

Inter-Society Color Council *Newsletter*



NUMBER 209
November-December 1970

TENTATIVE PROGRAM FOR THE ISCC WILLIAMSBURG SYMPOSIUM ON OPTIMUM REPRODUCTION OF COLOR

Monday Morning

Session Leader: W. L. Rhodes

R. W. G. Hunt -- Objectives in Color Reproduction

R. M. Evans -- Accuracy in Color Photography and Color Television

Monday Evening

Session Leader: J. A. C. Yule

C. J. Bartleson -- Photographic Prints (tentative title)

R. W. Burnham -- Informal Discussion of Research Activities at Eastman Kodak

Tuesday Morning

Session Leader: W. T. Wintringham

D. Zwick -- Reproduction of Color Film in Color Television

L. DeMarsh -- Color Television (tentative title)
R. Brodeur and K. R. Field -- The Measurement of Color Rendition in Color Television

Tuesday Evening

Session Leader: G. Wyszecski

M. Pearson and W. Rhodes -- Review of Color Reproduction in Printing

M. Austin (contributed paper) -- The Relationship Between Colors in an Original, the Reproduction Process, and the Color Gamut of Process Ink Sets

C. Phaxtan (contributed paper) -- Electronic Color Reviewer for Use in Color Printing

Wednesday Morning

Session Leader: R. W. Burnham

J. A. C. Yule, M. Pearson and I. Pobboravski -- The Relationship Between Photomechanical Reproduction and the Original Copy

B. H. W. Sunderland -- An Approach to Tone and Color Reproduction in Graphic Arts Color Printing

W. D. Wright -- Informal Summary and Impressions of the Symposium

ANNUAL MEETING

Banquet Speaker

Dr. Hereward Lester Cooke, Curator of Painting at the National Gallery of Art, Washington, D.C., will be our Banquet Speaker. He's the author of a fast-selling (if not yet a "best" seller) Watson-Gapill book on "Painting Lessons from the Great Masters." With his success in aiding would-be artists and appreciators of art to learn the tricks of light and shade which the Great Masters used to create the illusion of form and space on a two-dimensional surface, Dr. Cooke seemed to be the ideal man to remind us that the creation of harmony in form and color remains very much an art and that "realistic" pictures are actually abstractions of what the eye has seen.

The fly leaf we find has this to say about our speaker:

Hereward Lester Cooke is at once a distinguished scholar and a successful artist whose paintings are sought after by discriminating collectors. Born in Princeton, New Jersey, in 1916, Dr. Cooke was educated in England at both Harrow and Oxford, where he took an honors degree in philosophy and history. He returned to the United States in the late 1930's, attended the Art Students League in New York, then enrolled in the School of Fine Arts, Yale University, to continue his painting studies.

As a pilot and combat intelligence specialist for the Army Air Force during World War II, Dr. Cooke was sent to China, Burma, India, and the Southwest Pacific, receiving the Bronze Star and the Air Medal. After the war, he entered Princeton's Graduate Department of Art and Archaeology, where he received an M.F.A. and completed the course work

toward his doctorate. He stayed on as Instructor and Artist-in-Residence until 1951, when a Fulbright Fellowship took him to the Sorbonne in Paris to complete his doctoral thesis.

From Paris he went as a Senior Fellow to the American Academy of Rome, and there undertook an important study of Italian drawings which ultimately led to the publication of the scholarly book, Roman Drawings at Windsor, co-authored with Sir Anthony Blunt. After four years of painting and study, Dr. Cooke returned to America and joined the staff of the National Gallery of Art, where he has been Curator of Painting since 1962.

Color In Packaging

For the morning session right after the business meeting on Tuesday, Mr. Manuel de Torres, President of Metro Lithographing Company, Moonachie, N.J., has kindly agreed to tell us something about his market research on customers' reactions to color in packaging. He hasn't given us a formal title yet, but some idea of his fascinating research may be obtained from the following quotation from LITHOPINION which Midge Wilson sent along to us:

"Color: Man's Other Vocabulary" by Edward Swayduck

. . . "In recent years, use of color by marketers has attained great precision and subtlety. With all marketers aware that there is 'a fantastic plus for color,' there is more research than ever, and the research is more refined than it has ever been before. Manuel de Torres, whose plant specializes in packaging, is an expert on the use of color in lithography as a psychological factor, tells of an experiment of several years ago in a 'controlled super-market' -- a supermarket designed for research, in which hundreds of concealed movie cameras mounted behind shelves, took note of customer behavior. Each camera was coded to report the particular product being looked at by the potential buyer. 'Certain color combinations would attract four times as much attention as others,' de Torres and his associates found. 'We would use a unique method of testing customer reaction. Normally a woman buyer will blink her eyes eight times a minute. When she is particularly interested, the rate jumps to twelve to fourteen. When she is not interested, the blink rate will drop to four, five, or six. Absolute bottom, which is a state resembling hypnotism, is one blink per minute. We were able to pick the color combinations which aroused the most interest and attention' . . . "

Color Naming Contest

An added feature of the Annual Meeting will be a COLOR NAMING CONTEST, commemorating the 40th Anniversary of the ISCC and the initial assignment which prompted its founding -- the request from the

Revision Committee of the U.S. Pharmacopoeia for help in the selection of color names for describing drugs and drug products in the U.S. Pharmacopoeia.

This contest will offer all members an opportunity to test their Eye-Q. Kenneth L. Kelly, experienced Chairman of the Problem 2 Committee on Color Names, will serve as Chief Judge. Assisting judges will be announced later. The winning selection will be based upon the appropriateness of the name, which must reflect an appreciation of fine color differences. Presentation of a prize will be made to the winner at the banquet Tuesday evening.

R. Feller and M. Wilson

DOROTHY NICKERSON RECEIVES IES GOLD MEDAL



The IES Gold Medal and Certificate, the Society's highest honor, has been awarded to Miss Dorothy Nickerson, internationally renowned color technologist, for . . . "meritorious achievements which have conspicuously furthered the profession, art or knowledge of illuminating engineering." The Gold Medal and Certificate was formally presented to Miss Nickerson at the Annual IES Conference in September.

Miss Nickerson, elected a Fellow of the Society in 1956, is the second woman to be named recipient of the IES Gold Medal. The award recognizes her outstanding work leading to proper illuminants for color matching and discrimination, artificial "day-lighting" studies, Munsell color specifications for different illuminants, and many other studies of great value in

illuminating engineering. Of the more than 100 technical papers she has authored or coauthored since 1928, 14 of them have been directly related to illuminating engineering.

Text of Award Certificate to Dorothy Nickerson

Distinguished Colorist, in recognition of her work with light sources for color measurement and inspection; for psychophysical studies in color spacing and color rendition; for her unique talents in organizing and directing research projects in color specification and discrimination, and selection of light sources for textile color matching:

Internationally known for her development of methods for color grading of cotton, both visual and photoelectrical; for her leadership in developing the appraisal of light sources for their rendition of object colors; a long-time member-delegate of the International Commission on Illumination, she has brought honor to this country and distinction to the illuminating engineering profession:

Fellow of this Society and of the Optical Society of America, author of over 100 scientific and technical papers, she has earned the profound respect and regard of her colleagues and associates.

The IES Gold Medal is one of many honors conferred on Miss Nickerson. In 1961 she was awarded the Godlove Award of the Inter-Society Color Council in acknowledgment of her valuable psychological studies of color spacing, color tolerances, and color rendition; her studies of light sources for color measurement and inspection, and developments of instruments and methods for color measurement. Further honors came to her in 1964, when she was awarded the Distinguished Achievement Award of the Instrument Society of America, in recognition of her contribution to the advancement of optical and color instrumentation for agricultural applications. She was the first woman to receive this annual ISA Award.

Introduced to color research at the Munsell Color Co., in her home town of Boston, Mass., in 1921, Miss Nickerson has devoted most of her life to the study of color, colorimetry and illumination. She joined the U.S. Department of Agriculture in 1927 as a color technologist, and until her retirement in 1965 was responsible for the establishment and maintenance of color standards used in classing cotton. She designed and patented a disk colorimeter which determined color standards for cotton and other agricultural products. She also collaborated in the development of

a number of instruments for color measurement, including the Nickerson-Hunter Cotton Colorimeter, a self-standardizing electronic instrument for measuring raw cotton. For her contribution, she was awarded the Superior Service Medal of the Department of Agriculture in 1951.

Miss Nickerson's color research naturally led her to illumination. Her first new interest was related to the specification of artificial daylight by which color inspections of agricultural products should be carried out. This interest broadened, however, to specification of artificial daylight for color inspection generally, to textile color-matching in particular, and to studies of color rendition in which she is now a recognized international authority.

Miss Nickerson's second new interest lay in color-spacing. She organized a massive appraisal of the spacing of the Munsell colors. The chief result of this study was the development of the Munsell renotations. Her third new interest was in the development and promotion of the Inter-Society Color Council -- National Bureau of Standards method of designating colors, and its application to the colors of soils and flowers. One development from this interest was the Nickerson Color Fan, a 40-hue chart of 262 samples printed with ISCC-NBS name designations. This earned her the American Horticulture Council Gold Certificate of Recognition in 1957.

Miss Nickerson's talent has been generously contributed to the several organizations concerned with her profession. She is internationally known for her work as a United States expert on the international Committee on Colorimetry (E-1.3.1) of the Commission Internationale de l'Eclairage (International Commission on Illumination). As a member of the IES Capital Section, she has served as Section secretary-treasurer, vice chairman, and as chairman in 1954-1955. In IES technical committee work, she has also served as chairman of the Subcommittee on Color Rendition of the IES Light Sources Committee. Active also in the Inter-Society Color Council, for which she was secretary from 1935 to 1952 and its president in 1954-1955, Miss Nickerson was the third person to receive the Godlove Award. In accepting the award, she said:

"As problems came there were no answers, and I had the real privilege of helping to work out the basis of several really practical problems in the field of color measurement and lighting. These were adventures of the mind. The exploration of new fields and the search for knowledge provides a satisfaction that never becomes sated. Of almost everything else in the world we can get too much."

E. I. STEARNS NOMINATION

Edwin I. Stearns, an international authority on the chemistry of color and textiles, has been nominated for the presidency of the American Association of Textile Chemists and Colorists in 1971. A research associate in the research and development laboratories of American Cyanamid Company, at Bound Brook, New Jersey, Mr. Stearns has published more than 100 scientific papers, holds 20 patents and is the author of "The Practice of Absorption Spectrophotometry," a book published last year by John Wiley and Sons. Scientific honors awarded him include AATCC's Olney Medal and the Godlove Award from the Inter-Society Color Council of which he is an honorary life member. With Cyanamid since 1933, Mr. Stearns has held varied assignments in the research, manufacturing and commercial segments of the company's organic chemicals operations.

COLOR MARKETING GROUP AWARD

Miss Dorothy Liebes of New York City was named recipient of the highest award in the field of use of color -- THE DR. FORREST L. DIMMICK AWARD by the Color Marketing Group during their Fall Meeting.

Over the past four decades Miss Liebes has been accepted as the leading color and textile expert and prophet. Her aim has been to produce, not to reproduce; to develop new ideas and forms to suit the new world, instead of rehashing old cultures. She not only believed but proved that color is the universal language.

Dorothy Liebes' efforts were guided by the concept that good color does not cost more than bad. With a low budget, all kinds of miracles can be done with color. Every industry that utilizes color will secure their future success by adopting Miss Liebes' basic principle -- "There is no such thing as a bad color -- only bad color combinations."

Miss Dorothy Liebes has her studio at 767 Lexington Avenue, New York, N.Y. 10021.

COLOUR GROUP (GREAT BRITAIN)

Report of the Seventieth Meeting of the Colour Group in October 1970

The seventieth meeting of the Colour Group, the first of the 1970-71 session, was a seminar on education and training in colour. Six speakers introduced different aspects of the requirements for colour education and the present position in meeting the demands.

Professor R. W. G. Hunt illustrated the demand for training in the specialized subject of the reproduction of colour. All the places in the course at Imperial College with which he has been concerned had been filled in the seven sessions held since 1966, and he anticipated a continued demand for thirty or forty places each year. This arises because scientists entering the colour-using industries have usually no knowledge of colour science: while the largest companies might consider running their own courses, he felt it was better for the colleges to run them both because practical work was more easily arranged and it was preferable to have students with different backgrounds. Practical work is essential.

Mr. K. McLaren's experience in the colour-using industries was also that new entrants had little background colour knowledge. He outlined some of the

COLORAMA
FROM THE COLOR NOTEBOOKS OF
Howard Ketcham

THE FLAG the general use of flags began in the Middle Ages... frequently of religious significance...
the flag carried by a knight with William the Conqueror in 1066...

RED is present in about three fourths of all NATIONAL FLAGS. with exception ISRAEL (left)

the American Flag
the congress approved our national flag on June 14, 1777... they defined color symbolism as...
white for purity & innocence...
red for hardiness & valor...
blue for vigilance, justice, & perseverance...

Labels for the Israeli flag: white, blue, white, blue, blue, white.

Reproduced with permission of American Cyanamid Company

essentials of which additive mixture was one, since this leads simply to the principles of subtractive mixture, not vice versa. The increasing use of precise colorimetry gave this a place, with which was associated the 3-dimensional nature of colour. The Munsell System he thought to be very good in this context and proposed the use of the ANLAB method of Adams and Nickerson for numerical specification, since it used a similar colour space.

The review of the present state was opened by Mr. J. S. Ward, describing the educational role of the Society of Dyers and Colourists from its beginnings in Bradford in 1884. The textile industry uses the majority of the World's production of colorants and has a proportionate interest in everything connected with their use. The S.D.C. through its technical committees has pioneered techniques that are now standard throughout the industry, and by its examination of candidates for its Associateship has raised standards generally and encouraged the introduction of related work into university courses in the traditional textile areas. Mr. J. Fraser outlined the various courses run by the B.B.C. in its own special field of work. These are mainly for technicians and for operating staff at entry and also to bring them up to date at later stages of their careers. Colour appears in all the basic courses, as related to colour television, and tristimulus colorimetry and the Munsell specification of colour are dealt with in theoretical and practical classes. Programmed texts have not been found suitable within the classroom, as they take more time than traditional methods. Mrs. Enid Verity spoke about the newly inaugurated British Colour Education Institute, which is concerned with less specialised aspects of colour education. She felt that in their first pilot scheme, a five-day course on Colour in Industry, they had been too technical in some cases and too sketchy in others. More generally, direct colour education might appear at either primary or sixth-form levels, and necessarily directed at staff and students in training colleges. She found the kinetic aspects -- moving light and colour -- particularly interesting in her own field of interior design. There is a great deal to say about colour outside the purely scientific. In her very clearly set-out demonstrations she had included one on colour co-ordination in architectural design. Dr. C. A. Padgham concluded this part of the session, first acknowledging the help from many others that had been given to him and Professor Wright in arranging the seminar. He was able to list at least ten university level courses in this country and mentioned others in other European countries, as well as the commercial courses available, mainly instrumental.

In the discussion a number of extra courses were added to the list, and a good deal of heat generated on the subject of terminology. This was said to be a source of difficulty in art and architecture. One college teacher felt that, as a peripheral subject, colour was given insufficient time for its relevance to

be appreciated. However, for a school art teacher, the words were no problem but the money to pay for colour demonstrations was. Her request for help from industry elicited examples of just this sort of help to individuals. There were differences of opinion on whether the presence of 'two cultures' raises serious difficulties, but a speaker pointed out that in this field good practical demonstration prevents any confusion that might be due to an abstract theoretical approach.

While summing up, Professor Hunt brought out a few main themes. He excluded art appreciation from his brief, but considered the Munsell system (produced by an artist) convenient to teach, particularly since its terms (value, chroma) did not have popular meanings. Colour television, mentioned by several speakers raised some complex questions and it was better to deal first with surface colours. Colour education could have a place in schools and colleges, and the school medical examination should include a colour vision test that indicated the seriousness of a defect, with appropriate advice. He recognized the usefulness of a clearing-house for new courses, but not if it were to stifle the enthusiasm brought to a subject which crosses so many scientific and other boundaries.

Report of the Seventy First Meeting of the Colour Group in November 1970

Two papers were presented at the Seventy First Science Meeting of the Colour Group, "Optical Variables in White Paint Films" by D. F. Tunstall and "Uniform Radial Tolerance Method of Colour Difference Assessment" by J. S. Mudd.

Mr. Tunstall, who spoke first, said two distinct directions of work seem to have evolved in the process of colour matching. The practical paint mixer wants to make the right amount of paint, having the right colour, with the minimum of effort and cost. On the other hand the theoretician wants to solve the very complex problem of light scattering theory.

Neither route seems to have gained much from the other and neither has satisfactorily solved its problems. To make a significant advance, both disciplines must be united, and a true perspective of the problems gained so that the overall direction of research can be soundly pointed out.

In his paper the necessary corrections were made for the application of Kubelka-Munk (K-M) theory to paint films. A diffusing constant is introduced to allow for the directional vector of the incident light. It can be shown how true values of K/S , the ratio of the (K-M) absorption and scattering coefficients, can be found. From this analysis it can be shown that application of the Saunderson correction, though satisfactory for colour matching using present day standards of reflectance measurement gives purely

arbitrary values for K/S. The method consists of using the wrong value of a physical variable in an incorrectly applied correction equation. It was shown how a value for the Saunderson variable can be found from corrected (K-M) theory. The requirements of successful colour matching are different to those of the theoretician. The paint mixer only needs values of K and S that are proportional to concentration. Any theory that gives this effect is satisfactory irrespective of whether or not the K and S values are the true ones. The theoretician of course wants the correct values for comparison with the fundamental light scattering calculations. He should not, therefore, use the normal Saunderson correction.

An alternative method based on corrected (K-M) theory for rendering K/S proportional to concentration was given. It involved use of the quantity $(K/S)_a^{1.098}$, $(K/S)_a$ being the ratio calculated directly from the measured reflectance.

Finally some experimental results obtained on a series of rutile pigmented plastic samples containing varying quantities of vegetable black were presented.

The most salient point emerging from this work was that the present day standards and techniques of measuring absolute reflectance do not merit the use of more complex theories than those described in the paper. Either the Saunderson correction, despite its shaky foundations, or the corrected (K-M) theory provides a K/S ratio that is proportional to concentration within the accuracy limits of correct reflectance measurement. It is obviously in the field of practical absolute reflectance determination that the improvements in colour matching lie.

Mr. Mudd in his paper explained how an attempt had been made to find the best formula for converting instrument measurements into colour difference units. He used thirty series of patterns representing a useful gamut in industrial colouration, and compared the results of visual and instrumental assessment by means of rank correlation coefficient as a measure of agreement.

He said there is a general feeling that colour difference measurement, with its obvious applications to shade passing, would be much more widely used in industry if one could be really confident that the results would be more reliable than those obtained by visual assessment.

Initially he had used MacAdam tolerance ellipse but found that for practical industrial applications the tolerances could be circles in the x, y, z system.

Commenting on tolerance ellipses in general, he said the major axes of the ellipses lie along the lines of dominant wavelengths which implies that differences in

saturation are less readily seen than differences along the minor axes. While this was true for observations with coloured lights and to a lesser degree with transparent and translucent colour, there is evidence that differences in saturation with surface colours are seen as readily as other shade differences. This has to be inferred from the fact that colour difference calculations derived from classical observations on the behaviour of coloured lights do not give sufficiently good agreement with visually observed differences in surface colours. Surface colour differences are more important commercially than coloured light differences. Mr. Mudd was concerned with a practical approach to estimating colour differences of surface colours and the suggestion could not be avoided that there might be fundamental differences in observations of coloured light and coloured surfaces which would have to be investigated in due course. He then continued to show that the relative weights of luminance and chromaticity differences could be linked with dominant wavelength. The methods of colour difference calculation in common use, all give good results on some occasions and have an overall accuracy that was comparable with the best that could be expected from any one observer but on other occasions they failed badly.

The method of using uniform radial tolerances gave results better than variable tolerances or ellipses with every one of the thirty series of patterns examined and had an overall correlation that was significantly better than the observer mean.

Report of the Seventy Second Meeting of the Colour Group in December 1970

Three papers connected with the reproduction of colour were given at the third meeting of the Colour Group 1970-71 session on 2nd December.

Professor R. W. G. Hunt discussed 'Objectives in colour reproduction' in the perspective of the substantial improvements made during the last twenty years in colour photography, printing and television. The first of many well-chosen slides demonstrated the reductions in unwanted absorption in the dyes used in colour photography, the use of a matrix including negative terms for colour television cameras and the use of mechanical scanning to produce electronically corrected colour printing separation negatives.

Six different objectives in colour reproduction were discussed. Spectral reproduction (requiring equality of relative spectral power distributions for equivalent points in the original and reproduced scenes) is seldom practicable, although we might use the ideal as a basis for determining the amount by which a system gives metameric matches. The newer, and generally better, dyes and television screen phosphors were shown to give less accurate spectral colour reproduction of grey than their predecessors. When the original and

reproduction can have similar conditions of viewing and colour of illumination, the criterion of colorimetric reproduction is useful. Here the aim is equality of tristimulus values, although the use of a standard reference white and the CIE standard observer's colour matching characteristics are also implied. Exact colour reproduction adds equality of luminance levels to this: a demonstration showed the effects of illumination on the appearance of a picture, and it was shown how improved television pictures were produced by brighter phosphors although with a reduced gamut of colour. This gamut was compared in different ways with those obtained from real and idealized 'block' dyes in the photographic case.

The effects of the surround to a picture on its contrast and saturation were shown, and equivalent colour reproduction suggested for the case where tristimulus values and luminance are such as to ensure equality of appearance with different viewing conditions. As this is not possible at high luminance, the idea of corresponding colour reproduction was introduced to give equal appearance for the same luminance levels, which is a realistic criterion for most situations. When well-known colours are used, however, preferred colour reproduction may be required in which departures from equality of appearance may actually be desirable.

This paper will be published shortly in the "Journal of Photographic Science."

'The effect of surround on perceived saturation' by I. T. Pitt and L. M. Winter was introduced by Miss Winter. She demonstrated the effect of a dark surround on a coloured area and described experiments in which observers were asked to match the appearance of coloured filters in the middle of a transparency viewer screen. The matching colour was produced by a Burnham colorimeter giving a patch of light with a dark surround. The two colours were seen in a way intended to be more natural than the usual photometric viewing devices and no special fixation points were arranged. In all cases the observers needed a more saturated colour inside the dark surround, and in most cases a shift in hue was also needed for a match in the perceived colours. This can be regarded as if the dark surround drains colour from the patch of light. In another experiment, observers added coloured and neutral filters to a mosaic of six colours to match physically identical ones with a light surround.

Although the conditions of measurement in these experiments are not entirely similar to those in which coloured pictures are seen, it was hoped that it would lead to a better understanding of the objectives in colour reproduction. In practice the results proved to be in agreement with earlier work by Professor Hunt using the more academic methods of binocular colour matching.

Dr. S. B. Novick described his experiments on 'preferred Caucasian skin colour in colour television,' which proved to be an interesting special case of the effects described in the previous paper. Six slides were produced which included, as part of scenes taken in different surroundings, areas of skin whose appearance was to be considered. By using TARIF device with a flying-spot scanner, the colour balance of the picture seen on a colour television monitor could be modified. A preliminary enquiry found that 40 lx was a typical background level of illumination.

The results showed a large range of preferred colours, all more saturated than the original one, with chromaticity of $u = 0.271 \pm 0.014$, $v = 0.332 \pm 0.008$, differing from the average objective values by the amount to be expected from the ideas of the previous paper. The idea of a floating reference neutral point dependent on the colours in the general scene was used to explain different shifts of colour in different scenes. To interpret the complete results they were thus referred to a common objective point. The preferred colour for television is found to be more saturated and red than the original, while a less saturated and yellower colour is preferred on reflection prints, normally seen with very different luminance and surroundings.

THE PERCEPTION AND APPLICATION OF FLASHING LIGHTS

An international symposium is to be held in the Physics Department, Imperial College, London, 19-22 April, 1971. This symposium is being held under the joint auspices of the National Illumination Committee of Great Britain and of the Applied Optics Section, Imperial College and under the chairmanship of Mr. J. G. Holmes.

The program of the symposium is being arranged to promote the maximum exchange of ideas and experience between those engaged in academic research on the perception of flashing lights and those who are designers and users of flashing light signals, particularly in aviation, road and rail, and marine applications.

For information, write:

Professor W. D. Wright
(Flashing Lights Symposium)
Applied Optics Section
Imperial College
London sw7, England

S. LEONARD DAVIDSON BECOMES FEDERATION PRESIDENT

S. Leonard Davidson, Assistant Technical Director of the Pigment and Chemical Div. of National Lead Co., Hightstown, N.J. became the 49th President of the Federation of Societies for Paint Technology during the Federation's 48th Annual Meeting in Boston.

He joined the New York Society in 1951 and became an active member of the Technical Committee, especially the subcommittee on "Color Matching in Production." He was Chairman of this committee in 1954 and presented its well-known paper, "A Color Matching Box," at the Federation's Annual Meeting in 1955. Continuing his interest in color, he initiated the courses in color sponsored by the New York Society and served as the instructor for several years.

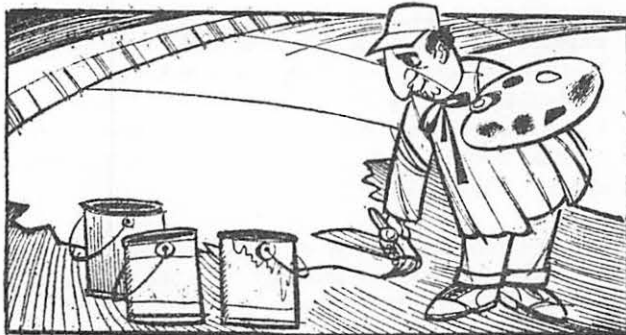
He served as Chairman of several Federation committees including the delegation to the Inter-Society Color Council, where he served for six years.

Mr. Davidson is a Director of the Inter-Society Color Council. At the Federation's Annual Meeting in 1969, he was presented the Armin J. Bruning Award for his "outstanding contributions to the science of color in the field of coatings technology."

GREEN, BLUE, WHAT HAVE YOU

District bridge engineers are getting fashion conscious, at least where their spans are concerned.

Beginning this summer, new colors will be added to State Highways Department paint buckets, not only for bridges but roads as well.



The department has painted the Fort Pitt and Fort Duquesne Bridges a golden color. Now, forest green and sky blue are being added to the bridge painters' palettes.

An experiment tinting highways in red, yellow and orange will be made to check for possible use as a safety measure to warn drivers of curves and other hazards.

From The Pittsburgh Press

FEDERATION OF SOCIETIES FOR PAINT TECHNOLOGY

American Paint Journal Awards

These cash awards are presented by the American Paint Journal for the most constructive papers, by Constituent Societies of the Federation, in connection with the research, development, manufacture, or application of the industry's products, or of the raw materials entering into their fabrication. Winners were:

Practical Category

First Prize (\$150.00) -- "Cold Storage of Panels Plus Colorimetric Control: An Approach to Stable Color Standards" -- Southern Society.

Second Prize (\$100.00) -- "Development of a Photographic Grind Instrument" -- Houston Society.

Research Category

First Prize (\$150.00) -- "Characterization of an Epoxy/Urea Formaldehyde Coating by Evaporative Rate Analysis" -- Chicago Society.

Second Prize (\$100.00) -- "Significance of Water Vapor Sorption as a Performance Parameter of Commercial Coatings" -- Pittsburgh Society.

George Baugh Heckel Award

This memorial award was established in 1951. It honors the late George B. Heckel, author, editor, poet, and historian who served as the Temporary Chairman when the Federation was organized in 1922, and as Secretary for many years thereafter.

The award, in the form of a plaque, is presented each year to the individual whose contributions to the general advancement of the Federation's interest and prestige has been outstanding.

The 1970 George Baugh Heckel Award was presented to Harry Burrell, Technical Director of the Building & Industrial Products Division, Inmont Corp., Clifton, N.J.

As an artist, Mr. Burrell is especially recognized for brilliant innovations in color combinations, for achievement of maximum "depth" through the artistic employment of both apparent and actual texture, and for the imaginative use of modern materials in developing his paintings.

Armin J. Bruning Award

This award -- "for the most outstanding contribution to the science of color in the field of coatings

technology" -- was established in 1962 by the Masury Co., Baltimore, Md., in honor of Armin "Joe" Bruning, who created the Bruning Colorimeter while in the employ of the Masury Co.

The award was presented to Miss Ruth M. Johnston, Director of the Dept. of Application Services, Kollmorgen Corp., Color Systems Div., Attleboro, Mass. She is chairman of the delegation to the Inter-Society Color Council from the Federation. She is also a member of The Colour Group (Great Britain).

RESOLUTION ON THE PASSING OF MR. M. REA PAUL

Excerpt from the Minutes of the June 24, 1970 Meeting of ASTM Committee D-1

WHEREAS, the many friends and associates of Mr. M. Rea Paul feel deep sorrow because of his death in January, 1970; and

WHEREAS, he became a personal member of ASTM in 1926, was elected to membership in Committee D-1 on May 15, 1930, served as Secretary of Committee D-1 from 1932 to 1944, as a Chairman of the former Papers Committee and the Subcommittee on Physical Properties of Paint Materials, represented ASTM in the Inter-Society Color Council and was the representative of Committee D-1 on Committee E-5 on Fire Tests of Materials and Construction, served as Chairman of Committee E-12 on Appearance of Materials from 1948 to 1957 and was Honorary Chairman of that Committee at the time of his death, was elected to Honorary Membership in Committee D-1 on March 6, 1958, was a member of Subcommittee VII on Accelerated Tests for Protective Coatings, VIII on Methods of Analysis of Paint Materials, X on Optical Properties, and XV on Specifications for Pigments; and

WHEREAS, he held positions of importance with National Lead Company, National Paint Varnish and Lacquer Association, Frederic H. Rohr, Inc., Eagle-Picher Sales Company, and Solvay Process Division of Allied Chemical and Dye Corporation.

BE IT THEREFORE RESOLVED, that Committee D-1, at its meeting in Toronto on June 24, 1970, expresses deep regret that M. Rea Paul will no longer be with us; and

BE IT FURTHER RESOLVED, that copies of this resolution be sent to Mr. Paul's immediate family and that a copy be retained in the permanent files of ASTM Committee D-1 at its Headquarters in Philadelphia.

SUMMARY OF SPRING MEETING OF ISCC PROBLEM SUBCOMMITTEE 10, CO-CHAIRMEN -- ANGELA LITTLE AND L. A. GRAHAM

The Subcommittee meeting was attended by 25 members of ISCC representing a wide diversity of interests. Discussion centered around the experiences of those present with the commercially available screening tests for color defective vision and the most widely used color discrimination and aptitude tests -- The Farnsworth-Munsell 100 Hue Test and the ISCC Color Aptitude Test.

The inadvisability of relying on a single screening test to identify color defective subjects was discussed. It was noted that significant differences exist among the plates of the many editions of the Ishihara Test which can lead to discrepancies in the evaluation of a subject depending on the edition used in testing. Angela Little reported on a subject who passed the HRR Plate Test, performed with normal score and test pattern distribution when given the F-M 100 Hue Test, but was classified as deuteranomalous by two editions of the Ishihara Plate Test. The Ishihara Test results confirmed the subject's identification as color defective, and indicated clearly that full reliance cannot be placed on the combination of the HRR Plate Test and the F-M 100 Hue Test to identify color defectives.

A number of questions were raised concerning the F-M Test and the ISCC-CAT as tools for the evaluation of color discrimination ability of subjects with normal color vision. These included the questions of lack of correlation between the two tests, of differences in their sensitivity to age and sex differences, of the effect of experience on test performance, and of the validity of the tests to predict performance of a specific task. These are some of the questions that the committee plans to consider as part of a long-term study.

The co-chairmen wish to extend a request to all interested members of ISCC to share with us information regarding interest in and experience with test methods. Specifically, we would like to know why you are interested in testing for color discrimination ability, what specific information do you seek regarding the subject, what are your job requirements, how do you expect to use the data. We have already received test score and test pattern information from a number of sources particularly for the F-M Test, and we extend our thanks to all of those who have been responsive to earlier pleas. May we reiterate our request?

Several decisions for action were arrived at during the Subcommittee session: (1) The decision to rewrite the ISCC-CAT brochure to eliminate inconsistencies, to

emphasize standardization of testing conditions, and to increase documentation of reference sources. (2) Because there was general agreement that the name Color Aptitude Test was imprecise, a proposal was made to change the name to Saturation Discrimination Test (with a notation -- formerly CAT), (3) Study the feasibility of decreasing the length of time of the ISCC-SDT (formerly CAT) by reducing the number of matching judgments.

The future success of the Subcommittee depends on the participation and support of members and member-bodies. We hope that the expression of interest will be such that a truly viable program can be realized.

STATUS REPORT OF ISCC SUB-COMMITTEE FOR PROBLEM 18

Six months have passed since our last meeting in Ottawa, Ontario and I thought a short resume of the present activity would be in order.

Measurement of SRF

The last round robin data were statistically evaluated in order to determine the variability among the participating laboratories. Spectral radiance was used in the restricted wavelength range, (400-500 nm), to put more weight on the overall response. By employing a multivariate statistical method called principle component analysis to each sample, it was possible to reduce the dimensionality of the variation among laboratory measurements. Principle component analysis assures that the first characteristic vector extracted will indeed explain the greatest percentage of total variability about the mean spectral radiance vector. The first characteristic vector was correlated strongly with the fluorescence distribution of the whitening agent contained in the sample. A short report with a simple explanation of this mathematical procedure will be given at the next Subcommittee meeting.

Task Force I (Visual Appraisal of Fluorescent Materials; Chairman, W. L. St. John

Two laboratories have completed the visual evaluation; and, we hope to have two more completed shortly. We hope to analyze these data and present the results at the spring meeting. We also have communicated with Dr. Berger, who is organizing similar work for the CIE, concerning our views and our experience on selection of samples for visual appraisal task.

Task Force II (Analysis of Spectral Radiance Factor in Terms of True Reflectance and Fluorescent Components; Chairman, W. Foster Chromatic Samples

A number of subcommittee members have indicated their interest in participating in this problem. Two samples, one FWA and one chromatic red were sent to six laboratories who indicated a willingness to actively contribute to this problem. We hope to obtain the preliminary results before the next meeting. The objectives of this first test are: to show again that spectral radiance factor can be reliably measured; to demonstrate how spectral radiance factor can depend on spectral energy distribution of the light source; and, to compare various methods for determining true reflectance.

Chromatic Samples

In view of the great interest in fluorescent dyes and pigments, the subcommittee initialized some work with such materials. A set of selected chromatic and highly fluorescent samples along with a white sample were submitted to four laboratories for measurements. Only the data with D_{65} source will be evaluated at this time, other illuminants may follow.

We would like to urge all the subcommittee members to communicate to us their interest and to volunteer their help in the problems outlined above or for that matter any other problems that should be considered by this subcommittee. Your active participation and your advice will be much appreciated. Together we can bring about some new information and facts pertaining to the color problem of fluorescent materials in which we are all so deeply involved in our daily tasks.

Franc Grum, Chairman

NEW COLOR MEASUREMENT INSTRUMENT

A Clemson University specialist in the color science field, Frederick T. Simon, has helped to design a new instrument which revolutionizes color measurement techniques. "For the first time there is an instrument specifically designed to coordinate color measurement with computer color matching and control," said Simon. "It's really quite a remarkable breakthrough."

The first model of the spectrophotometer is located in the Color Measurement Laboratory of Clemson's College of Industrial Management and Textile Science. The instrument greatly strengthens the undergraduate and graduate teaching programs in color science. It automatically prints out color data directly in numbers and on punched paper tape in a simultaneous operation.

COLOR MARKETING GROUP

New officers of the Color Marketing Group were elected at the Fall Meeting in Boston, Oct. 13-15.

Named were Jack Siderman, Pantone, Inc -- president; Ralph Ceisler, Carl Gorr Color Card, Inc. -- vice-president; Bonnie Bender, M. A. Bruder & Sons, Inc. -- treasurer; John B. Haverly, Ameritone Paint Corporation -- secretary.

Five Board Members were elected to three year terms: Annett Francis, House & Garden Magazine, James Radcliffe, U. S. Plywood-Champion Papers, Inc., Astrid Scheffler, Container Corporation, Boone Siegchrist, SCM Corporation and F. F. Walrod, Georgia-Pacific Corporation.

The Color Marketing Group has become a member of the Color Planning Center of Japan, and the Color Planning Center has become a member of the Color Marketing Group. An international exchange of ideas and information is expected to benefit the companies represented by individual members of both groups.

WORDS OUT OF CONTEXT

"Colors for Fall 1971 are reassuring. More dependable and more inspiring than any crystal ball, they project an economic upswing and commercial revival. Lively, positive shades buoy the spirit and boost business."

RPI COLOR COURSES

The seventh annual program of continuing education in Color Technology at Rensselaer will begin with a special spring offering of the course Principles of Color Technology, March 29-April 2, 1971.

Directed by Fred W. Billmeyer, Jr., Professor of Analytical Chemistry at Rensselaer and Max Saltzman, Allied Chemical Corp. and Adjunct Professor of Chemistry at Rensselaer, this course will be repeated on July 12-16, 1971. It provides both theory and practice in the description, specification and measurement of color. It will be of particular interest to industrial personnel responsible for color matching and color control; and of special value to men without advanced degrees and those whose practical experience in the field is a substitute for a college degree.

Typical commercial color measurement and computation equipment will be available for use by each individual participating in the program. Laboratory sessions will be scheduled daily to implement the theory learned. The goal is to train staff members of companies maintaining or planning color control laboratories in the proper use of color measuring equipment and the interpretation and application of measurement results.

A two day course in Color Technology for Management will be offered July 8-9, 1971. This course, designed to aid executives responsible for research, production or sales of colored products in reaching correct decisions based upon color technology, describes what can and cannot be expected from programs of instrumental color measurement, control and computer color matching.

Advanced Color Measurement -- Offered July 19-23, 1971 -- is a limited attendance laboratory course which will provide individual instruction to each member of the class. The basic requirements for acceptance in this course are two or more years' experience in instrumental color measurement; or a shorter period of experience plus completion of the course, Principles of Color Technology, or an equivalent course elsewhere.

Interested applicants are requested to write for course bulletins available from the Office of Continuing Studies, Rensselaer Polytechnic Institute, Troy, New York.

DIANO ANNOUNCES 1971 SCHEDULE FOR COURSE IN COLOR TECHNOLOGY

A world wide schedule of courses in Color Technology covering the first half of 1971 has been announced by DIANO CORPORATION. These courses are two days in duration and are designed for the industrial colorist or management personnel who wants an introductory course to the subject of color technology and a review of the latest state-of-the-art in implementation of color technology to practical industrial color matching problems. Course content includes basic color theory; fundamentals of colorimetry and spectrophotometry; applications of instruments and computers for color matching, production control, color specifications and tolerance work; and recommendations for establishing an instrumental color control program. The instructors, W. A. Coppock and C. Harris, who have had several years of teaching experience in color technology, stated that DIANO's course is unique in that the course is conducted in most industrial centers of North America and Western Europe and is condensed into two days -- thereby making it possible for even busy management personnel to attend. The entire course including the workshop is documented in a textbook for the student.

Scheduled Courses Include:

January 21 and 22, 1971, Boston, Mass., USA
February 15 and 16, Edison, N.J., USA
March 1 and 2, Chicago, Ill., USA
March 8 and 9, Detroit, Mich., USA
March 11 and 12, Pittsburgh, Pa., USA
April 5 and 6, Raleigh, N.C., USA
April 8 and 9, Washington, D.C., USA

May 13 and 14, Manchester, England
May 17 and 18, Milano, Italy
May 20 and 21, Frankfurt, Germany
June 17 and 18, Montreal, Canada
August 12 and 13, Cape Cod, Mass., USA

Course fee is \$100/student and includes all student materials plus lunches. Reservations should be made direct with:

DIANO CORPORATION
P.O. Box 231
132 Central St.
Foxboro, Mass. 02035, USA
Telephone: (617) 543-5383

CIBA--GEIGY

CIBA-GEIGY CORPORATION was formed on October 21 by the merger of CIBA Corporation and Geigy Chemical Corporation.

The newly established Plastics and Additives Division of CIBA-GEIGY Corporation includes three marketing groups:

The Pigments Department, headed by Paul Papillo, comprises the former Pigments Departments of Geigy Industrial Chemicals and CIBA Chemical & Dye Company. The product range includes the high fastness pigments, solvent soluble dyes and related products of both predecessor companies. Headquarters will be at Ardsley; all former Ciba and Geigy business locations and representation will be maintained for the present.

The Polymer Additives Department, headed by Dr. Donald Black, comprises the former Polymer Additives Department of Geigy Industrial Chemicals. The product range includes light stabilizers, antioxidants and related products. Headquarters will be at Ardsley; all Geigy business locations will be maintained.

Ciba Products Company, headed by William J. Clark, comprises the former division of CIBA Corporation. The product range includes epoxy resins and related products, also reinforced plastics (Ciba Pipe Systems). Headquarters will remain at Summit, New Jersey.

Geigy Industrial Chemicals' Research Department, headed by Dr. George Ham, becomes the Research Department of the new Plastics and Additives Division.

THE REVOLUTION IN COLOR REPRODUCTION

An intensive conference was conducted by The Institute for Graphic Communication in December, 1970. The conference concerned the revolution in printing technology which is affecting color reproduction as well as typesetting, platemaking and printing. While

the basic theory has not changed, the means of implementing it have. Color correction has been simplified and new pigments may make it unnecessary. Electrostatic scanners using analog computers to make corrections have been improved so they can enlarge, reduce, color compose, and even produce halftone separations in digital form. Scanners are also being designed which are self programming and use digital computers. Color proofing is getting a great deal of attention from many important suppliers striving to produce reproducible, consistent press color proofs to replace slow and expensive press proofs. Many new devices have been introduced for controlling and maintaining the quality of color reproduction during printing.

This conference examined in depth all these developments and more and included a study of new marketing and research trends.

CHARLES ABBOT

The October, 1970, issue of the Smithsonian magazine, a new nontechnical publication of the Smithsonian Institution, carries an article on Charles Greeley Abbot, known to colorists for his early work on the Abbot-Priest daylight spectral-power distributions. Dr. Abbot, now 98 years old, celebrated his 75th anniversary at the Smithsonian in June. He was its Secretary from 1928 through 1944. In recent years he has been perfecting a system of long-range weather forecasting based on solar cycles. The major one of these has a period of 273 months. For any location, after analysis of weather data for a sequence of about 1,000 months, Dr. Greeley can predict the weather for any day in the year with a 50-70% accuracy, about as good as current 24-hour forecasting now averages.

F. W. Billmeyer, Jr.

DIANO DEVELOPS SYSTEM TO AUTOMATE THE KOLLMORGEN COLOR-EYE

DIANO CORPORATION has announced a new "AutoMATE" System for installation on the Color-Eye instrument to make it completely automatic in its operation and recording of results. Available for installation on both the Small and Large Sphere models, the "AutoMATE" will automatically operate the filter wheel and digital dial, with all data automatically printed out on an ASR-33 Teletype. The time required for the complete measurement and recording cycle is about 1-1/2 minutes for the 16-point spectrophotometric measurement and 1/2 minute for tristimulus measurements.

According to DIANO, a large number of companies are now using the manual Color-Eye in conjunction

with digital computers and while the measurement results have usually proved satisfactory, the slow manual operation of the instrument has limited the productivity of the entire system. The new DIANO "AutoMATE" System frees the operator to perform other duties such as preparing the next sample for measurement, thus substantially increasing the productivity of the color matching laboratory. Errors due to manual reading and transferring of data are eliminated since the teletype provides a punched tape that can be used for direct input to most computers or for transmittal to a remote location by telephone lines.

For more information contact:

DIANO CORPORATION
P.O. Box 231
132 Central St.
Foxboro, Mass. 02035
Telephone: (617) 543-5383

INDEX

For last Index see No. 205, March-April 1970.

January-February 1970 -- No. 204

Annual Meeting, 1970
Reprint, Nickerson
CAUS
Kollmorgen, education
Kollmorgen, service
Problem 10
Problem 30
Garnsey, Julian
Duncan, D. R.
37 Years Ago -- M. Rea Paul
Colour Group
Computers
TAPPI, Annual Meeting
Paint Research Institute
Award, Faulkner
Symposium, Flashing Lights
Diano, instrumentation
Diano, color technology
Research, Lehigh U.
FSPT, Annual Meeting
Electronic Color
Metropolitan Museum of Art, Exhibition

Book Reviews:

Yule, Color Reproduction
Nimeroff, Color Standards
Wright, Color Philosophy -- by I. Nimeroff
Hammond, Colorimeters
ASTM, Radiometric Definitions
Schultz, Color Theory -- by H. Hemmendinger
Arens, Color Measurement -- by J. C. Schleiter
Wyszecki and Stiles, Color Science -- by Don F. Hill

DCMA, Activities
NBS, Color Measurement
Teleradiometer
Experiments, Art and Technology
Computer Matching
Art Lighting
Feller, Robert L.
Colour Group -- Bibliography
Colour Group -- Patents
Color Engineering -- Index

March-April 1970 -- No. 205

Annual Meeting Reports:

Overview by C. J. Bartleson
Impression by W. L. Rhodes
Midge Wilson and Herb Aach -- R.W.B.
Rohrschach -- A La Couleur -- Midge Wilson
Ott -- Physiological Responses -- R.W.B.
Helson -- Color Combinations -- D. B. Judd
Symposium Review -- R. F. Witzel

Ralph M. Evans -- Retirement

New Members

Old News -- 1933 Citrus Color Standards
1971 Shoe Leather Standards -- T.C.A.
Acrylic Paint Standards -- F. Wright
Benjamin Franklin on Color -- D. Nickerson
Courthouse Color -- Newark Evening News

Colour Group:

Announcements
66th Science Meeting
67th Science Meeting

Hungarian Illumination Conference

Diano -- remote color matching
Car colors and personality -- Farmer's Almanac
Index -- 1969.

May-June 1970 -- No. 206

Editor's Note

Gertrude Rand, PhD
M. Rea Paul -- First ISCC Secretary
Herb Aach, Annual Meeting Contribution
Color Inserts
Cartoon, New Yorker
Universal Color Language, AIA-ARA
Ultraviolet Irradiance Calibration
SPE News
Color Association News
AIA Honor Award
Information from England
Captain Charles Bittinger III
Color Marketing Group Meeting
GE Spectrophotometer -- Diano
FSPT Organic Coatings Course
Red Wine Color Preference

Letter to the Editor -- G. J. Chamberlin
Colorama -- Howard Ketchum
Color Tolerance
Color Difference Charts -- Diano
Low Light Level Calibration -- Optronic Labs.
Flexographic Ink Pigments -- Leichhold Chemicals
Enclosure: Colour Group Bibliography

July-August 1970 -- No. 207

Annual Report Issue

Officers:

Hanes, President
Hunter, President Elect
Billmeyer, Secretary
Reese, Treasurer

Story of the ISCC

Officer Reports:

President -- Billmeyer
Secretary -- Evans
Finance Committee -- Macbeth
Treasurer -- Macbeth

New Business

Committee and Special Reports:

Officer for Member-Body Liaison -- Hanes (See
Newsletter 208 for correction.)
Officer for Individual Member Liaison -- Hale
Membership Committee -- Granville
Publications Committee -- Burnham
Color Information Bureau -- Fink
1971 Williamsburg Conference on Optimum Color
Reproduction -- Rhodes and Yule

Delegation Reports:

American Artists Professional League -- F. C. Wright
American Association of Textile Chemists and
Colorists -- R. F. Hoban
American Chemical Society -- F. W. Billmeyer, Jr.
American Institute of Architects -- W. Faulkner
American Institute of Interior Designers -- B. West
American Ceramic Society -- F. J. von Tury (no
report)
American Oil Chemists' Society -- W. L. St. John
American Psychological Association -- Jo Ann S.
Kinney
American Society of Photogrammetry -- J. T. Smith,
Jr.
American Society for Testing and Materials --
G. W. Ingle
Color Association of the United States, Inc. -- Midge
Wilson
Color Marketing Group -- L. A. Graham
Dry Color Manufacturer's Association -- R. Thornton
(no report)
Federation of Societies for Paint Technology -- Ruth
M. Johnston

Graphic Arts Technical Foundation -- E. W. Harslem
(no report)
Gravure Technical Association -- O. Smiel
Illuminating Engineering Society -- C. W. Jerome
Industrial Designers Society of America -- R. Spilman
Institute of Food Technologists -- J. N. Yeatman
National Paint, Varnish and Lacquer Association, Inc.
-- E. R. Call (no report)
National Society of Interior Designers, Inc. -- Dede
Draper (no report)
National Association of Printing Ink Manufacturers --
F. L. Wurzburg, Jr.
Optical Society of America -- Dorothy Nickerson
Package Designer's Council Delegates -- K. Fink (no
report)
Paperboard Packaging Council -- W. B. Leavens (no
report)
Society of Motion Picture and Television Engineers --
W. T. Wintringham
Society of Photographic Scientists and Engineers --
C. J. Bartleson
Society of Plastics Engineers -- M. M. Gerson
Tanner's Council of America, Inc. -- Ruth H. Kerr (no
report)
Technical Association of the Graphic Arts -- H. B.
Archer (no report)
Technical Association of the Pulp and Paper Industry
-- J. M. Patek
Detroit Color Council (Sustaining Member) -- G. J.
Forman (no report)

Problems Subcommittee Reports:

Problem 7 -- Survey of Color Specifications -- R. F.
Hoban
Problem 18 -- Colorimetry of Fluorescent Materials
-- F. Grum
Problem 22 -- Procedures and Material Standards for
Accurate Color Measurement -- J. T. Atkins
Problem 25 -- Determination of the Strength of
Colorants -- R. Kuehni
Problem 24 -- Survey of Color Measuring Instru-
ments -- R. M. Johnston
Problem 30 -- Color in the Building Industry -- M. D.
Folley

Enclosure: "Fundamentals and Problems of Color: III
Color Differences and Tolerances" FSPT-ISCC Panel
Discussion -- M. Salzman, moderator

September-October 1970 -- No. 208

Williamsburg Conference
1971 Annual Meeting
Fall Board Meeting
"Tiny" Erikson
Psychedelic Products
Cooper-Hewitt Museum
Theology of Color Measurement
Arthur C. Hardy -- Diano

Book Reviews:

Birren, Light, Color and Environment by D. B. Judd
Goethe, Theory of Colours by R. W. Burnham

Colour Group Meetings 1970-71

Kollmorgen Training Courses

AIC Symposium

Problem 31 -- Standard Methods of Measuring and
Specifying the Color of Exposed and Processed
Color Transparencies -- J. T. Smith, Chairman

DCMA Delegation

NSID Delegation

Color Boom

1970 Report of the Officer for Member-Body

Liaison -- R. M. Hanes

Cinema-Size Color TV

Recommended Colour Difference Formula

Adams-Nickerson Colour Difference Formula

Daniel Comstock

Harry Helson Honored

Context in Industrial Design

The Unseen World

Richard L. Pipe -- Diano

Apollo's Color TV

Film Review: Laser Light, reviewed by C. G. Shugart

Photocopies of Technical Articles, FSPT

Letter to the Editor -- A. Hård

Book Review: R. L. Gregory -- The Intelligent Eye
by M. Gardner

Author's Abstract -- H. Helson and T. Lansford --

Pleasantness of Object Colors

Eastman Kodak -- New Red Dye

Colorama -- H. Ketcham

New Members

ASTM Metallic Surfaces Publication

November-December 1970 -- No. 209

Williamsburg Conference

Annual Meeting Plans

D. Nickerson Award

E. I. Stearns Nomination

D. Liebes Award

Colorama

Colour Group (Great Britain)

Symposium -- Flashing Lights

S. L. Davidson Election

Highway Colors

FSPT Awards

ASTM Committee D-1

Problem 10 -- Color Tests

Problem 18 -- Fluorescent Materials

Color Measurement Instrument -- Clemson U.

Color Marketing Group

Colors -- Fall 1971

RPI Color Courses

Diano Color Courses

CIBA-GEIGY

Color Reproduction Conference

Charles Abbot News

Kollmorgen Color Eye -- Diano

Index 1970

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