Inter-Society Color Council *News*

Number 291 JULY-AUGUST 1984

ISCC-SCAI MEETING 1985

Plans for the 1985 ISCC Annual Meeting "Color: The End User" are well underway. This meeting is to be held in the Sheraton Hotel at interesting Station Square in Pittsburgh from April 14-16 and will be immediately followed by a symposium on color and instrumentation (SCAI) sponsored by the Federation of Societies for Coating Technology and the Manufacturers Council in Color and Appearance. This can mean five great days of color information for those with an interest in color measurement.

Of course, individuals can choose to attend either the ISCC section or SCAI section, April 17-18, as well as both, and the Tuesday afternoon, April 16, session of papers will be open to those attending either or both sections.

In addition to the serious business of papers, project committee meetings, workshops and seminars during the ISCC section of the April meeting there will be a reception, two luncheons and a boat trip. The ship Liberty Bell, which sails from a dock next to the hotel, will cruise along the river on Monday from 7 to 10 p.m. affording a beautiful evening view of the new Pittsburgh.

Dinner will be served on the ship and there will be music for those who want to dance, but since the ship has three levels, two of which are enclosed, those who want to talk can find a quiet place. As is remarked every year, one of the most valuable parts of an ISCC meeting is the opportunity to talk to people with different viewpoints on color.

Just below in this newsletter and continued in the next newsletter, you will find brief biographical notes on the authors and abstracts of papers scheduled to be given on April 16. Don't forget to mark the week of April 14 on your 1985 calendar.

PAPERS PLANNED FOR 1985 ISCC ANNUAL MEETING

Among the papers to be presented during the bridge section on Tuesday, April 16, will be one by Ruth Johnston-Feller who received the Macbeth Award last April for her outstanding contribution to color science. Mrs. Johnston-Feller is currently a consultant in color science at the Mellon Institute, Carnegie-Mellon University.

Prior to this she was Manager of the Coatings and Colorimetry Laboratories of the Pigment Department of CIBA-GEIGY Corporation in Ardsley, New York, and before that she was Director of Application Services of Color Systems Division of Kollmorgen Corporation. She is the author of more than 40 technical articles and a major chapter on "Color Theory" in the three-volume Pigment Handbook published by Wiley and Sons.

Abstract:

The Many Facets of Pigment Tinting Strength

Anyone who mixes colorants probably believes he understands what the term tinting strength of a pigment implies – and he certainly may – for his specific application. Considered broadly, however, the definition is not a simple one because the optical characteristics of pigments are not simple. To understand the various interpretations of the term, tinting strength, pigments – excluding flake pigments – may be considered to be one of three different types: (1) those which absorb light much more strongly than they scatter it, (2) those which scatter light much more strongly than they absorb it, and (3) those which both absorb and scatter light significantly. Examples of the first type are carbon blacks and the transparent organic pigments; examples of the second type are the white pigments and the nickel titanates; examples of the third type are many of the iron oxides and the lead chromates. Categorizing pigments in this way, however, may not be simple, either, because the specific category selected may be dependent on the use and color being considered. The relative values of the light absorbed and scattered also affects the opacity, a characteristic sometimes difficult to separate from the tinting strength.

Examples of the intermixture of pigments of each of these types in a variety of colors will be presented.

We are fortunate to have Dr. Robert L. Feller as a speaker. He is Director of the Research Center on the Materials of the Artist and Conservator at the Mellon Institute and was earlier Senior Fellow and Director of National Gallery of Art Research Project at the Mellon. His research has been on conservators' problems related to the properties of thermoplastic resins and the effects of light on polymers, paper, pigments and dyes. He has coauthored a book "On Picture Varnishes and their Solvents" which has had two editions. He is an Honorary Fellow of the American Institute for Conservation and has served as President of the International Institute for Conservation, American Group, the ICOM Committee for Conservation and as Chairman of the National Conservation Advisory Council.

Abstract:

Recollection of Pigments Past

In a project jointly sponsored by the National Gallery of Art and the National Endowment for the Arts, the speaker has been working for more than a decade in the preparation of a series of ten monographs that will describe the history and

identification of artists' pigments of historical interest. He will discuss the contributions of museum scientists and conservators in tracing the history of all-but-forgotten pigments such as Indian yellow, Naples yellow, aureolin and cronstedtite green earth.

Another speaker will be the ISCC's former president, Dr. Franc Grum who has been appointed the first Richard S. Hunter Professor for the new Munsell Color Science Laboratory in the College of Graphic Arts and Photography at Rochester Institute of Technology. This appointment followed an outstanding career in the Research Laboratory at Eastman Kodak Company and major contributions to the international CIE and AIC. He also served as Vice-President of the Munsell Color Research Foundation.

Professor Grum will describe the program of instruction, research, standardization and industrial liaison in color science and technology being put in place at Rochester and what future plans are. The Munsell Color Science Laboratory is becoming the major center for color in this country thanks to the expertise of both Professor Grum and Richard Hunter, whose generosity and understanding of color problems led to its establishment.

Joy Turner Luke

TECHNOTE – GENERALIZED L,a,b COLOR-SPACE EQUATIONS

Psychophysicists have long sought, and are still seeking, the ideal uniform color space to which the CIE tristimulus values X,Y,Z should be transformed. Useful transformations of this type have long been made by using the L,a,b equations developed by Richard Hunter while working at the Gardner Laboratory from 1946 to 1952. The lightness value, L, is computed as the square root of the luminous reflectance, Y. Chromaticity coordinates, a and b, are computed from differences between X,Y, and Z. Coordinate a, representing redness when positive and greenness when negative, is controlled by the difference (X-Y). Coordinate b representing yellowness when positive and blueness when negative is derived from (Y-Z). Scaling coefficients and division by the square root of y are used to promote color-space uniformity. The well-known Hunter square-root equations, used with most filter-type colorimeters for nearly 40 years, and still available in current designs, are:

$$L_H = 10\,Y^{1/2}$$

$$a_H = 17.5\,Y^{-1/2}[(1.02\,X - Y)]$$

$$b_H = 7.0\,Y^{-1/2}[(Y - 0.847\,Z)]$$

Note:–Another subscript and frequently no subscript has been used to identify, L,a,b values obtained from Hunter equations. I recommend that the subscript "H" be adopted because it is the initial of the author of the equations.

These equations were developed to provide a more uniform color space than CIE X,Y,Z space for objects viewed in daylight, specifically CIE Illuminant C.

The development of spectrophotometer-based colorimeters with associated microprocessors, now permits the rapid computation of CIE tristimulus values X,Y,Z for a wide variety of illuminants in addition to C. Illuminant A, representative of incandescent lamplight and a number of F illuminants, representative of different types of fluorescent lamplight, are now published as spectral power distributions. Thus it becomes convenient to compute color change with change in illuminant. However, substitution of specimen, X,Y,Z values computed for an illuminant other than C when entered in the above equations gives an erroneous result. When a simple substitition is made, the result applies to a grossly distorted color space when the spectral power distribution of the illuminant is vastly different from daylight. As an example, consider a specimen having a strong blue color. Under illuminant C, the computed b value will be large and negative. When the X,Y,Z values of the specimen computed for illuminant A are entered in the above equations, the b value comes out positive, indicating erroneously that the specimen will appear yellow under incandescent lamplight. Yet no change in an illuminant can make a blue specimen appear yellow!

What has been forgotten is the fact that when the illuminant is changed, not only do the tristimulus values, X,Y,Z, for the specimen change but those of the white reference change as well. For this reason, each tristimulus value for the specimen must be normalized by dividing it by the respective tristimulus value of the reference white. For the perfect white, the tristimulus values are the same as those of the illuminant. They are designated X_n, Y_n,Z_n. The equations then become:

$$L_H = 100\,(Y/Y_n)^{1/2}$$

$$a_H = 175\,(Y/Y_n)^{1/2}[(X/X_n) - (Y/Y_n)]$$

$$b_H = 70\,(Y/Y_n)^{-1/2}[(Y/Y_n) - (Z/Z_n)]$$

Note:–The normalization causes the numerical coefficients to be increased by a factor of 10.

One can question whether the values of the numerical coefficients, 175 for a and 70 for b, should be modified when computing coordinates in Hunter color space to further take into account the chromatic adaptation of the observer for illuminants other than C. Very little data are available on this subject.

A few years ago, Mr. Hunter was making instrumental measurements and visual observations on colored material under illuminant A. He found that the instrumental data required further adjustment of the coefficients to correlate well with the visual observations. He first tried using the ratio of the X tristimulus value for illuminant A divided by the X value for illuminant C to provide a factor by which to modify the 175 coefficient for a. A similar ratio of the tristimulus values for Z was used as the factor by which to modify the 70 coefficient for b. The direct use of these ratios, however, produced too much correction; so Mr. Hunter modified the factors by taking the square root of each ratio. This modification appeared to be satisfactory for illuminant A and the colors of the specimens with which he was working. Other specimens and other illumi-

nants may require a different modification of the equations.

What appears to be needed is a research project such as might be conducted by a graduate student making this research the subject of his master's or doctoral thesis. Until more information is available, the best procedure may be to simply use the simple normalization technique that takes into account the tristimulus values of the reference white. This procedure may not provide the best factors to take into account chromatic adaptation, but if everyone uses it, the result will be a standard computational procedure that will facilitate comparison of data from different sources.

Note: Readers are encouraged to send comments on this technote to the editor or to the author.

Gardner/Neotec Instrument Division
Pacific Scientific Company
2431 Linden Lane
Silver Spring, MD 20910

NEWS OF MEMBERS

Billmeyer Retires from Rensselaer

Professor Fred W. Billmeyer, Jr. has retired from Rensselaer Polytechnic Institute (RPI), Troy, New York, where he served with distinction as professor of analytical chemistry for the past twenty years while at the same time founding and directing the respected Rensselear Color Measurement Laboratory. But be of good cheer, Billmeyer is not retiring from the World of Color. He has planned to continue as a consultant from an office at 2121 Union Street, Schnectady, New York 12309. If you wish to contact him by telephone, the number is 518-377-2460.

Billmeyer's background and accomplishments in the fields of color and polymer chemistry are well known to many people, especially ISCC members, but they are recounted here for the benefit of those unfamiliar with them. After graduation from California Institute of Technology, he went to Cornell University where he received a PhD in Physical Chemistry in 1945. For nineteen years (1945-1964) he was associated with the Plastics Department of E. I. de Pont de Nemours and Co., Wilmington, Delaware, and then for twenty years with RPI.

A prolific writer and excellent editor, Billmeyer has authored mroe than 200 technical papers in the fields of polymer chemistry and color. He has helped to draft or revise numerous color and appearance standards published by ASTM and other member bodies of ISCC. Wiley-Interscience has published four of his books: "Textbook of Polymer Science," (1st edition 1962, 2nd edition 1971, 3rd edition, 1984), "Experiments in Polymer Science," with E. A. Collins & J. Bares (1973), "Entering Industry: A Guide for Young Professionals," with R. N. Kelly (1975), and "Principles of Color Technology," with M. Saltzman (1st edition 1966, 2nd edition 1981). He has received the Arman J. Bruning Award of the Federation of Societies for Coatings Technology (1977) and the Macbeth Award of the ISCC (1978).

Billmeyer has served as an officer of the ISCC in every capacity except Treasurer. He was Director (64-66), Vice-President (66-68), President (68-70), Secretary (70-82), and having retired as Secretary, he is again serving as Director (82-85).

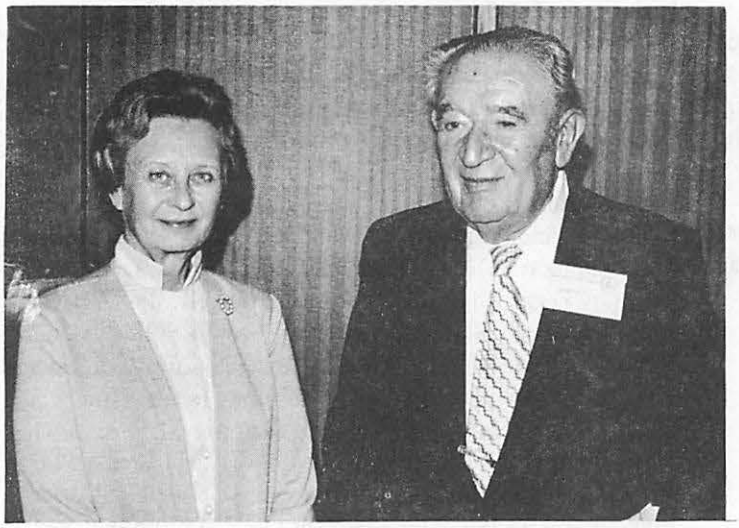
The above accomplishments and honors, important as they are, are not nearly as gratifying as the training of future leaders in the fields of chemistry and color. They will be life-long living tributes to his educational efforts. Billmeyer liked to teach and the students liked him as a teacher and advisor. When Billmeyer announced that he would retire this year at the end of the spring term, it was graduate student Joann Taylor and Secretary Peggy Ruggeri who planned a surprise dinner party at the Troy Club, Saturday, April 28, 1984 for Billmeyer and his wife Annette. His son David and daughter in law, Joan were also present. Sixty other people comprising faculty, students and friends gathered for the occasion to honor this guru who has been responsible for the education of more than twenty PhD and MSc color scientists, not only for their academic instruction but also for obtaining funds for research projects to help support them while in graduate school. Friends and former students unable to attend sent greetings by letter and individual gifts. Monetary gifts were pooled to purchase a desk designed to accommodate the retiree's personal computer and word processor.

Readers of "Color research and application" know that Billmeyer has served as Editor-in-Chief since Wiley began to publish it in 1976. He has agreed to continue to serve the World of Color in this capacity. We all wish him a continuation of a fruitful and rewarding career.

Harry K. Hammond III

Frank O'Donnell, RPI PhD 1984

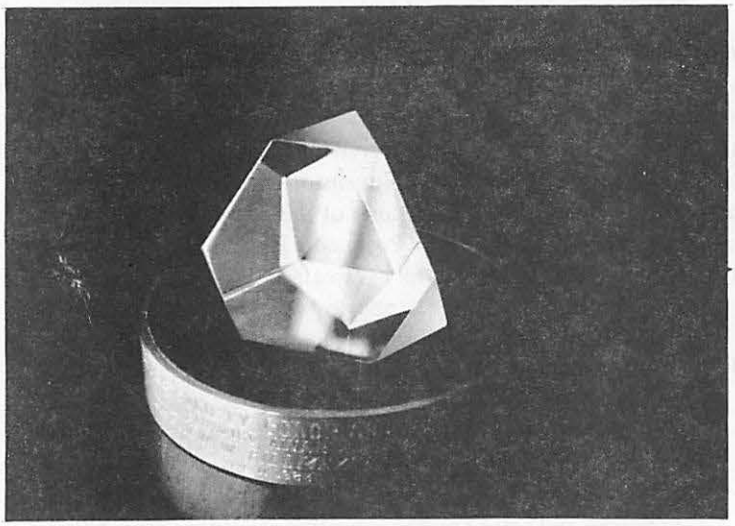
One of the interesting doctorates conferred at RPI this year, just prior to Professor Billmeyer's retirement, has been that of Francis Xavier Desmond O'Donnell. His thesis involved gloss rather than color per se, but some people contend that gloss is the fourth dimension of color anyway! Because of the involvement with gloss, Billmeyer looked to Hunter Associates Laboratory and to the Gardner/Neotec Instrument Division of Pacific Scientific Company for support, both technical and financial. For this reason, Jack Christie of Hunterlab and Harry Hammond of Pacific Scientific were asked to serve on O'Donnell's doctoral committee from the beginning. His thesis is titled "Psychometric Scaling of Gloss." Because of the scaling aspect, Tarow Indow, University of California, Irvine, renowned researcher in multidimensional scaling in color was also asked to serve as a member of the committee. Billmeyer served as Advisor and RIP Professors Ronald Bailey, Kenneth Miller, and Herbert Richtol completed the committee membership. We all met in Troy to approve O'Donnell's admission to candidacy a year ago and then again on July 18 when we listened to his thesis defense, discussed it with him, after which we excused the candidate in order to discuss the quality of his research among ourselves. However, there was no hesitation that he merited our recommendation for conferral of the degree of Doctor of Philosophy. This does not mean that he addressed and solved all the problems of gloss scaling, but he



Prof. and Mrs. I. A. Baluckin. University of Cincinnati .

Dorothy Nickerson and Joyce Davenport, President-Elect

Prof. Eugene Allen



ISCC Service Award

ISCC 1984 ANNUAL MEETING

MacBeth Award recipient, Mrs. Ruth Johnston-Feller

Dick – Fred – Marg.

President Lou Graham presenting Certificate of Honorary Membership to Max Saltzman

did make an excellent beginning.

What will Frank do now that he has received his PhD? Look for a job of course. I am happy to report that he telephoned on August 15 to say that after a brief vacation, he and his wife, Janie, who typed his thesis, will move to Dayton, Ohio, where he will be employed by Diconix, a company that makes ink jet printers. Until recently it had been part of the Mead Corporation, but it is now part of Kodak. It will be interesting to follow Frank's industrial application of his RPI training.

People who attended the Gloss Workshop held in conjunction with the ISCC Annual Meeting in Troy, Michigan, April 1984, will remember that O'Donnell presented some of his research results as well as a display of the gloss specimens made for the scaling experiments. Persons interested in gloss research may wish to procure a copy of his thesis from University Microfilms International, 300 N. Zeeb Road, Ann Arbor, MI 48116, telephone 800-521-3042.

On May 23, 1984, in Montreal, Canada, as part of the Symposium on Review and Evaluation of Appearance: Methods and Techniques, sponsored by ASTM Committee E-12 on Appearance of Materials, O'Donnell and Billmeyer presented a paper entitled "Psychometric Scaling of Gloss." This paper will be published by ASTM as part of the proceedings of the symposium.

Harry K. Hammond III

NEWS OF MEMBER BODIES

American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists is an organization which fills a valuable niche in the applications of dyes and chemicals to the wet processing of textiles. The AATCC is responsible for developing and disseminating information on most of the test methods used in both domestic and international markets to establish the acceptance for finished textile products. These test methods are developed through a rigid committee procedure designed to implement the consensus principle. At present over 1000 of AATCC's 6000 members participate in the fifty technical committees charged with developing scientific data which leads to establishment of test methods. When new committees are formed any AATCC member may apply for membership and up to 25% of the committee may consist of non-members. Committee decisions are made through letter ballot and any negative vote, even if only one is received, must be considered and resolved.

To avoid duplication of effort AATCC coordinates its activities with some 23 other technical and trade Associations such as the Technical Association of the Pulp and Paper Industry, the U.S. Army Natrick Laboratories, and the National Bureau of Standards. In addition AATCC is not only a member of the ISCC, but the CIE, the American National Standards Institute (ANSI), the American Society for Testing & Materials (ASTM), and the Society of Dyers and Colourists (SDC).

To further support the technical activities the Society maintains a $600,000 Technical Center in Research Triangle Park in North Carolina. This Center contains every piece of testing equipment associated with AATCC test methods and maintains a close liaison with the technical committees. It also serves as a demonstration center and is used for research conferences.

Although primarily oriented towards test methods the AATCC is by no means a one purpose organization with narrow scope. It provides a meeting ground for the interchange of technical knowledge in the textile industry and promotes technical achievement in chemical processes and materials of importance to the textile industry. Of its many publications, the one perhaps most familiar to many ISCC members is the Colour Index published jointly with the Society of Dyes and Colourists. This seven volume work is in its third edition and contains CI name and number, properties, chemical composition and description for all the dyes and pigments on which such information exists. This index, last updated in 1982, is an essential reference to all involved with using colorants. Another familiar publication of AATCC is the monthly technical and news journal: Textile Chemist and Colorist.

There are six classes of members in the AATCC: Senior; Junior; Associate; Student; Honorary; and Corporate. Only senior members have the right to vote and hold office. A senior member must be at least 26 years old with five years of experience in a related phase of the textile industry although certain educational equivalants can count toward a maximum of three of the five experience years requirement. At last count there were 6000 members representing the USA and 50 other countries. About 224 corporate members also support the activities of this Association which was formed by Professor Louis A. Olney in 1921 at the Lowell Textile School in Boston.

The AATCC delegation to the ISCC includes Lou Graham, Terri Commerford, Bob Hoban, and Ralph Besnoy with Roland Connelly as chairman. The members of the AATCC have continually made a significant contribution to the work of the ISCC.

Ed Cairns

Detroit Colour Council

The DCC Automotive Color Difference Committee met July 26 and September 11 and reported considerable progress toward the objective of establishing a standard test method for determination of color difference. Three primary automotive applications were identified.

- High gloss (body color surfaces)
- Low gloss pigmented (plastics, coated fabrics, interior painted)
- Dyed (fabrics, carpet, webbing)

Voting members of the committee are as follows: James Abell, General Motors; David Alman, DuPont (secretary); Ronald Budzinski, Ford; Donald Campbell, C. H. Masland; Leonard Dick, PPG; Brian Hake, G.M.; William Howell, Milliken; Charles Kenney, G.M.; David Koziara, G.M.; Rolf Kuehni, Mobay; William Longley, Ford (chairman); Robert Marcus, Uniroyal; Sid Paradee, Ford; Richard Pinamonti, 3M; Allan Rodrigues, DuPont; Brian West, PMS.

Ex-officio members: Richard Bialk, Chrysler; Richard

Harold, Hunter; Thomas Keane, Pacific Scientific; Charles Leete, CTS; Calvin McCamy, Macbeth; Thelma Sibley, AMC; Ralph Stanziola, ACS.

W. V. Longley

LETTER TO THE EDITOR

The following letter (addressed to Mr. Charles Fletcher) was received in answer to a request published in the January-February, 1984 issue of the News.

In reply to your question in the ISCC Newsletter the following:

The colorschemes you refer to are based on the systematization of paint-mixing, which is based on the assumption that all colors can be mixed from red-yellow-blue (and white and black).

The knowledge that colors can be mixed from these three 'primaries' is old and in forms part of the heritage of artists. Perhaps the best example of this is the theory of Philipp Otto Runge (+/- 1810) who formulated a colorsphere on the mixing of r-y-b-w-bl.

The five terms you refer to, are, as far as I know, most clearly defined by Arthur Pope, an American art historian (+/- 1900). His pupil; Denman Waldo Ross, is also of importance here. These color schemes try to formulate the principles of harmony. The assumption is that the geometric position of the color on the color circle will eventually deliver harmonic color compositions. This assumption has even more been attacked, e.g. Munsell, Ostwald, UCS-color solid and many more. These people state that harmonic laws are governed by psychophysical processes of the human brain and that the ordening of (harmonic) colors have to follow suit. It should be noted, however, that time and time again tests do not underline the theoretical assumptions. It seems that harmonic feeling is not explainable in clear defined terms. Both the artistic approach, based upon simple terms like the ones you quoted, and the scientific approach, formulated in several theories, seems to be incomplete. As with many issues the truth lies in the middle.

As far as I am informed the old system of educating color theory seems to be evaporated from the schools, at least here in Europe the interest is very low. Whenever color comes in discussion at art schools and the like, the Bauhaus color theories are generally followed, These are very much like the one you refer to, perhaps less schematic, with less stress on the primary mixing of paint. In the USA I think the Munsell color system has won much ground. This implies that on the whole a general 'accepted' color theory is missing, at least not in the scientific circles. There, people use the CIE-notation system and its many methods, derived from the explanation of color as a Physical phenomena. A general theory of artistic application has not (yet) been formulated by the scientists, and that is, perhaps, a happy thing.

It should be noted, that in the artistic circles, the opinion that colors can be mixed from red-yellow-blue is still widely held. This gives a lot of argument between those people and the more informed people. The argument is that red-yellow-blue should be replaced by magentared-citron yellow-cyanblue. These pigments are (for several reasons) more adequate, especially for printing techniques. For paintmixing they are also adequate, but, one should take care that these colors are mostly very sensitive to light and they will lose in a short time their colors. So, practical reasons limit the introduction of these modern primaries to artistic practices. Perhaps it will be solved one day.

Lastly, a comment on the terms you asked about. Personally I think they are very adequate. One should take care to inform people about their origin: paint mixing, and their relative use for harmonic uses: rules don't exist, there are other methods. My experience is that order at the palette will support orderly painting and secondly, there does exist a certain relation between arithmetic/geometric order and harmonic interpretation, but again it is all very relative. Furthermore, I think, in the end all colors do harmonize, it depends on the manner by which you use them (nothing new, many artists stated this).

It does surprise me that you were unable to trace information on the subject, especially in the USA there are so many activities in the field of color research. I finish by giving you some literature on the subject. Also, if you might come to Holland you are welcome to visit my home and see some of my research.

With kind greetings,

Mr. E. Melse
Postbox 439
2270 CK Voorburg Z-H
Holland

Birren, *Principles of color, a review of past traditions and modern theories of color harmony*, Van Nostrand Reinhold, New York, 1969, isbn 0442207743. *Munsell; a grammar of color*, same, isbn 0442255764.

Roy **Osborne**; *Lights and Pigments*, Murray, London, isbn 0719537479. *Color, Research and Application*, magazine Wiley, New York, see Vol. 7 no. 3 page 217; Vol. 8 no. 4 page 221; Vol. 4 page 19-24 no. 1?; Vol. 6 no. 2 page 85-92.

Arthur **Pope**; *The Painter's Terms Vol.1.2.*, Cambridge USA, 1929/39; *Color in Art, a tribute to Arthur Pope*, catalogue by James M Carpenter, Fogg Art Museum, Harvard un., 1974.

Denman Waldo **Ross**, *The Painter's Palette*, Boston-New York, 1919, (some of his assumptions are outdated, but he is very interesting, if you could find his other book(s) I would like to receive a fotocopy of them/it).

Further the list is endless, check your bookshop and/or library.

MEETINGS

AATCC Workshop
Color Measurement Principles and the Textile Industry

The American Association of Textile Chemists and Colorists is sponsoring a workshop entitled "Color Measurement Principles and the Textile Industry – 1984" to be held October 17-18, 1984, at the AATCC Technical Center, Research Triangle Park, N.C.

Continued on page 9

Pale Lilac Speaks

Every morning, I start out the day with *oatmeal*.

Not the cereal, the color: I set out for work in a cap that is described on the label as "7¼, Oatmeal." I used to think of *oatmeal* as lumpily *gray*; this cap is *ivory*, with touches of brown, like the scratchy little things that fleck my scruffy oatmeal soap. In my pocket is a torn-out ad from Lord & Taylor, seducing me with "a shirt of red, royal or white silk and pleated linen trousers in white, oatmeal or black."

Everybody knows that *oatmeal* linen trousers are somewhere between *ivory* and *brown*, but what color is *royal* silk? It must be *blue*, a shortening of *royal blue*, which is lighter and more brilliant than *navy blue*, taken from the British naval uniform, which is a darkly purplish blue, not quite as black as *midnight blue*.

Used to be, colors were named after things in nature, like foods and flowers. *Rose* was a color — pinkish red — until roses began blooming in a variety of colors. Then different shades of roses began getting names, like the *Windsor rose*, after a noted British family, and a marketer of fingernail polish in the 1930's called one of its shades *Windsor*, snipping off the *rose*. (That's what just happened to the *blue* in *royal blue*.)

Those were the simple days of color naming, with *lemon* yellow, *forest* or *emerald* green, *periwinkle* or *robin's-egg* blue, and *tomato* red.

How unimaginative. Today, when flowers are used as a referent, the color can be *amaranth*, a genus of plants that includes pigweed, tumbleweed, and the sadists' favorite, love-lies-bleeding; the color described is supposed to be a purplish red. Similarly, Saks Fifth Avenue is advertising an oversized safari jacket, "for summer moves and all-out pizzazz," in *colored-up sagebrush*. Sagebrush is a forage plant common in dry, alkaline areas of the western United States and has a cowboy connotation; the color probably comes from *sage*, of the mint family, usually dark green. (According to a study for Avon cosmetics, flowers sell better than food.)

When *earth tones* became the fashion rage, the plants and creatures of the forest and sea became the base of color naming. Diet-conscious decorators and copywriters, coming back to the office after a seafood salad, came up with *oyster*, similar to the old *pearl gray*; *salmon*, which is slightly pinker than lox, and *shrimp*, not yet listed in the dictionaries as a color but which strikes me as pinkish beige, tilting toward pink, very close to *sand-dune pink* and *warm coral*.

Bisque is an offshoot of *shrimp*; it is a creamy soup made from shrimp, lobster or rabbit and looks ivory with a hint of pink. Both *shrimp* and *bisque* are more *pink* than *beige*.

These "natural," or muted, colors — what you see when you look at the Grand Canyon — include *taupe*, a favorite of outdoorsy catalogues like those of L. L. Bean, a brownish gray, the color of moleskin. (It is also the color of the field rat, but rats and reptiles are rarely used in color naming.) Another earthy color is *ruddy*, defined in dictionaries as "healthy red" but in fashion a dull red; in British slang, it is the euphemism for *bloody*, and the current notion of this color is close to that of drying blood.

"Earth tones are now dead," declares Ken Charbonneau, chief color man for Benjamin Moore Paints, "and pastels have become very important. Right now, we are dealing in *Garden Pastels & Romantic Whites*, which are pretty, pale, soft colors. Our soft yellow is *jasmin*, a pale feminine blue is *first frost*, an off-white green is *sweetwater*, and our pale lilac is *white sapphire*."

White sapphire? Isn't that gem known for its blueness? "Naming is a form of seduction," explains the paint man. "*Ivory*, about the oldest color, was in 20th place in our sales several years ago. We changed the name to *Oriental silk* in 1973, and in two years it rose to sixth. That name sounds fragile, of course, so it would never do for an exterior paint; outside, you want *Tudor brown* or *Richmond bisque*. Durable-sounding. *Bisque* sounds better than *beige*, which is overused."

Beige, French for the natural color of wool, is rooted in *bambax*, Latin for "cotton." From the cotton base has risen the word *bombast*, meaning "padded oratory." Columnist Mary McGrory asked a health-food-store manager in San Antonio about the possibility of Texas Senator Lloyd Bentsen as a running mate for Walter Mondale: "Bentsen's beige," was the reply. "So is Mondale, and you don't need two of them."

Not everyone thinks that "earth tones" are dead (though most would agree that an all-beige ticket would not excite the electorate). The Coach Store, a leather emporium in several cities, advertises *mocha*, a chocolate brown named after an Arabian coffee; *tabac*, with an 1894 origin as "tobacco-colored," and *putty*, named after the mixture of chalk and linseed oil used to fill cracks, which is a more appealing name than, say, *concrete gray*.

The earth tone showing most signs of life is *khaki*, the Hindi word for "dust-colored," which means "dull, yellowish brown." (*Dirt* is rarely used in colors because it has been pre-empted by *dirt-cheap*.) Soldiers are often infuriated when fashion designers confuse *khaki* with *olive drab*, which is greenish brown and especially suitable for camouflage.

What comes after earth tones? Black and white, say some, with black known from *pitch* to *jet* to *ebony*. Pastels, say others, with a remembrance of earthiness: "What was *pastel peach* is now *snow peach*," says Janet Eackloff of the National Paint & Coatings Association, who thinks that gray is being mixed in many pastels. (She spells it American *gray*, not British *grey*.) In olden times, *pearl gray* was popular; a darker shade was *charcoal gray*; now, for men's underwear, there is a medium tone called *locker-room gray*, similar to what used to be derogated as *tattletale gray*.

Makeup people like the mythical Roy G. Biv (who changed *rouge* to *blush*) think that this turn toward pastels will include more white, which is why *snow* is modifying *peach*. However, department-store executives like Geraldine Stutz of Henri Bendel suggest we keep our eyes squinting for *neon colors*, also known as *acid colors*, a trend from England that features *taxi yellow*, for people who like to hail their colors.

Is there any rhyme or reason to the nomenclature of color? The National Bureau of Standards tried to collect the names being bandied about for colors a generation ago, in order to show where each stood on a spectrum. The last time "Color — Universal Language and Dictionary of Names" was reprinted was in 1976, and I think the bureau has given up hope of trying to help consumers make out the difference between *shocking pink*, *pizzicata pink* and *hot pink*.

The editor thanks Rolf Kuehni for drawing this article to her attention.

Many professional enamelists have found a way to standardize the description of colors by avoiding language. The Munsell Color Notation System assigns a letter and number indicating hue and position on a color wheel, a number denoting color value, or degree of lightness, and another number indicating chroma, or brightness. Thus, when I asked Sylvia Hamers, an artist who teaches enameling at the Smithsonian Institution, for the designation of a blue sky on a sunny day, she replied, "10B 8/6. Very pretty."

Should consumers demand a similar standardization of color nomenclature when shopping for stuff to slop on their eyelids? Ought we to write prescriptions for a designated amount of pink, and no more, in *shrimp*? Shall we stipulate that a *slate gray* is henceforth darker than, say, a *Dorian Gray*?

I think not. That would interfere with freedom of poetic speech. I asked a good-humored old friend, Dan Moriarty, now vice president of Revlon, which of the 269 shades of lipstick had the sexiest name. He replied: "*Afterglow* is a strong pink, almost an ecstasy." (Is dat you, Dan?) That word, originally meaning the light after sunset, is now defined by Merriam-Webster as "a reflection of past splendor, success, or emotion" but of late has gained an almost exclusively sexual connotation.

The language of color has departed from the constraints of description and entered the realm of poetry. Suggestiveness is all. That's this week's word from *Pale Lilac*. ■

Continued from page 7

The program is designed to provide maximum hands-on experience in performing the techniques that will be discussed. One-half of the program time will be devoted to laboratory participation in the areas of reflectance measurements, transmittance measurements, color difference and shade sorting. In addition, each participant will be given a copy of the recently published "Color Technology in the Textile Industry."

The speakers for this program are all recognized leaders in their field and will discuss the following subjects:

"Color and the CIE System," Gultekin Celikiz, Philadelphia College of Textiles and Science; "Instrumentation and Color Measurement Procedures," Leonard A. Weiner, Atlantic Chemical Corporation; "Reflectance Measurement," Roland L. Connelly, Burlington Industries;" Transmittance Measurement," Robert F. Hoban, Sandoz Colors & Chemicals; "Application of Statistics to Color Measurement," Charles D. Sweeny, CDS Laboratories, Inc.; "Strength Determination," Rolf G. Kuehni, Mobay Chemical Corporation; "Color Difference Determination," Lisa B. Hepfinger, U.S. Army Natick R&D Labs; "Whiteness and Whiteness Measurement," Rolf G. Kuehni, Mobay Chemical Corporation and "Instrumental Shade Sorting," Richard W. Harold, Hunter Associates Laboratory, Inc.

To register or for further information, please contact Joan Mitchell, AATCC Technical Center, P.O. Box 12215, Research Triangle Park, NC 27709, telephone 919/549-8141.

CIE

The Annual Meeting of the United States National Committee of the International Commission on Illumination (USNC/CIE) will be conducted by the newly elected officers. The meeting will be held at the Holiday Inn in Gaithersburg, Maryland from October 21 to 23, 1984. This meeting is being held to receive the reports of the various committees and technical divisions, especially in relationship to their work internationally. Reports will also be received from Constituent Societies and new members will be elected.

The newly elected officers who serve a four year term are: President, Charles L. Amick of the Day-Brite Lighting Division, Emerson Electric Company, St. Louis, Missouri. The Vice President is John E. Kaufman of the Illuminating Engineering Society of North America, New York, New York. The Secretary is Klaus D. Mielenz of the Radiometric Physics Division, National Bureau of Standards, Washington, D.C.; and the Treasurer is Hyman M. Kaplan of K/S Engineering, Burbank, California. Their term of office extends through the next CIE International meeting which will be held in Venice, Italy in 1987.

For information about the USNC/CIE, the annual meeting, its programs and publications, contact: Tom Lemons, Publicity Chairman, TLA-Lighting Consultants, Inc., 72 Loring Avenue, Salem, MA 01970. Telephone 617-745-6870.

Color of Foods

On August 15th the Second Symposium of Color on foods was held in Argentina with eight papers scheduled for presentation. We hope to present a description of the symposium in a later issue of the ISCC News, but for those who wish more details in the interim please contact Dr. Silvia Resnik, PROIPA, CONICET, Dpto. de Industrias Fac. de Cs. Exactas, U.B.A., Ciudad Universitaria, 1428 Buenos Aires, Argentina.

EDUCATION COUNCIL PRODUCES COLOR APTITUDE TEST

The Education Council of the Graphic Arts Industry, Inc., a Graphic Arts Technical Foundation (GATF) affiliate, has introduced the Color Aptitude Test for measuring color-matching ability.

The test is designed for printing plant personnel who are responsible for color-matching decisions, as a tool in the selection process for new employees, and in schools to evaluate the color-matching capabilities of students.

The test may be taken in the plant by press operators, the pressroom supervisor, the production manager, quality control personnel, or other employees to determine who is qualified to make color-matching decisions.

The Color Aptitude Test kit contains 48 chips mounted on an easel in four rows with twelve colored chips per row, a chip dispenser with 48 corresponding loose chips, 100 score sheets, a score key, instructions, and a carrying case.

In taking the test, a candidate removes chip no. 1 from the dispenser, finds an appropriate match on the easel, and records the chip number on the score sheet in the window of the easel below the matched mounted chip. This procedure is repeated through chip no. 48.

Upon completion, the test is scored and analyzed to determine the colors the individual is weak, fair, or strong.

For ordering information, contact Bonnie Bokor, Education Council administrative assistant, at GATF, 4615 Forbes Avenue, Pittsburgh, PA 15213; phone: 412/621-6941.

CALENDAR

AATCC
Color Measurement Principles and the Textile Industry Workshop, October 17-18, 1984, Research Triangle Park, NC

Color Symposium, March 20-21, 1985, Charlotte, NC

AIC
International Congress Colour 85, June 16-22, 1985, Monte Carlo

COLOR MARKETING GROUP
Fall Meeting, September 30-October 3, 1984, Dallas, TX

FEDERATION OF SOCIETIES FOR COATINGS TECHNOLOGY
Annual Meeting, October 24-26, 1984, Chicago, IL

ISCC 1985 ANNUAL MEETING
April 14-16, Sheraton Station Square Hotel, Pittsburgh, PA

ISCC 1985 WILLIAMSBURG CONFERENCE
"Color: Then and Now," February 11-13, 1985

SOCIETY FOR INFORMATION DISPLAY
Conference on Colour in Information Technology, March 26-29, 1985, University of Surrey, Guildford, Surrey

SOCIETY OF PHOTOGRAPHIC SCIENTISTS AND ENGINEERS
Second International Congress on Advances in Non-Impact Printing Technologies, November 4-8, 1984, Arlington, VA

PANTONE, INC. COLORS NEWSLETTER

A very generous donation of paper and color printing from Pantone, Inc. has restored the color spectrum to the front page of the NewsLetter. The ISCC Board of Directors wishes to express its thanks to Pantone, Inc. for this tangible expression of support and help.

1. Any person interested in color and desirous of participating in the activities of the Council for the furtherance of its aims and pusposes . . . . shall be eligible for individual membership (By-Laws, Article I, Section 2). Application forms for individual membership may be obtained from the Secretary (address given above).

2. 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 Cooper-Hewitt Museum, 9 East 90th Street, New York 10028.

Deadlines for submitting items to be included in the Newsletter are: February 15, April 15, June 15, August 15, October 15, and December 15; in other words, the fifteenth of the even-numbered months.

Send newsletter items to:
Ms. Mary Ellen Zuyus
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11495 Sunset Hills Road
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