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CALVIN HATHAWAY DIES at 67

From the *New York Times* of July 11, 1974, forwarded by Margaret Balcolm from Princeton, we learn with sorrow of the death on July 10 of Calvin S. Hathaway of a heart attack while on vacation in Boston.

Calvin Hathaway, individual member of the ISCC, may perhaps be best remembered by fellow members of ISCC for the very fine color exhibit arranged in 1960, while Director of the Cooper Union Museum for the Decorative Arts, to help celebrate the Cooper Union Centennial anniversary. With his associates, Christian Rohlfing and Edward Kallop, he was responsible for what was noted in the *Newsletter* to be "far and away the best all-around color exhibit" some of us had ever seen, one that "indeed . . . lay equal weight on the Art-Science-Industry aspects of color." (See *Newsletters* 148 and 149 for reviews.)

In 1964 Mr. Hathaway became R. Wistar Garvey Curator of Decorative Arts at the Philadelphia Museum of Art. (It may be recalled that the ISCC annual meeting of 1960 — a memorable one — was held at the Philadelphia Museum and its College of Art.) He retired in 1972 but continued to live in Philadelphia.

The *Times* article notes that in 1945 Calvin Hathaway, a major with the Military Government Department of Monuments, Fine Arts and Archives, located a cache of art, part of the Vienna Kunsthistorische Museum collection, in a cellar near Kitzbuhel, Austria, for which he received the Bronze Star. The collection included Dürer and Velásquez portraits, a number of Breughels, 10 cases of smaller paintings, ivory objects and jewelry, among them the famous Benvenuto Cellini gold saltcellar.

Mr. Hathaway was a member of the American Association of Museums, the Historical Society of Pennsylvania and the International Center for the Study of Ancient Textiles. As a member of the ISCC he served for some time as a member of the *Newsletter* Committee.

Dorothy Nickerson

SYMPOSIUM ON VISUAL SIGNALLING

ABSTRACT

A symposium on visual signalling was held on April 9 and 10, 1974, in Washington, D. C. sponsored by CIE Committee TC 1.6, in cooperation with several agencies of the Department of Transportation. The symposium, attended by investigators from many parts of the world covered researchers on a wide variety of topics such as:

1. visibility of daytime and nighttime signals
2. visibility and of legibility of signs
3. colorimetry of surface colors, particularly retroreflectors.

For the first time since the 1967 meeting of the Commission Internationale de l'Eclairage, did an international meeting of any of its Committees occur in Washington, D. C. The C.I.E. Committee that returned to the U.S.A. capitol city for meetings on April 11 and 12, 1974, was Committee TC-1.6, Fundamentals of Visual Signalling of which

Charles A. Douglas of the National Bureau of Standards is the Chairman.

As a preliminary to the committee's meeting a Symposium on Visual Signalling was held on April 9 and 10, 1974, in cooperation with U.S. Coast Guard, Federal Aviation Administration, and Federal Highway Administration, all of the Department of Transportation. It was the announced purpose of the symposium to provide to persons in the U.S. who are concerned with visual signalling an opportunity to meet and to learn of the work of counterpart guests from abroad, to hear of the on-going work in the U.S., and to discuss current visual signalling problems in general.

Prior to the start of the symposium there were the excitements of greetings exchanged between people from many parts of the world who had not seen each other for some years. There were also informal personal introductions and small-talk exchanges among attendees and participants alike who had not previously met. Among those who registered for the meeting were people concerned with visual signalling from Canada, England, France, Germany, and Japan as well as from across the United States of America.

The Symposium was well organized with a presider for each of the four sessions, two on each day. These presidors, all from the Washington, D. C. area, were, in order, Commander W. W. White, Signal Branch, U. S. Coast Guard, R. E. Conner, Traffic Control Systems Division, Federal Highway Administration, W. C. Fisher, Visual Aids Section, Federal Aviation Administration, and C. A. Douglas, Illuminating Engineering Group, Optical Radiation Section, National Bureau of Standards. Not only was each participant introduced with a recitation of his background just before giving his paper, but each presider was similarly introduced at the outset of his session.

The sessions were opened with a welcoming address by Rear Admiral J. W. Moreau, Office of Engineering, U. S. Coast Guard. His review of the Coast Guard's attempts to provide visually conspicuous signals against the clutter of background to guide ship and boats to a safe haven set the tenor of the symposium.

Further introduction of the subject matter was focused in the next two presentations. C. W. Jerome, Sylvania Lighting Center described the purposes, activities and organization of the International Commission on Illumination. Next C. A. Douglas described the Scope of the CIE Committee on Fundamentals of Visual Signalling. With these fine addresses the audience of over 75 persons was prepared for the symposium of the technical programs that was to follow.

After a short recess the technical papers were started by two comprehensive and interesting papers that treated visual signalling at great distances under favorable, as well as adverse conditions, as an aid to navigation in coastal waters. The first, by P. Blaise, French Lighthouse Service, Issy-les-Moulineaux, France, was concerned with long range visibility of daytime signals. The second paper, by L. G. Reynolds, Trinity House Lighthouse Service, England, dealt with long-range nighttime visibility of fixed, flashing, and rotating light signals. In the first paper the solution to the making visible a mark under a variety of background

and daylighting conditions was its spherical dome shape and fluorescent red coating in several configurations. The difficulty of the problem and the satisfactory nature of the solution was demonstrated by a large number of effective color-photograph slides. In the second paper approximate methods of computing effective intensity of flashing and rotating beacons were used to evaluate their effectiveness and to predict luminous intensities required in favorable and adverse weather conditions. It was found that the probability of seeing a light at its "normal range" is about 45% on Britain's west coast, but only 21% on the east coast.

It was this reporter's opinion that the treatment of effective intensity of flashing lights in the paper by L. G. Reynolds was introductory to the third paper, by G. L. Howett, Sensory Environment Section, National Bureau of Standards. This paper described how the procedure for computing the effective intensity of flashing lights, developed in 1957 by C. A. Douglas, was programmed for automatic computer operation. It is remarkable how few iterations of the underlying integrative process are required to reach a converging evaluation of the effective intensity of flashing or rotating light signals.

The next two papers were concerned with visibility and legibility of signs. Each paper was presented by a member of the Psychology Department of Michigan State University, T. M. Allen and T. W. Forbes, who have been involved for many years with studying sign legibility parameters. These parameters include: luminance and color contrast, illumination in night and day situations, layout, letter aspects and stroke widths, observers' visual acuity and color normally. It was suggested that "mocked-up" signs be tested before extensive installations are made lest they prove ineffective.

The next two papers were concerned with the appearance of signals in day and night situations. The first of these, by S. Kawai of the Department of Psychology, Chukyo University, Japan, reported on studies made on the non-additivity of lights in fairly close proximity when seen at appreciable distances. The conditions found for complete and incomplete additivity were described. The second, by H. Hofmann, Technical University of Darmstadt, West Germany, described color recognition of light signals under various observation conditions: adapting luminance, angular size of signal, exposure time, and hue. The conclusion was reached that all of these conditions affect the certainty and reliability of the color recognition.

Following these two papers on the appearance of signals were two papers on emergency of immediate reaction signals. The first of these by C. J. Glass, Marine Safety Technology Division, U. S. Coast Guard described the magnitude of the needs of providing night and day alerting and locating signals to recreational boaters in distress. Because of the possible loss of life in such distress situations, a wide variety of visual signals are provided to alert the Coast Guard and aid in locating the distressed personnel and vessels. The second of these two papers, by R. Hennessy, Human Factors Research, Inc., dealt with the design and use of tricolor glide-slope indicators in helicopter approach and landing on ships at sea. Improper design of the indicators causes faulty information about the location of the ship and results in delayed or missed landings. Proper op-

tical design and color arrangement, described by the author, provides an effective signal to the pilot of the helicopter.

The next paper, by E. J. Rinalducci, Department of Psychology, University of Virginia discussed transient adaptation effects as causes of night visibility losses. Sudden increases or decreases in prevailing illumination tend to decrease the observer's ability to recognize signals. The studies described in this paper attempted to find acceptable tolerance levels of increase or decrease of illumination.

The remaining three papers, two of which had been announced before the meeting, were concerned with the measurement of surface colors for signalling use. The first, by F. W. Billmeyer, Department of Chemistry, Rensselaer Polytechnic Institute, confined itself to the measurement of surface colors other than retroreflective or fluorescent. The point was made in this paper that spectrophotometers with geometries of diffuse illumination and normal viewing (D/O) or its inverse equivalent (O/D), permitted under CIE recommendation since 1967, may give results that are equally as good as or better which can be obtained with geometries of 45° illumination and normal viewing (45/0) or its inverse equivalent (0/45).

This paper served as an excellent introduction to the next presentation, by I. Nimeroff, Illuminating Engineering Group, National Bureau of Standards, on the colorimetry of retroreflective materials. With materials that have strong geometric characteristics, color measurements should be made under conditions that simulate actual use conditions. In daytime these are D/O, while at night the materials for highway signs are illuminated unidirectionally at entrance angles that range from near-normal to 45° and viewed unidirectionally at angles which are small angular departures from the incidence line.

The final paper, not announced prior to the meeting, was presented by H. Terstiege, Photometry and Colorimetry Section, Federal Institute for Material Testing (BAM), Berlin, West Germany. This paper described color measurements of normal and printed retroreflective sheeting materials. Although several sources, D65, D75, and A were used with a variety of geometries, the author indicated that the geometry he preferred for color measurement of retroreflective materials was 45/0 for both daytime and nighttime color.

During the lunch period on the first day of the symposium two short U. S. Coast Guard films, "Always Ready" and "Coast Guard Lighthouses", were presented to the attendees. These films described the activities and responsibilities of the Coast Guard.

During the lunch period on the second day of the meeting the attendees were treated to a film, "Pilot Orientation for Low Visibility Landing", prepared under F.A.A. sponsorship. Although the situations portrayed in the film were simulated, the impressions were very realistic.

It was the intention of the organizers of this Symposium to provide adequate time for discussion by those in attendance. For this reason only a limited number of papers were invited for presentation. All of the authors formed their papers in the same general format: first a review of their special segment of the field of visual signalling, followed by a discussion of their current work. The introductory reviews in each presentation served as refreshers for the "old-

hands" and as tutorials for the novices in visual signalling. Descriptions of the current work served to bring everyone in attendance abreast of the direction in which the broad field of visual signalling was moving.

In summary, this reporter was impressed with the fact that even though visual signalling has been in use for several centuries, there is still much that needs to be done. This is particularly true of the use of new measuring devices in the evaluation of new materials employed in new and more complex situations than in earlier years.

Isadore Nimeroff
National Bureau of Standards

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**PROCEEDINGS OF THE INTERNATIONAL
CONFERENCE ON PHOTOMETRY AND
COLORIMETRY
VARNA, BULGARIA, 25-30 JUNE 1973**

The Secretary has received a copy of the above Proceedings, and will be pleased to furnish photocopies of papers from them at a price of \$1.00 each to cover preparation and handling. Many of the papers are in Bulgarian, and not even the English titles of these are known. The following papers, in addition to 10 in Bulgarian, are from the booklet on Colorimetry:

G. Wyszecki, "The Basic Concepts of Colorimetry," 7 pp.

H. Terstiege, "Farbmessung an fluoreszierenden Aufsichtfarben," 11 pp.

N. G. Jerlov, "Colour of the Sea," 9 pp.

T. Indow and K. Matsushima, "Euclidean Representation of four Color Difference Formulae," 6 pp.

G. Eppeldauer, J. Schanda, and J. Graner, "Colour Television Colorimeter," 6 pp.

G. Baba and M. Sengoku, "On Some Experiences Gained with Hitachi Model 307 Colour Analyser," 6 pp.

A copy of the Table of Contents of the booklet on Photometry will be sent to those interested in the possible purchase of reprints of those papers (8 in English, 6 in German, 15 in Bulgarian).

**A SILVER BUT NON-PHOTOGRAPHIC
ANNIVERSARY**

Dr. Burnham saw and heard this anniversary announcement on television and obtained a transcript of it for use in the *Newsletter*.

Today is a television anniversary. It was exactly twenty years ago that RCA began the first commercial production of color television sets in the world. In the TV years B.C.—(before color)—virtually everyone saw television the way you're seeing this—in black and white and nifty greys. But in March 1954, the scientists and engineers pushed their magic buttons . . . and Z-A-P! . . . color sets appeared. Pessimists said they would never work. Other pessimists said they would work. The first RCA color set was called CT-100. It had 35 tubes . . . a 15-inch screen . . . and it

cost \$1,000. And in that very first year—1954—5,000 color sets were sold. By 1960, color programming was so varied that half a million sets were in use. I didn't know there were that many taverns. RCA had defied the sceptics and had invested \$130 million on color research for its compatible color system—compatible meaning that people with black and white sets would see the color programs in black and white without having an engineer in the house. At the end of the first decade—going in to 1964—there were 1.7 million color sets. The rest of America was compatible. In 1964, the peacock was flipping his feathers: It was the first year in which more than one million color sets were sold. It was a terrific time to be a service man. It was also a fine time to have a color set—if you liked company. Suddenly you had a lot of friends. And relatives. So how come they were always hungry? The compatible people covered their screens with transparent colored celluloid-like material tinted in three horizontal strips: blue across the top for the sky . . . amber through the middle . . . and green along the bottom for grass. Which was terrific unless the scene took place in a closet or on the President's face. Today, all of television is a business of \$12 billion a year. There are almost 53 million color sets in America, and 64 million black and white sets—about 117 million sets in all. Now they can eat in front of their own sets. There are more television sets in America than there are bathtubs. Or automobiles. Or washers, driers, dishwashers and airconditioners combined. So . . . it is the 20th anniversary. And, by all indications, color television is in the pink . . . and the fuchsia seems bright.

Gene Shalit

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**SELECTED EXAMPLES FROM THE FABER
BIRREN COLLECTION OF BOOKS ON COLOR
WILL BE ON DISPLAY IN THE CLOISTER
GALLERY OF THE STERLING MEMORIAL
LIBRARY, YALE UNIVERSITY**

The Faber Birren Collection of Books on Color in the Art Library at Yale University is one of the largest specialized collections on the subject in the world. Mr. Birren has long been active as color consultant, author and editor of texts on color in the United States. His collection has its major strengths in post-Renaissance texts on color theory in original editions and a number of texts which he edited, in materials on color perception and color psychology, in artists' manuals and in color standards. These works, in addition to copies of most of his books, demonstrate the wide range of areas within the general term "color" in which Mr. Birren has long been interested. The book collection is accompanied by a photographic archive of material on artists' palettes as depicted in paintings of all periods. These act as an index to the use of color by individual artists and to the artifacts of the artists' studios.

July 1 through October 1, 1974
 Nine A.M. to Five P.M.
 Monday through Saturday

A DEPOSIT BIBLIOGRAPHY IN COLOR

The July 1974 issue of the Yale University *Library Gazette* contains a 50-page bibliography of books on color contributed by Faber Birren and collected by him over many years. Feature items from the collection have been on public exhibit at the Yale Sterling Library during July, August and September, 1974.

Using the Birren collection as a nucleus, the Art Library at Yale now intends to establish a basic depository bibliography on color, to record all books on color now in all Yale libraries—as well as to index any significant books on color located anywhere in the United States or abroad. The project, in effect, will help to make Yale headquarters for biographical material on color.

In addition to books, the Faber Birren collection includes nearly 300 photographs of paintings in which artists hold palettes. These were assembled by Birren through world-wide correspondence with museums and picture collections. Postage-stamp size reproductions have been presented in the July *Gazette* for visual reference.

Active at Yale in the bibliographic program is Robert L. Herbert, Professor of the History of Art. He writes in the *Gazette*, "The deposit bibliography will be designed to serve not the scientist, whose work requires highly specialized bibliographies, but the historian and general reader who need access to histories of color in the sciences and in painting, textiles, ornamentation, and the like. Within the sciences, emphasis will be given to those fields whose studies of color impinge most directly upon the arts, principally optics, perception, physiology of vision, and psychology, and to those theoreticians like Newton, Chevreul, and Helmholtz, who set standards for the general knowledge of color. Within the arts, principal place will be given to direct discussion of color, for which a thorough listing should be possible.

"Where available, listings of holdings in color and color theory from sister institutions in Europe and America will be kept with the deposit bibliography, which will in any case note the locations of the works that are indexed. Contributions of books (several have already been promised) and of bibliographies will be of material help in the development of the deposit bibliography, and suggestions from others will be gladly received by the Birren Collection in the Art Library."

In active charge of the collection will be Robert C. Kaufmann, Art and Architecture Librarian.

BOOK REVIEW

Woodworth and Schlosberg's *Experimental Psychology*, Third Edition, J. W. Kling and Lorrin A. Riggs. Holt, Reinhart, and Winston. New York, 1971. xiv + 1278. Price \$13.95.

This book is a thoroughly updated version of the monu-

mental 1954 Second Edition by Woodworth and Schlosberg on the broad subject of experimental psychology. The two authors were assisted by seventeen contributors who compiled information in their respective areas of specialty. The topics range through psychophysics, neural function, the several senses, perception, learning, and motivation. This massive revision includes only about 10 to 15 percent of material previously used; the rest represents more recently established experimental facts. The theoretical biases represent the thinking of the 1960's.

The areas of greatest interest to Color Council members are those concerned principally with vision and psychophysics. These chapters comprise almost a third of the whole book, largely because so much work has been reported in these areas. The specific areas covered were the psychophysics of discrimination and detection; psychophysical scaling methods; vision (in the broad sense); color vision; effector mechanisms in vision; and the perception of color, shape, space, and movement.

The authors described their plan of action as follows:

"A good part of the success of the previous editions can be attributed to the avoidance of any preoccupation with jargon and narrowly defined experimentation. Especially to the student making his first explorations of an area, this is an important characteristic. We hope that we have achieved authenticity by having the chapters prepared by persons actively engaged in research in these areas; but we trust that the experience each author has had as a student and a teacher has been reflected in the organization he has given to his materials."

There is no question that this is a basic reference for students of color who may wish to update themselves on the technical studies that have been reported in widely scattered parts of the literature.

R. W. Burnham

REPORT ON THE 103RD COLOUR GROUP MEETING HELD AT CITY UNIVERSITY ON THE 3RD APRIL, 1974

The overall topic for this meeting was Industrial Quality Control in which the three speakers outlined the methods and techniques of colour measurement which were applicable in their industries.

Dr. W. S. Maughan of Gunson-Sortex gave the first paper on Colour Sorting machines. Sortex have developed an hexagonal optical box, with three viewing slits mounted 120° apart which view the background colour of the box, with or without filters. The box needs to approximate to an integrating sphere to accommodate the non-uniformity of the particles. The particles to be sorted are dropped or blown through the centre of the box and the rejects are deflected by air jets from the main stream. To achieve sufficient resolution at the very high speed of operation a line scan is achieved by an array of photo sensitive diodes. It is possible for the box to be any size. To analyse the colour of large rocks it is the size of a lorry. With a similar type of equipment employing X-ray fluorescence it is possible to analyse gravel for the presence of diamonds and as a feature

of the cost/benefit study it is possible for this equipment to pay for itself if only one large diamond is found in 10 years. At a more mundane level it is possible to sort food-stuffs like rice, white beans, tomatoes and peas.

For different products it may be necessary to make each of the three observing heads sensitive to different wavelength bands by means of filters and depending on the application, the sensitivity can be varied so that there are some bad items in the good or good in the bad. The selection of either of these conditions will depend on the requirements i.e. the necessity to get the maximum throughput or a very high assurance that there will be no bad items in the output.

Finishing on the more exotic note Dr. Maughan told of the success which they have had in the analysis of gravel for diamonds, where on test runs, some diamonds had been found in material which had already been screened by other means. For this application the advantages of the automatic system and lack of personal handling is very apparent. This paper introduced a fascinating new approach to colorimetry.

Mr. T. M. Hanlon of Beechams gave the next paper on applications in the pharmaceutical industry. Here, colorimetry is used to establish correct colour matching where reformulation is indicated and to detect changes in colour of the product on storage. Correct colour matching is necessary for customer acceptability and colour change may be associated with some form of chemical breakdown of the contents of a formulation.

For the use of a photoelectric colorimeter, the method of presentation of pharmaceutical preparation to the measuring head is important and standardization and control of the instrument and conditions are vital. Tablets can be measured individually in specially made holders using a narrow beam, and liquids, suspensions and particles are measured in a dish with a glass seal, using the wide beam. This gives a constant surface texture and minimum variation at the interface between the cover and the product. Capsules may be measured in a similar manner to tablets, but further work is necessary to establish the most suitable method of measuring capsule granules, since the effect of granule size may be important.

Mr. Spencer of Stevensons Dyers gave the last paper on the use of a match prediction system to attain more rapid and reliable matches for the knitted pieces of garments. He also emphasised that the method of presentation could not be too heavily stressed. Colour changes could also be introduced by texture differences. He showed examples of the apparent colour difference obtained with the same yarn knitted with a different stitch. These he said had to be dyed separately to make the result look the same. Because of the time taken to obtain the results in a standard colour difference format the bulk could have changed colour in the meantime. He therefore liked the ICI instrument which gave the results in less than a minute in the Dyers standard parameters of strength/brightness/hue. This was immediately understood by the operators. He had found that it was necessary for the operators to have complete freedom to choose whether the instrumental system was used or not. By this means a full acceptance of the method had now been obtained. Initially the measurements

were used as a compass to ensure that dye modifications were always made in the direction of improvement, and eventually after a library of tolerances had been established these could be applied for the pass/fail decision. It was necessary to adopt different tolerances for different types of knitting and also for differences in different direction of colour space.

This talk stirred up the interest of the audience into the meaning of the dyers terms strength/brightness/hue. An impromptu lecture by K. McLaren explained how these variables are not the same as saturation/luminance/purity and are peculiar to the dyestuffs industry.

It would appear that the parameters used by the pigments industry are yet again different. The words being used here are flatter/brighter thinner/fuller and stronger/weaker. Again these also did not appear to correlate with the three parameters of the colorimetrist. It was wondered whether it was not time to attempt another full listing of these terms with their meaning in our now, rather better understood, measured parameters.

This was a fascinating afternoon with many introductions into methods of modifying strict theoretical methods to give very practical answers.

104th Meeting

Mary Mayer gave an excellent paper on Colour Symbolism. She illustrated her points by many excellent slides, and stimulated a very energetic and full discussion.

Scottish Section

We learned too late to include in the Pink Notice of three very interesting meetings arranged by the Scottish Section and held in March and April. At that time Madame Vienot of the Physics Laboratory of the National Museum in Paris gave a series of lectures at Edinburgh, Paisley and Glasgow on Colour Rendering, Variability of colour matching among normal observers and the specification of colour vision tests. Madame Francoise Vienot, a colleague of Dr. F. Parra, also teaches Colorimetry.

Since we had our visit to the Tate Gallery, they have been sending us literature on their current exhibitions. In the June issue a special display is announced to mark the 250th anniversary of the birth of George Stubbs. It was Stubbs who in the 1770's experimented simultaneously with, and independently of Josiah Wedgewood on enamel colour. Stubbs also modelled the reliefs for the "Black Basalt" (1769) and Jasper (1774) stoneware of Josiah Wedgewood. The originals of the Frightened Horse in Black Basalt and the Fall of Phaeron in Jasper are on display from the 19th June to 18th August at the Tate Gallery.

BSI, ISO and EEC Standards

Due to lack of space it has been some months since the

latest BSI, ISO and EEC standards have been reviewed here. The importance of this has again been underlined by a paper by the ISO President, Dr. Ake Vrethem in *BSI News* May 1974. In this, again, the first listed advantage of "standards" is given as "The Legislative work is simplified and accelerated."

In the May issue of *BSI News*, page 11, there is yet another article which outlines the modifications which member countries are expected to make to their internal standards to bring them into line with ISO norms.

In Chronological Order

ISO/DIS 3207 Statistical treatment of data—Determination of a statistical tolerance interval. Draft standard. Comments should have been received by 1st April!

BSI 4995 1973 Recommendations for measuring the veiling glare index of lenses and optical systems. Issued March 1974.

BSI 74/20353 DC Tungsten filament lamps for domestic, general lighting and special applications (Revision of BS 555) Draft for comment by May 1974.

BSI 3143 Part 3 1974 Road danger lamps. Electrically operated cordons (flexible barrier lamps). (Specifies the colorimetric and photometric performance). Revised standard issued.

BSI 3483 1974 Methods for testing pigments for paints. Part A1 1974 Comparison of Colour. Corresponds to ISO/R 787 pt 1. Part A2 1974 Visual comparison of hue of powdered white pigment (hollow cone method). Corresponds to ISO/R 787 Part X11.

BSI 74/51409 DC Colours for plastics products for building purposes. Draft available for comment by 30th August.

BSI 74/60915 DC Inks for three or four colour printing using the web offset process. Draft available for comment by 30th Aug.

ISO 1524 1973 Paints and Varnishes — Determination of fineness of grind issued.

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Middlesex HA1 4TY

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- 1296 Farbe Kritisch Betrachtungen zum Buck van Harald Koppers — FOGRA Mitteilungen, No: 79, 1974
- 1297 Het CIE System voor de Wargrave van Kleuren, W. M. du Pont and D. Schilstrom, *ICT Nieuws*, 26, No: 6,

1973

- 1298 Instrumental Assessment of Colour Fastness, J. H. Anderson, *Textile Inst. & Industry*, p. 45, 1974
- 1299 Comparative Performance of Color-Measuring Instruments: Second Report, F. W. Billmeyer, Jr., E. D. Campbell and R. T. Marcus, *Appl. Optics*, 13, p. 1510, 1974
- 1300 Statistical Study of Colour-Measurement Instrumentation, R. T. Marcus and F. W. Billmeyer, Jr., *Appl. Optics*, 13, p. 1519, 1974
- 1301 Measurements of White Uniformity of Color Picture Tubes, K. Kinameri and M. Nonaka, *Appl. Optics*, 13, p. 1270, 1974
- 1302 Effect of blur and overlap on brightness matching, G. A. Fry and W. W. Somers, *J. Opt. Soc. Am.*, 64, p. 717, 1974
- 1303 Computer Color Matching: A Review of Its Limitations, A. Brockes, *Textile Chem. Colorist*, 6, p. 98, 1974
- 1304 Analysis of the Conventional Reflectance of Fluorescent Samples, F. W. Billmeyer, Jr., *Appl. Optics*, 13, p. 1007, 1974
- 1305 The Perception of Transparency, F. Metelli, *Sci. Amer.*, 230 (4), p. 90, 1974
- 1306 International Colorfastness Test Methods — Part One, F. Schlaeppli, *Textile Chem. Colorist*, 6, p. 117, 1974
- 1307 A General Procedure for Determination of Relative Dye Strength by Spectrophotometric Measurement of Reflectance Factor, C. E. Garland, R. F. Hoban and R. C. Kuehni, *Textile Chem. Colorist*, 6, p. 104, 1974
- 1308 WMU Holds Conference on Special Instruments and Opacity Report in *Paper Trade J.*, 158, p. 30, 1974
The 18th Annual Pulp and Paper Conference was held at Western Michigan University on March 13 and 14. A substantial portion of the programme was devoted to colorimetry and on-machine control of colour. The use of pigments both as fillers and in coatings were discussed in a number of papers. There were two papers on computer control.
- 1309 Predicting Reflectance and Color of Paint Films by Kubelka-Munk Analysis. III: Effect of Concentration Errors on Color for Mixtures of Chromatic Pigment with White, F. W. Billmeyer and D. G. Philips, *J. Paint Technology*, 46, p. 592, 1974

The following papers were presented at the International Conference on Photometry and colorimetry organised by the Bulgarian Academy of Sciences and held in Varna, Bulgaria, on 25-30 June 1973. Only the papers presented in English are listed. A copy of the full proceedings has been presented to the Colour Group.

- 1310 Required and Achieved Accuracy in Photometry and Radiometry, C. L. Sanders, p. 1
- 1311 New Needs for Optical Radiation Measurement, E. S. Steels and B. Steiner, p. 35
- 1312 The Measurement of Extremely Low Light Intensities, J. Schanda, p. 47
- 1313 Accuracy of Luminous Flux Measurements of Fluorescent Lamps, D. L. Sanders, J. Bak and W. Gaur, p. 81

- 1314 Spectral Sensitivity Distribution Measuring System for Photo-Sensors, G. Eppeldauer and J. Graner, p. 109
- 1315 IC Detector Circuits for Si Photovoltaic Cells, G. Eppeldauer, p. 121
- 1316 A Multiplicative Comparator of the Spectral Radiances, S. Tahata and S. Hattori, p. 141
- 1317 Co-ordinate Sensitive Photodevices on the Basis of Photocrystalline Cadmium Sulphide, V. Stoyanov, M. Lakova and B. Kafedji'vska, p. 153
- 1318 A Comparison of Methods of Assessing the Effect of the Screen in an Integrating Sphere, L. Morren, p. 187
- 1319 The Basic Concepts of Colorimetry, G. Wyszecki, p. A1
- 1320 Colour of the Sea, N. G. Jerlov, p. A19
- 1321 Euclidean Representation of Four Color Difference Formulae, T. Indow and K. Matsushima, p. A34
- 1322 Colour Television Colorimeter, G. Eppeldauer, J. Shanda and J. Graner, p. A40

BIBLIOGRAPHY

After a recent check-up on the Bibliography I understand that the following periodicals will be covered in the future. If you see any errors or omissions please let me know. If you can offer to cover the omissions that would be even better.

Michael R. Pointer, Kodak Limited, Colour Group, Harrow, Middlesex, HA1 4TY

- | | |
|----------------------------|-------------------------------|
| American Ink Maker | J. Animal Science |
| Applied Optics | J. General Psychology |
| American Paper Industry | Japanese Pulp & Paper |
| American Chemical Society | J. Textile Institute |
| —Coatings & Plastics | J. Soc. of Scientific Phot. |
| Appitta | of Japan |
| Atip Bulletin | J. British Kine. & Television |
| American Laboratory | Soc. |
| American Scientist | J. Psychology |
| American Journal of | J.S.M.P.T.E. |
| Psychology | J. Genetic Psychology |
| Archives of Ophthalmology | J. Photographic Science |
| British Printer | J. Illumin. Engineering Soc. |
| B.K.S.T.S. Journal | Lighting Design & |
| B.A.S.F. Review | Application |
| British Ink Maker | Modern Plastics |
| British Journal of | Medical Officer |
| Ophthalmology | Norsk Skoindustri |
| British Journal of Physio- | Optical Spectra |
| logical Optics | Optical Technology |
| Bull. of the Soc. of Sci. | Pigment & Resin Technology |
| Phot. of Japan | Photographic Science & |
| British Journal of | Engineering |
| Photography | Pulp & Paper Magazine |
| Canadian Pulp & Paper | (Canada) |
| Industry | Paper Trade Journal |

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|-------------------------------------|-------------------------------------------------------|
| Chemical & Engineering News | Photography Applied in Science, Technology & Medicine |
| Canadian Journal of Psychology | Perceptual & Motor Skills |
| Child Development | Pulp & Paper |
| Das Papier | Pulp & Paper International |
| Endeavour | Paperi Ja Puu |
| Engineer | Paper (Paper Maker & World Paper Trade Review) |
| Engineering | Packaging |
| Food Technology | Physics Today |
| Flag Bulletin | Psychological Bulletin |
| Gravure | Psychological Review |
| Industrial Photography | Photographic Journal |
| Industrial & Commercial Photography | Research/Development |
| Institute of Meat Bulletin | Scientific American |
| J. Paint Technology | Science |
| J. Optical Society of America | Svensk Rapperstidning |
| J. Science of Food & Agriculture | Southern Pulp & Paper Manufacturer |
| J. Food Science | Tappi |
| | Trans. Ophthalmological Soc. of the U.K. |
| | Textile Chemist & Colorist |

Stop Press

| | |
|-----------------------------------|-----------------------|
| European Plastic News | Modern Irish Printer |
| Plastics Engineering | Modern Lithography |
| Australian Printer | Professional Printer |
| Australian Lithography | TAGA Proceedings |
| Asian Printer | IARIGAI Proceedings |
| GATF Technical & Research Reports | Graphics Arts Monthly |
| Gravure | FOGRA Mitteilungen |
| Lithoprinter | UGRA Mitteilungen |
| | IGT News |

You will see there are now some serious omissions from our list. I list some of them below. If you can cover them please contact me as soon as possible.

| | |
|---------------------------------|--------------------------------|
| Image Technology & Engineering | J. Neurophysiology |
| J. Society Dyers & Colorists | J. Applied Psychology |
| J. Oil & Colour Chemists Assoc. | J. General Psychology |
| J. Physiology | Light & Lighting |
| J. General Physiology | Lighting Research & Technology |
| J. Applied Physics | New Scientist |
| | Physiology & Behaviour |
| | Vision Research |

PRODUCTS AND SERVICES

Graphic Arts Research Center (GARC) Rochester Institute of Technology (RIT)

GARC has published a survey report titled *Shortrun Color, Markets and Methods*. The report includes the major systems for short runs. DuPont Cromalin, Kodak Poly-Trans, Remak, 3M Transfer-Key, 3M Color-in-Color Systems, and Xerox 6500 are included.

Copies may be obtained for the price of \$5.00 from GARC by writing to Catalog Orders.

GARC has announced the availability of English translation of a Russian book. Russian literature reports considerable information on photography and photo-reproduction. Some of this information deals with such subjects as emulsions, films, photo-resists, and sensitization which are useful in the field of graphic arts. In 1973 GARC established a capability for translating such material and making it available to industry. Carlo Bauman, formerly employed as translator of scientific literature at the Research Laboratories of Eastman Kodak Company for 27 years, joined the staff of GARC as Translator.

Transactions of the First All-Union Conference on Non-Silver and Unusual Photographic Processes, published in Kiev in 1972 is a compilation of 124 transactions, of which 84 (sections 2, 3 and 4) have been translated. The three translated sections are entitled Electro-photography, Semiconductor Photography, and Photochemical Methods of Image Recording. The price is \$21.50.

The book has been composed on a typewriter and printed on 8½ x 11 inch paper with a soft-cover binding. In order to provide more information for the potential user, the entire table of contents of the book is available free upon request. Write to Catalog Orders, Graphic Arts Research Center, Rochester Institute of Technology, One Lomb Memorial Drive, Rochester, New York, 14623.

GARC has announced a Color Seminar for Pressmen. The seminar will be given on three occasions, June 26-28, 1974, October 9-11, 1974, and January 28-31, 1975. One of these seminars had already been held before a notice could be placed in the *Newsletter*, but there will be plenty of time for you to obtain information on the January session. Information can be obtained from William D. Siegfried, Training Director, at RIT address.

GARC has announced additional dates for the Photographic Process as a Scientific Instrument, an intensive five-day program designed to assist engineers, scientists, and technicians in applying photographic technology to the acquisition of data, and to provide information on the photographic process and image necessary in the employment of photographic technology.

The course is held three times annually at Rochester Institute of Technology. Dates now scheduled are September 16-20, 1974, November 11-15, 1974 and March 17-21, 1975. Registration is open, although a B.S. degree or equivalent experience in physics, engineering, or chemistry is desirable.

Specific content of the program is as follows:

Day 1: Sensitometry — experimental methods of estimating the response of photographic materials to radiation; exposure methods, processing techniques, densitometry, and data analysis;

Day 2: Statistics — statistical tools for quality control; variability and measure of variability; estimation of experimental error; interpretation of data and statistical inference;

Day 2—(Evening): Color — measurements of color in the CIE System; additive and subtractive color reproductions; masking;

Day 3: Chemistry — chemical and physical properties of silver halide-gelatin emulsion and the relation of these properties to its photographic response; the chemistry of processing the emphasis on component interaction; instrumental and other problems peculiar to the control of photographic processing;

Day 3—(Evening): Non-silver image forming systems; Recent advances and product trends; principles and methods of physics and chemistry, latent image theory, mechanism of development, spectral sensitization, and sensitometry as applied to non-silver photography;

Day 4: Image evaluation — criteria for image excellence and methods of securing data; problems of correlating objective and subjective procedures; emphasis on optical instrumentation and data reliability;

Day 4—(Evening): Dinner Meeting — discussion of topics selected by the participants;

Day 4: Photographic Instrumentation — introduction to principles of photo instrumentation; image geometry and radiometry; precision and accuracy; basic systems and techniques.

A sliding tuition scale which includes text materials and supplies is:

\$70 per day for any single or two days (\$70 or \$140);
\$60 per day for any three or four days (\$180 or \$240);
or \$275 for all five days.

The Day 2 and Day 3 evening programs are an additional \$25 each.

The Day 4 dinner and discussion meeting is open to all participants in any part of the program at no additional cost.

Further information on the program is available by writing to:

Dr. Ronald Francis, Program Chairman, College of Graphic Arts and Photography at RIT address or by calling: 716/464-2786

Registration is through:

Mr. William D. Siegfried, Graphic Arts Research Center, (at RIT address) or by calling: 716/464-2758

GARC has announced new resolution test patterns with a choice of three different contrast levels. These 38 x 50 inch patterns are based on the "USAF-1951" design and have been reproduced on heavyweight plastic coated paper suitable for use under adverse weather conditions.

The test patterns are used to evaluate the resolving power of photographic and other optical systems under test conditions typical of everyday use such as atmospheric haze, variable mount stability, operator focusing error, and other working conditions.

The new medium contrast pattern and low contrast pattern are useful for evaluating night surveillance devices and infrared detecting devices for law enforcement agencies.

A high contrast pattern 100:1 (image density 2.0) are available at \$7.00 each. The medium contrast pattern 6.3:1 (image density 0.8) and low contrast pattern 1.6:1 (image density 0.2) are available at \$12.00 each. Quantity discounts are available.

Write or call Catalog Orders, GARC address. Phone 716/464-2736.

GARC has introduced a new size RIT Alphanumeric Resolution Test Object. This new resolution test pattern

uses the same alphanumeric characters of RIT's smaller test object with all its "recognition" advantages. However, the new size is 11 x 11 inches which makes it suitable for the amateur and professional photographer who wants to test the resolution of his own camera equipment. Furthermore, the price of \$3.00 prepaid, which includes lens testing procedures, was intended to put the test object within easy reach of every photographer.

The 11 x 11 alphanumeric resolution test object consists of block letters and numbers which are randomly arranged in four displays, two of which are at 90 degrees to the other pair. Thus, the observer is required to *recognize* the character, as well as *detect* it in the image at the threshold of perception.

The test object is printed on high quality enamel paper, comes in reflection copy only, has a contrast of approximately 1.6 image density, and has a range of resolution from 0.25 to 4.5 lines per millimeter.

Send your requests to Catalog Orders, GARC address.

GRAPHIC ARTS TECHNICAL FOUNDATION (GATF)

GATF has announced two workshops that deal specifically with color processes — "Advanced Color Separation," Gary Field, Supervisor, GATF Color and Photographic Reproduction Division, Dec. 16-18, 1974, and "Color Printing Standards and Control," Gary Field and Charles Shapiro, an education consultant for GATF, Nov. 14-15, 1974 and Feb. 10-11, 1975. For further information, write to Special Programs Department, Graphic Arts Technical Foundation, 4615 Forbes Ave., Pittsburgh, Pa. 15213.

GATF's Color Reproduction Seminar will be presented in five locations this fall under the sponsorship of local printing industry associations, GATF Executive Director Gilbert W. Bassett announced today.

The following seminars and sponsors have been scheduled: Ottawa, Ont., Canada, Sept. 20-21—Graphic Arts Industry Assn. of Canada (Brian Linklater, general manager); Buffalo, N. Y., Oct. 4-5—Printing Industry of Western New York (Ken Smelcer, executive director); New York, N. Y., Nov. 1-2—Printing Industry of Metropolitan New York (Dr. Paul Noble, president); Atlanta, Ga., Nov. 8-9—Printing Industry of Atlanta (Richard Stout); Cleveland, O., Dec. 13-14—Printing Industry of Northern Ohio (Neil Johnson, regional manager).

In making the announcement, Mr. Bassett said, "There is unusually strong interest in the Color Reproduction programs this year, primarily because of paper and ink problems and related substitutes and shortages now affecting the printing industry. The program is especially appropos to today's problems since its content reflects the Foundation's continued close contact with industry on current technical problems of production in both web and sheet-fed areas."

Mr. Bassett continued, "The two-day Seminars are presented by Gary G. Field, supervisor of GATF's Color Division, and are designed for experienced color camera operators, pressmen, and other personnel involved on a daily basis with color reproduction. However, all those seeking

to advance their knowledge and understanding of color reproduction will benefit significantly from the Seminar. Mr. Field has a strong industrial background in color technology, with several years of color camera operating experience. He is a printing graduate of the Melbourne College of Printing, Australia, and a printing technology graduate of the Trent Polytechnic, Nottingham, England. Special to the contents of the fall, 1974, program is up-to-date information on the Munsell-Foss Color Order Systems, for both sheet-fed and web offset printing. The latest GATF Research Project Reports on the use and applications of the new Color Charts will be distributed and fully explained at the programs."

He concluded, "The Foundation urges those in the eastern half of the United States and Canada to register early for the Color Reproduction Seminars. Additional color seminars for central and western United States will be announced at a later date."

For further information on GATF Color Reproduction Seminars contact: Special Programs Department, GATF address or association executives listed for each seminar location.

The Munsell-Foss Color Chart, made available in 1973 exclusively to GATF members, may now be obtained through the Foundation by others in the industry, according to Dr. William D. Schaeffer, GATF research director.

The chart is now available to non-members of the Foundation for \$400; cost to members is \$200. For further information, contact: Order Department, GATF address.

[For a description of this chart see *Newsletter*, July-August 1973, Number 225, Ed.]

Research Project Report Supplement 96 announces the availability of the web offset version of the Munsell-Foss Color Chart, William D. Schaeffer, GATF research director, said recently.

According to Dr. Schaeffer, "During 1973, the Foundation made available to members a conceptually new color chart known as 'the Foss Color Order System.' Master film sets were supplied to members to produce printed color charts for use in color specification and communication situations. These film sets were designed for use only on sheet-fed lithographic presses."

Dr. Schaeffer concluded, "The web-offset version is designed to be delivered as a 16-page booklet from a 22 inch x 35 inch press. We believe it is the first and only web-offset color chart that has been developed anywhere in the world. Other features are common to the sheet-fed version: the spacing between color steps is approximately equal, thus providing as much emphasis on light as on dark colors; the colors are displayed on the chart in a proper color order, a serious drawback of most other charts; it is easy to visualize the contribution of the black printer to the overall color; and, the chart includes the GATF Gray Balance Chart and the GATF Color Reproduction Guide, which together with the color chart form the basis of a systems approach to color reproduction."

The master film sets for the new web-offset version of the Munsell-Foss Color Chart are available exclusively to GATF members for \$350; when the chart becomes available to non-members, they will pay \$700. The sheet-fed version of the chart can be purchased by members for \$200,

and by non-members for \$400. For further information contact: Order Department, GATF address.

GATF's 1974 Catalog, listing publications, instruments, materials, and services developed by and available through the Foundation, was published recently and is now being distributed to GATF members. The announcement was made by GATF Executive Director Gilbert W. Bassett.

Mr. Bassett said, "Through its programs in research, education, technical services, and technical information, the Foundation has developed a variety of textbooks, audio-visual aids, quality control instruments, and other training and production aids. All are designed to improve the knowledge and proficiency of members of the graphic communications community—the 'man at the bench', the supervisor, the manager, the salesman, the designer, the typographer, the student and teacher, the buyer, and the manufacturer of printed materials. The GATF Catalog contains a complete listing of these publications, products, and services currently available to the industry through the Foundation."

The GATF Catalog is mailed automatically to all GATF members. Non-members can request a free copy of the publication from the GATF Order Department, GATF address.

FEDERATION OF SOCIETIES FOR PAINT TECHNOLOGY

Federation Series on Coatings Technology

| Unit | Title |
|------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | "Introduction to Coatings Technology"—W. R. Fuller. (Oct. 1964) (Revised May 1973) |
| 2 | "Formation and Structure of Paint Films"—W. R. Fuller. (June 1965) |
| 3 | "Oils for Organic Coatings"—F. L. Fox. (Sept. 1965) |
| 4 | "Modern Varnish Technology"—A. E. Rheineck. (May 1966) |
| 5 | "Alkyd Resins"—J. R. Blegen. (Mar. 1967) |
| 6 | "Solvents"—W. R. Fuller. (May 1967) |
| 7 | "White Hiding and Extender Pigments"—W. H. Madson. (Oct. 1967) |
| 8 | "Inorganic Color Pigments"—W. R. Fuller and C. H. Love. (Mar. 1968) |
| 9 | "Organic Color Pigments"—J. G. Mone. (July 1968) |
| 10 | "Black and Metallic Pigments"—W. S. Stoy, E. T. Usowski, L. P. Larson, D. Passigli, W. H. Byler, R. Evdo, and W. von Fischer. (Jan. 1969) |
| 11 | "Paint Driers and Additives"—W. J. Stewart. (June 1969) |
| 12 | "Principles of Formulation and Paint Calculations"—W. R. Fuller. (June 1969) |
| 13 | "Amino Resins in Coatings"—W. L. Hensley and W. E. McGinty. (Dec. 1969) |
| 14 | "Silicone Resins for Organic Coatings"—R. W. Clope and M. A. Glaser. (Jan 1970) |
| 15 | "Urethane Coatings"—D. Lasovick. (July 1970) |
| 16 | "Dispersion and Grinding"—M. H. Schaffer. (Sept. 1970) |
| 17 | "Acrylic Resins"—Gerould Allyn. (Mar. 1971) |

- 18 "Phenolic Resins"—R. D. McDonald. (Mar. 1971)
 19 "Vinyl Resins"—G. M. Powell (Apr. 1972)
 20 "Epoxy Resins"—R. A. Allen (Apr. 1972)
 21 "Nitrocellulose and Organosoluble Cellulose Ethers
 in Coatings"—E. C. Hamilton and L. W. Early, Jr.
 (Sept. 1972)
 22 "Plasticizers"—J. K. Sears (June 1974)

These publications can be ordered from The Federation, 121 South Broad St., Philadelphia, Pa. 19107. The reprints are \$1.50 each.

Modern Chromatics

Rood's 1879 edition of MODERN CHROMATICS has been published in facsimile (by VanNostrand Reinhold) with preface, introduction, and commentary notes by Faber Birren.

This book, a prime reference in its day on light and color, went through many American and English editions and was published also in German (1880) and French (1881). As Birren points out, it was addressed to both scientist and artist, highly regarded by both, and the French edition became "what can be fairly considered the most significant of all influences in the school of Neo-Impressionism . . . avidly read and studied by artists such as Camille Pissarro, Georges Seurat, Paul Signac."

We note the availability of this book, and promise a review for the *Newsletter* as soon as a review copy is made available.

Dorothy Nickerson

THINC

THINC recently introduced an extensive line of ratioing photometers for performing color measurements, chemical analyses, and general light measurement applications. All instruments can be used "on-line" for quality control or process control applications. The CP-601 Adsorbance Monitor is primarily designed for chemical analyses, where a digital readout is used to display concentration directly. The CP-602 Digital Ratioing Photometer can be used for general light measurement applications with one or two probes, or it can be used to ratio two different wavelengths for color difference measurements. The CP-603 Photometer is a battery powered version of the CP-602 and is designed for field use. The CP-604 Color Monitor is a three wavelength digital ratioing instrument designed for tri-stimulus color measurements. The CP-604 is the first color measuring instrument to monitor three color channels continuously with optical probes.

A wide variety of interchangeable probes are available for all instruments. These include single and triple wavelength spot photometers, single and triple wavelength fiber optic probes, and colorimeter modules. All probes use individual detector-filter modules, of which 14 different types are available.

The "top-of-the-line" CP-604 Color Monitor is pictured. The price is \$775.00. Additional information can be obtained from Technical Hardware Inc., P.O. Box 3609, Fullerton, Ca. 92634.

LOVIBOND OF AMERICA, INC. IS NOW VISUAL COLOR METRICS, INC.

Effective August 1, Lovibond of America, Inc. changed its name to *Visual Color Metrics, Inc.*

There will be no change in our sales and service policies. You will continue to deal with the same people for the same Lovibond products.

Our mailing address and telephone number remain unchanged.

(TRANSLATION OF THE PRINTED GERMAN PROGRAM ATTACHED HERE)

Invitation

to all our AIC friends from foreign countries to our
COLOR MEETING

on the occasion of the 25th anniversary of
Fachnormenausschuß Farbe (FNF)
im Deutschen Normenausschuß
(= Standards Committee on Colorimetry
of the German Standards Council)
to be held at Frankfurt on Main
24th and 25th October, 1974
in the DECHEMA House,
Theodor-Heuss-Allee 25 (near the fair area)

By this Meeting the FNF intends (i) to inform on the present state of theory and practical application of color metrics, (ii) to render account of its activities, and (iii) to bring together German and foreign colleagues. We expect a great many of participants of all branches in the lectures and at the welcome evening as well. Particularities of the program see below.

PROGRAM:

Wednesday, * 23rd October:

19,30 h Informal Welcome Evening in the Restaurant
"Schwarzer Stern", Kalbächer Gasse 8 (near
"Hauptwache")

Thursday, 24th October:

9,30 h Opening, by the President of the FNF, Prof.
Dr. H. W. Bodmann (Karlsruhe) and further
salutations

10,00 h Prof. Dr. M. Richter (Berlin): 25 years of FNF
activity

11,00 h Break

11,15 h Dr. W. Schultze (Ludwigshafen): The problems
of color-distance evaluation

11,45 h Dr. A. Berger (Leverkusen): The visual color
inspection

12,15 h Lunch break

14,00 h Dr. H. Scheibner (Nauheim): The present
physiological ideas on color vision

14,30 h Dr. N. Mayer (München): Color metrics in color
television

15,00 h Dipl.-Ing. U. Schultz (München): Illumination
and color rendering

15,30 h Break

- 15,45 h Prof. St. Eusemann (Nürnberg): Color Metrics and color design
 16,15 h Dr. H. Terstiege (Berlin): Color in traffic

Friday, 25th October:

- 9,30 h Dr. F. Heinrich (Ludwigshafen): Modern methods of color measurement
 10,15 h Dr. D. Gundlach (Berlin): Problems of Illuminating samples and of measuring geometry in colorimetry
 10,45 h Break
 11,00 h Dr. G. Geutler (Berlin): Special problems of tristimulus colorimetry
 11,30 h Dipl.-Phys. K. Mahr (München): Modern colorimetric methods for light sources
 12,00 h Lunch break
 14,00 h Dr. G. Völz (Krefeld-Uerdingen): Colorimetric problems in evaluating pigments
 14,30 h Dr. K. Hoffmann (Frankfurt-Hoechst): Technical possibilities of recipe calculation
 15,00 h Break
 15,15 h W. Kunz (Opladen): Color metrics in textile dyeing
 15,45 h H. J. Perrottet (Frankfurt): Color on the stage (with demonstrations)
 16,30 h Closing speech, by the FNF Vice-President, Dr. A. Brockes (Leverkusen)

For registration, please write to our office mentioned below, not later than 15th October. If you will do so, your registration card will be prepared and you can pick it up in the meeting office in Dechema House, Frankfurt, on Wednesday, 23rd Oct., from 14-18 h, or Thursday, 24th Oct., from 8,30 h.

Please remit the registration fee (35,- DM) not later than 15th October to the following postal check account: Prof. Dr. M. Richter, Sonderkonto, Postscheckamt Berlin West 49 14-102.

For room reservation, please write to: Frankfurter Verkehrsverein (Zimmernachweis), D-6000 Frankfurt (M), Am Hauptbahnhof 16 not later than 15th October.

If the acknowledgement card from there did not reach you before your departure, please visit the tourist office mentioned above. You will find it open from 8 to 22 h on weekdays. You should do so also in the case you could not order your room reservation in due time; the tourist office will do its best to help you.

*Please note that the weekday names in the German printed program are misprinted, but the dates are right!

Fachnormenausschuß Farbe (FNF)
 im Deutschen Normenausschuß
 Geschäftsstelle: 1 Berlin 45, Unter den Eichen 87
 Tel.: (030) 8 10 45 48

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NOTE:

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