

Inter-Society Color Council *Newsletter*



NUMBER 221

November-December 1972

ISCC ANNUAL MEETING

This is just a reminder that the next ISCC annual meeting will be held in New York City on April 30 and May 1 at the Statler Hilton Hotel. (See N. #219.) An announcement of the final details of the meeting will be mailed separately to all members.

R. S. HUNTER, ISCC PRESIDENT, APPOINTED TO NBS PANEL

Mr. Richard S. Hunter, ISCC President, has been appointed as a member of the Photometry Evaluation Panel, Institute for Basic Standards, National Bureau of Standards. The appointment, announced by Dr. Phillip Handler, President of the National Academy of Sciences, followed upon the recommendation of Dr. W. D. Baker, chairman of the NAS-NAE-NRC Evaluation Committee for the Bureau, and Dr. I. C. Schoonover, Director of the Evaluation Panels.

During the past year several organizations and associations have expressed their deep concern to the National Bureau of Standards and the Department of Commerce over the reduction of manpower and services in the color and appearance area. The Manufacturers Council on Color and Appearance was one of these groups addressing itself to the problem and after a number of discussions with NBS it was concluded that the appointment of an additional member to the Evaluation Panel for the Photometry and Radiometry Program of the NBS, who could represent the general interest in the color and appearance areas, would be a satisfactory solution to some of the problems.

Mr. Hunter is well qualified to represent the general interest with over 40 years of experience in the field of color, reflectance, and gloss measurement. In addition to being president of Hunter Associates Laboratory Inc. in Fairfax, Virginia, he is best known as the developer of the method of photoelectric-tristimulus colorimetry, the designer of the Multi-purpose Reflectometer and Color Difference Meter,

the originator of the concepts of different aspects of gloss, and the developer of other instruments and procedures to measure reflectance, color, by reflectance and transmission and gloss.

He is a Fellow of the Optical Society of America, the American Association of Textile Chemists and Colorists, and the Technical Association of the Pulp & Paper Industry; member of the American Society for Testing Materials, Washington Academy of Science, A.A.A.S., and Institute of Food Technologists. Mr. Hunter has received numerous awards for contribution in the field of color and appearance.

DEANE B. JUDD MEMORIAL SERVICE

The Memorial Service held for Dr. Judd on October 21 was heavily weighted in referring to his color interests and associates -- though there was some mention of his interest and skill at tennis, and at the piano. Lester Lewis, formerly with color interests (as a physicist), but a practicing Unitarian minister who knew Dr. Judd well (for several years they lived in homes side by side while their children were growing up), conducted the service. He had five of Dr. Judd's associates join him in speaking briefly of those aspects of his life with which each was best acquainted. The service was conducted from the floor, with a number of colorful displays of particular relation to Dr. Judd, and the various awards and medals he had received were on display. At the conclusion the family remained to greet those of his friends who had come to the service -- and practically all took time to examine the several displays.

D. Nickerson

1973 AIC MEETING

Word has been received from Professor W. D. Wright that a second notice and registration forms for the International Color Association Meeting are being sent to our Secretary. (See N. #214 for first announcement.) The meetings are being held in York, England, from July 2-6, 1973. Anyone wishing copies may write to Dr. Billmeyer.

HUMAN RESPONSE TO COLOR MEETING -- NOVEMBER 21, WASHINGTON, D.C.

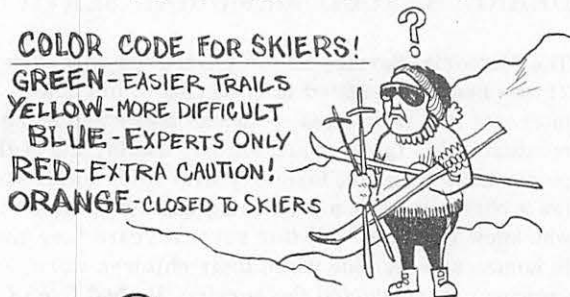
Amongst the 16 participants at an exploratory meeting of a proposed new Sub-committee on Human Response to Color were Industrial Designers, Architects, Engineers, Psychologists, Medical and Behavioral Researchers and some outstanding authorities on Color usage. The meeting was chaired by Alexander F. Styne, delegate from the Industrial Designers Society of America, the group who had originally asked for the formation of a problems sub-committee. An extremely interesting interchange of thinking led to a concrete proposal which will be submitted to the Board of ISCC for their January meeting by George Gardner, chairman for the Problems Committee. It is anticipated that the group will meet again at the annual meeting of ISCC in New York in April.

COLORAMA

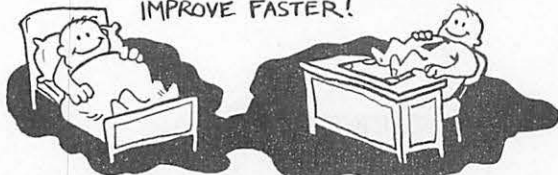
FROM THE COLOR NOTEBOOKS OF
Howard Ketcham

COLOR CODE FOR SKIERS!

GREEN - EASIER TRAILS
YELLOW - MORE DIFFICULT
BLUE - EXPERTS ONLY
RED - EXTRA CAUTION!
ORANGE - CLOSED TO SKIERS



A GERMAN HOSPITAL REPORTS THAT ULCER PATIENTS
- IN A ROOM PAINTED A RESTFUL OLIVE-GREEN -
IMPROVE FASTER!



PERHAPS ADVERTISING AGENCIES SHOULD ANTICIPATE -
GIVE THEIR EXECUTIVES OLIVE-GREEN OFFICES?

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BRITISH COLOUR GROUP

Report on the 88th Meeting on Current Research in Colour Vision at NPL Held in October, 1972

Dr. F. J. J. Clarke and Dr. P. W. Trezona

Dr. Clarke opened with a brief review of the history of the CIE 10° Colour Matching Functions, and Stiles' work thereon; how Stiles found non-additivity with the 10° field and how this related to Clarke's own extrafoveal observations at Imperial College. On the other hand Dr. Trezona, using small fields, could detect no significant non-additivity. These experiments suggested that the rods with their denser population outside the fovea were responsible for the discrepancies. Stiles compensated for rod intrusion in the resulting CIE 10° functions, which were tested in controversial field trials by Stiles, Wright and Wyszecki, which led to a private correspondence with Clarke.

Other direct tests of various individuals' 10° CMF's by Crawford, Lozano and Palmer with broad-band test colours revealed large discrepancies. The present situation is exemplified by the cautionary statement Judd asked the CIE to publish two years ago, and Wyszecki last year at Driebergen said that the rod mechanism may be functioning even at very high levels.

In the past five years the NPL Trichromator has been reassembled with improvements designed to facilitate tetrachromatic matching, which should balance out the rod component. The lack of symmetry in the original design, which caused slight vignetting, was much improved with relay lenses to equate the optical paths in the three tiers, and ingenious ray-inverting prisms in the spectrum plane now gave additive dispersion in the wavebands of the instrumental stimuli, as well as compensating for lens aberrations. The slit width was thus doubled for the same spectral resolution, and the exit slit spreaders were no longer needed.

Dr. Trezona then reviewed previous work on tetrachromatic matching by Bongard et al, and Palmer. Her own 2-level technique is distinct from theirs and was described at a Colour Group meeting in 1971. She produced further results to show that tetrachromatic matches are indeed unique for test stimuli in all five spectral regions and that the two forms of the additivity laws are obeyed, namely constancy of a given match with an extreme range of level, and addition of the stimuli in two matches to produce a third valid match. The Maxwell spot was reduced almost to invisibility. Tetrachromatic colour matching functions were shown for a normal observer, and the new data were compared with

linear transformations of the CIE 10° and V¹ (λ) data. There was, however, some imprecision in the results, especially for violet test lights, which could largely be compensated by reducing the data mathematically to a trichromatic system with the aid of appropriate trichromatic matches. This was presumably the preferred form for industrial users.

Dr. Clarke concluded by asking whether the tetrachromatic system could possibly be non-additive. Only a change of shape of one or more of the four receptor response curves could cause additivity failure, and this could not be significant for human rods because the rhodopsin density is too low; however at very high levels matches could break down for the same reasons that applied to the foveal matches of Wright and of Brindley. In discussion Dr. Ruddock agreed that additivity failure could not occur due to bleaching in rods, and thought that simple bleaching effects in cones were the cause of failures at very high levels. Dr. Clarke's argument against this was based on Dartnall's conclusion that cone responses are mediated by difference spectra rather than the absorption spectra of single pigments.

Metameric Colour Rule Matches of Normal, Colour Deficient, Cataractic and Aphakic Observers

Professor H. Kalmus

Professor Kalmus described his recent work (Ann. Hum. Genet. Lond. (1972), 36, 109) with the Colour Rule devised by Dr. H. Hemmendinger, and marketed by the Munsell Co. of Baltimore, U.S.A., which he showed has diagnostic use in various normal and abnormal eye conditions. This has two slides painted with colour gradations of constant brightness. In daylight, one scale numbered A-V varies from purple to green. In the second scale the pigments blend from blue to brown, numbered 1-21. A portion of each slide appears through a window; the corresponding letter and number are read from the back. For most people, including colour defectives, there is only one combination of positions which match under a particular illuminant but the tolerance is much wider for severely affected people.

Professor Kalmus found that with tungsten light the match was never satisfactory, whilst most people, including defectives, were able to make good matches under a daylight-type of fluorescent lamp at 6500K. This he therefore used in his experiments. First of all, it was shown there was a good correlation between the letters and the numbers on the two scales. Normal observers exhibited a variation with age, due presumably to progressive lens discoloration. This effect was enhanced in cataractic patients,

who were restored to a youthful setting after their operations. In young people there were no special settings for various racial types, skin or iris colorations, except possibly for Mexican girls.

Professor Kalmus showed that by numbering the lettered scale (A -1, B -2 etc.) and adding both figures together, the total score could indicate certain colour defects, especially when plotted in a special diagram to show the range of acceptable matches (the worse the defect, the greater this range). On such a plot, protanopia and deuteranopia, protanomaly and deuteranomaly can all be distinguished at least as well as with an anomaloscope, and also tritan types not detectable by ordinary tests. The last case may assist the early detection of glaucoma and ocular hypertension, which often produce tritan defects. Professor Kalmus concluded by stressing the reliability, versatility, cheapness and convenience of the color rule for colour vision studies.

In the discussion, Mr. Collins asked whether the divisions of the rule were fine enough. Professor Kalmus replied he had tried reading to 1/2 division but the extra work was not justified. Dr. Padgham asked whether a greater difference between the regression lines for protans and deutans could be obtained if the rule were redesigned with different pigments. Professor Kalmus said he had asked the Munsell Co. to consider this, but the cost was prohibitive. Mrs. Morley said her own rule had small pieces of coloured cloth stuck on the slides. Perhaps this suggested how to change the scales. The help of British dyestuff firms was proposed. Dr. Clark wanted to know about diagnosis of specific diseases such as retinitis pigmentosa. Professor Kalmus replied that even that name covered several distinct conditions, so specification was not so easy. Dr. Padgham referred to Mrs. Birch's work at the City University with a Tintometer, to investigate acquired defects. Mr. Kahn wanted to know how the rule compared with the Ishihara test. Professor Kalmus replied it took longer, but was more quantitative.

PRODUCTS AND SERVICES

R.I.T. Photography Course

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, will be held at Rochester Institute of Technology from March 19 to 23, 1973.

Sponsored by RIT's College of Graphic Arts and Photography, the program is for those with a B.S.

degree or equivalent experience in physics, chemistry, or engineering.

Subject matter to be covered during the five-day program is as follows: Sensitometry, Statistics, Chemistry, Color, Image Evaluation, and Photographic Instrumentation.

Further information on the program is available by writing: William D. Siegfried, Training Director, Graphic Arts Research Center, Rochester Institute of Technology, One Lomb Memorial Drive, Rochester, N.Y. 14623, or by calling (716) 464-2758.

Appearance Measurement Seminar for the Textile Industry

Hunter Associates Laboratory, Inc., will hold a seminar on Color and Appearance Measurements in the Textile Industry on February 22, 1973, at the School of Home Economics, University of North Carolina at Greensboro. This Seminar will be held in cooperation with Dr. Pauline E. Keeney of the School of Home Economics, exclusively for those in the textile industry.

Lecturers will include Richard S. Hunter, President of Hunterlab, and Drs. Pauline E. Keeney and Victor S. Salvin, of the School of Home Economics. Subjects to be covered, of key interest to the textile industry, will be precise measurements for whiteness, color and fading, as well as discussion of detergency studies.

For application or further information contact Mrs. Margaret Burns, Director, Education and Information Department, Hunter Associates Laboratory, Inc., 9529 Lee Highway, Fairfax, Virginia 22030, telephone (703) 591-5310.

Hunterlab Seminars

A 2-1/2 day Workshop designed to give participants a better understanding of the appearance of his product and how to get meaningful measurements of it will be presented by Richard S. Hunter and his staff January 17-19, 1973, at the Holiday Inn of Falls Church, Virginia.

One-day area seminars covering basic material on colorimetry and color science will be presented by Mr. Hunter and his staff as follows:

February 1, New Orleans, La.
March 22, St. Louis, Mo.
April 11, Chicago, Ill.
April 26, Toronto, Can.
May 10, Louisville, Ky.

May 17, Boston, Mass.
May 24, Rochester, N.Y.

For application and information on any of the above contact Mrs. Margaret Burns, Director, Education and Information Department, Hunter Associates Laboratory, Inc., 9529 Lee Highway, Fairfax, Virginia 22030, telephone (703) 591-5310.

1973 Program in Coloring of Plastics

The 1973 Program in Coloring of Plastics, sponsored jointly by Rensselaer Polytechnic Institute and the Plastics Institute of America is scheduled to be held March 20-22, 1973 on the RPI campus.

Co-directors are Dr. Fred W. Billmeyer, professor of analytical chemistry at Rensselaer and Mr. William V. Longley of Ford Motor Company, Dearborn, Michigan. Both Dr. Billmeyer and Mr. Longley are widely known in the field of color technology. They will be joined by other outstanding authorities on the coloring of plastics who will present lectures in the areas of their specialties.

This course provides complete coverage of the important aspects of coloring plastics, from the initial selection of colorants to the final quality control. It is designed to be useful to personnel in research, production and sales, but of particular interest to those directly concerned with the production of colored compositions. Particular attention will be paid to problems of quality control and the judgment of production for satisfactory color.

The three other Color Technology courses planned for the summer of 1973 are: Principles of Color Technology -- July 16-20, Color Technology for Managers -- July 26-27, and Advances in Color Technology -- July 30-August 3, 1973.

For further information contact the Office of Continuing Studies, Color Technology Program, Rensselaer Polytechnic Institute, Troy, New York 12181.

BAEYER STRUGGLES WITH LUDWIG'S BLUES

The BASF Review has lately printed several letters from Adolf Baeyer (1835-1917) to Heinrich Caro at BASF on a chemical problem posed by Ludwig II, King of Bavaria. In Linderhof the dreamy king a Venus Grotto had decreed, but when it was finished he didn't like the lighting. Not blue enough, he said.

The grotto is a story in itself. Ludwig was a great fan of Richard Wagner, and the Venus Grotto, dug into the side of a hill, was taken from a scene in Tannhauser. It also included elements of the Blue Grotto of Capri. Inside his grotto King Ludwig would loll in a gilded boat floating on an artificial lake, listen to an artificial waterfall, and ponder Wagner's operas.

The king was no piker, and the grotto embodied the latest technology of the day (ca. 1879). Among other features, it was lit by 24 arc lamps powered by 24 generators. The light was filtered through glass panes coated with collodion dyed blue, Ludwig's favorite color. He didn't care for the shade of blue in the grotto lighting, however, and Baeyer was asked to help. The future Nobel Prize winner, then at the University of Munich, did a number of experiments with coal-tar blues. He ran into trouble, however, and wrote to Caro at BASF for help:

"Dear Dr. Caro:

"I have a strange request to make of you today.

"As you know, His Majesty possesses in Linderhof a grotto in which he has had electric light installed. The electric lamps are enclosed in glass panes coated with dyed collodion. Of all colors, blue is His Majesty's favorite, and a blue must now be obtained which is of maximum purity and yet soluble in alcohol so that it can be used to dye the collodion. A sample of the blue employed hitherto is contained in the little box marked 'Illumination blue.' The king doesn't like it, saying that it is not pure enough. His ideal is the color of lapis lazuli, and although it's not possible to make a grotto as dark as lapis lazuli and light at the same time, one might nevertheless satisfy his wish by finding a better blue.

"The triphenyl rosaniline from my collection, which I believe I owe to you, appears a purer blue in the spectroscopic apparatus. In particular, it is freer from green.

"... Please don't describe the various blues to me but simply tell me whether there is a bluer blue than the triphenyl rosaniline enclosed. If this is the best one, I would ask you to let me know the trade name and whether it can be supplied in Ludwigshafen or in another factory in a state of highest purity. . . ."

This and the other letters in the BASF Review don't say whether Baeyer and Caro ever solved King Ludwig's problem. That monarch, meanwhile, was planning to build an early medieval castle and a Chinese palace in the neighborhood of Linderhof. These plans were never realized, however.

Reprinted from C&EN, November 20, 1972

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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.