, relation between different color measuring instruments.

Dr. Albin F. Turbak (AChS)
215 Denvale Dr.
Danville, Ill. 61832

AATCC, IFT. Dye systhesis; structure/color and fastness relationships, textile dyeing, paper dyeing, food packaging coloring, printing.

Mr. Herbert J. Zeller (IDSA)
9401 W. Grand Ave.
Franklin Park, Ill. 60131

Industrial design.

Mr. Russell R. Zimmerman (ASP)
7500 Old Xenia Pike
Dayton, Ohio 45432

SPSE. Measurement, psychophysical phenomena of interpretation, etc.

Mr. Milton L. Pearson (TAGA)
Graphic Arts Research Center
Rochester Inst. of Tech.
One Lomb Memorial Dr.
Rochester, N.Y. 14623

SPSE. The measurement of color and the reproduction of color in the Graphic Arts.

Mr. William N. Welch (TAGA)
Gravure Research Inst.
22 Manhasset Ave.
Port Washington, N.Y. 11050

GTA. SPSE, Graphic Arts reproduction and processes.

Mr. John R. Metcalfe (TAGA)
4605 Olden Ct.
Bowie, Md. 20715

Printing, Litho, Color.

FEDERATION OF SOCIETIES FOR PAINT TECHNOLOGY

The 1971 Annual Meeting of FSPT will be held in Detroit from October 27 to 31 in conjunction with a Paint Industries Show.

The technical sessions of the Annual Meeting Program will be conveniently held across the corridor from the Paint Show in Cobo Hall.

The theme of the 1971 Program is "Man and His World of Color" and some of the "colorful" presentations planned include: New Theories of Interference Color . . . Electro Luminescent Bubble Coatings . . . Liquid Crystals . . . Color Problems in Manufacturing . . . Radiation Curing . . . Design of Consumer Colors. Add to these the "Standards" of Federation Annual Meetings: Paint Research Institute Symposium . . . Roon papers . . . Society papers . . . Mattiello Lecture . . . Keynote Address . . . Workshops.

The program sessions will open Wednesday afternoon, October 27, and continue through Thursday, Friday, and Saturday morning.

INDUSTRIAL DESIGNER'S SOCIETY OF AMERICA

William M. Goldsmith, principal in the Chicago industrial design firm of Goldsmith, Yamasaki, Specht and Anderson, has been elected President of the Industrial Designers Society of America, an office he will hold for two years.

The Industrial Designers Society of America is a non-profit national organization with a membership of some 670 professionals whose record of accomplishment indicates competence in the field. The Society's objectives include the maintenance of high standards of design and professional integrity, the encouragement of sound design education, research, creative experiment, and cooperation with Industry and Government. Chapters of the Society are in the following areas: Ohio Valley, San Francisco, Los Angeles, Atlanta, Southern New England, New York, Boston, Chicago, Detroit and Central New York.

PROFESSIONAL DESIGNERS' OPTIMUM EXHIBITED AT AMA SHOW IN CHICAGO

An exhibit of professionally designed packages by members of the Package Designers Council formed one of the key visual elements of the American Management Association's 1971 Packaging Conference in Chicago, May 3rd through the 6th.

This exhibit, the first one limited to entries from the Council membership, featured design excellence as accomplished by some of America's finest professionals. Each PDC member was invited to contribute one package design considered to represent the designer's optimum achievement.

The Package Designers Council, founded in 1952, is the professional organization of industrial design consultants who specialize in package design and other visual expressions of the corporate image. Its membership includes persons who render professional services in designing packages for mass production and other point-of-sale material, acting as packaging counsel, conducting package research projects, and applying their knowledge of the design, function and structure of packages, packaging procedures and marketing to the problems of their clients.

The purpose of this exhibit was to call public attention to the contribution of creative design to a package's effectiveness and to the increasingly important role of packaging as a marketing medium.

PUBLICATIONS COMMITTEE

Robert W. Burnham, Chairman
Deane B. Judd
William J. Kiernan
Dorothy Nickerson

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