ISCC

Inter-Society Color Council Newsletter

NUMBER 225
July-August 1973

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Number 225–July-August 1973

COVER DESIGN – DONALD M. GENARO AND VALERIE PETTIS OF HENRY DREYFUSS ASSOCIATES, NEW YORK CITY
COVER PRINTED BY PROGRESSIVE COLOR CORPORATION, ROCKVILLE, MARYLAND
COVER STOCK – OXFORD STARFLEX GLOSS ENAMEL
COURTESY OF OXFORD PAPER CO., DIVISION OF THE ETHYL CORP., RICHMOND, VA.
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FROM THE EDITOR:

Now that we have successfully made the transition to our splendid new format, I have another surprise for you.

Last May, while on a pleasure trip with my wife to the Far East, I made arrangements for a day off in Tokyo to visit the Japan Color Planning Center. My idea was to establish a regular communication link with them. This aim was accomplished. This issue will feature a series of abstracts in English of Japanese studies which should be of interest to many members of ISCC. I expect these abstracts to continue.

The British Colour Group has been a regular contributor, and this new addition should create a desirable "East-West" balance. (See issue Number 219, July-August 1972, p. 7, by Dorothy Nickerson, for our really first report on Japanese studies.)

PROFESSOR W. D. WRIGHT

The 30th of September marked the end of an era. On that day Professor Wright retired from the chair of Applied Optics at Imperial College. Prof. D. J. Bradley who takes over on the 1st October has been active in the fields of laser physics, quantum optics, and space optics.

David Wright will still sometimes be available at Imperial College, continuing with his Delhi Committee work. He is, of course, chairman of the British Colour Group, and none of us has seen the last of him by any means. Nevertheless we hope he will have a little free time now, and that he thoroughly enjoys himself with the reins just slightly slacker. Professor Wright was recently elected an Honorary Fellow of the British Society of Dyers and Colourists 'in recognition of his outstanding and extensive contributions in the field of colour measurement'.

ASTM COMMITTEE D-1 HONORARY MEMBERSHIP
W. J. KIERNAN

Bell Telephone Laboratories

Prior to his retirement in January, 1971, Mr. W. J. Kiernan, a long-time contributing member of ISCC, was a member of ASTM Committee D-1 for approximately 22 years. He was a member of Subcommittee 26 and served as its secretary for several years. He served as chairman of numerous task groups including those on Color Difference, Munsell Color, Munsell Gray Scale and Gloss. Many of the methods developed by Subcommittee 26 were edited by Mr. Kiernan. He was the D-1 representative to Committee E-1, Task Group C, and an ASTM representative on the U.S. National Committee of C.I.E. (International Commission on Illumination).

PUBLICATION POLICY

In the March-April, 1973, Issue No. 223, I ignorantly listed "shoe leather colors for Fall and Winter, 1973". These were apparently not agreed upon in the industry overall, but represented a choice by only a single company. Since it is not our commitment to advertise in this manner, treat the recommendations as having come from a single source, and not as representative of the industry as a whole. Based on a policy set by the ISCC Board, we do not plan to reproduce this kind of information in the future unless it comes as a report from a member organization or a Problems Subcommittee.

R.W.B., Editor

ANALYSIS OF RETURNED QUESTIONNAIRES OF ISCC PROBLEM SUBCOMMITTEE 34 "COLOR DIFFERENCE PROBLEMS"

In issue number 222 (Jan. - Febr. 1973) of the ISCC Newsletter a questionnaire dealing with aspects of industrial use of color difference formulas was circulated by Problem Subcommittee 34. A total of 73 questionnaires have been returned to the chairman (8 from overseas). The following is an analysis of the pertinent information contained in the returned questionnaires. The chairman of ISCC Problem Subcommittee 34 would like to express his appreciation to all who have taken the time to participate in this important inquiry.

Total number of questionnaires returned: 73 (8 from overseas)

The following data is always expressed in percent of the number those people which answered the respective question.

1. What type(s) of colored material is your company producing? Textile: 11%, Plastic: 9%, Paint/Varnish: 14%, Printing Ink/Graphic Arts: 9%, Dyes/Pigments: 18%, Others (15 different industries): 39%.
2. How would you assess the color tolerances required in the production of these products? Tight: 63%, Moderate: 29%, Loose: 8%.
3. Is visual assessment used for the determination of the acceptability of your products? Yes: 83%, No: 17%.
4. How many people are on the average looking at the samples to determine visual acceptability? Average: 3.3, Range: 1-15.
5. Do you have visual tolerance limits? Yes: 62%, No: 38.
6. Are color difference formulas used to determine the acceptability of production in terms of color? Yes: 59%, Sometimes: 13%, No: 28%.
7. Aside from production control, do you have any other current uses for color difference formulas? No other use: 27%, one other use: 35%, two other uses: 31%, more than two other uses: 7%. The most common other uses mentioned are computer color matching and fastness evaluation.
8. Which formula are you currently using? MacAdam/Simon-Goodwin: 17%, FMC II: 32%, CIE: 7%, Adams-

Nickerson: 12%, Hunter: 18%, Others (8 different mentioned): 24%.

9. What were your principal reasons for selecting this formula? Availability on instrument: 19%. Typical other responses: "Feeling this formula would prove to be best", "Simplicity", "Godlove most useful for large differences", "Practical", "Graphical display separates hue and lightness", "Good agreement with CODIC", "NBS is easiest for production control", "Good correlation with visual evaluation", "Confirms to our experience", "Ease of calculation from tristimulus values", "Fits computer best", "Xi-eta relates best to Simon-Goodwin and to Eye", "Gives best results", "Use separate Δa, Δb, ΔL", "CIE we recommend", "We use ASTM C609", "Until a reliable formula can be found, the use of a formula is a method of 'Blinding with Science' ", "Computer program available".

10. How do you compute the color differences routinely with this formula? Computer: 51%, Charts: 23%, Tables/Desk Calculator: 14%, Color Measuring Instrument: 12%.

11. Have you evaluated the agreement of the color difference formula you are using with the results of visual assessments? Yes: 89%, No: 11%.

12. Are you satisfied with the performance of the formula in terms of your requirements? Yes: 68%, No: 32%.

13. If no, what are the principal shortcomings? Typical replies: "Cannot convert for practical corrections in plant", "Need for expensive equipment", "Materials OK instrumentally are poor matches visually", "Results very satisfactory for near whites", "Eye doesn't always see what formula tells us", "Problems with bright reds and purples", "Shortcomings in dark and metallic colors", "Munsell spacing on which formula is based is not perfect", "Discrepancy between dyers terms and color terms", "Does not detect metamerism", "Correlation with visual assessment is too low", "Very poor correlation to visual experience in pigmented metallics", "Occasionally we have modified a tolerance limit in a particular direction based on experience", "It does not give accurate corrections for dark and light opaque material".

14. What is the relative importance of lightness difference and hue difference in your application of the formula? Lightness difference more critical: 8%, Hue difference more critical: 69%, Both equally important: 23%.

15. Would your company derive economical benefits from an improved color difference formula? Yes: 36%, Maybe: 40%, No: 29%.

16. Should an improved color difference formula mainly be accurate for small differences, large differences, or both? Small differences: 41%, Large differences: 2%, Both: 57%.

17. Should an improved formula be primarily useful for acceptability problems or be universally applicable? Acceptability problems: 43%, Perceptibility: 7%, Universally applicable: 50%.

18. To what specific aspect of color difference application should ISCC Problem Committee 34 address itself first? (only most frequent replies mentioned). Acceptability problem: 16%, Uniform color space: 9%, Try to standardize on one formula: 6%.

Rolf Kuenhi
Chairman
Problem Subcommittee 34

COLOR REPRODUCTION

"Photo by Ray Atkeson, reprinted from International Wildlife Magazine, Jan/Feb., 1973. Copyright, National Wildlife Federation – 1972"

The reproduction is provided to the ISCC through the courtesy of Progressive Color Corporation, Rockville, Maryland.

FROM OUR SECRETARY

Here is a list of reprints I have available for distribution. They are the following, priced at $1.00 each (prepaid) to cover handling costs, except for the 1972 Williamsburg Proceedings, which are $5.00:

Book review: *Sources of Color Science,* by David L. MacAdam. Reviewed by Deane B. Judd.

"Standard Practices for Visual Examination of Small Color Differences," report of Problems Subcommittee 21, Sam J. Huey, chairman. Reprinted from J. Color Appearance *1* (4), February-March, 1972.

"General Procedure for the Determination of Relative Dye Strength by Spectrophotometric Transmittance Measurement," report of Problems Subcommittee 25 (Dyes), Rolf Kuehni, co-chairman. Reprinted from Textile Chem. Colorist *4* (5), May, 1972.

"Color Measuring Instruments: A Guide To Their Selection," Ruth M. Johnston. Reprinted from J. Color Appearance *1* (2), September-October, 1971.

"A Catalog of Color Measuring Instruments and a Guide to their Selection," preliminary report of Problems Subcommittee 24, Ruth M. Johnston, chairman, April 11, 1970.

Proceedings of the 1972 Inter-Society Color Council Williamsburg Conference on *Fluorescence and the Colorimetry of Fluorescent Materials* (J. Color Appearance *1* (5) and *1* (6), 1972).

Dorothy Nickerson, "History of the Munsell Color System," Color Engineering *7* (5), (1969).

Colour Group (Great Britain), "Colour Bibliography," entries 1-300, 1969-1970.

F. W. Billmeyer, Jr.

COLOR AND MAN-MADE ENVIRONMENTS

Three grim specters are haunting us today: overpopulation, congestion and pollution. Unless they can be exorcised soon, they will increasingly threaten man's very existence on this planet.

Our environment was once natural, but it is becoming progressively artificial. Tomorrow it will be largely man-made. If we are someday to have entire cities enclosed under colossal domes that are artificially ventilated and lighted, as has been seriously suggested, they will present new problems of planning on a gigantic scale. Architects, engineers and city planners will be required to answer questions that they have never faced before. To find answers to these riddles, they will have to depend more and more upon

new scientific research in many fields and on empirical experience covering many disciplines. The planning profession will have to know more about controlled environment, radiation and the effects of color and light, both natural and artificial, on plants, animals and human beings.

Faber Birren, the author of three articles published in the *AIA Journal*, is in a position to answer many of the questions that will confront architects and engineers in the near future. Because of his vast experience with light and color, and his knowledge of related fields, he speaks with authority.

Color may become a major factor in a man-made environment. Its physical impact influences man's psychological reactions as well as his emotional life. Psychedelic lights, colors and sounds may induce the same sensory overstimulation as do drugs. On the other hand, absence of sensory stimulation resulting from isolation or confinement may bring about similar reactions and even hallucinations. These are vital considerations that must be taken into account in designing the man-made world.
Waldron Faulkner, FAIA

Reprinted from *AIA Journal*, August, 1972, p. 15.

BRITISH COLOUR GROUP

EDITOR'S NOTE

The unnumbered Report for the British Colour Group in Issue 223, March-April 1973, p. 6, should have been numbered 92.

REPORT OF THE 93RD MEETING IN MARCH, 1973

Colour Discrimination and Adaptation
Dr. M. R. Pointer, Kodak, Ltd.

A colorimeter was constructed to measure the size of just noticeable colour differences as a function of observer adaptation. It was of the Burnham type with 1.6° test and matching fields and a 15° adaptation field that had a luminance of 1000 fL. Nine different types of adaptation were used: dark adaptation, five types of Plankian adaptation with colour temperatures in the range 6500K to 2000K, and three coloured adaptations; red, green and blue. Very little difference was found between the sets of discrimination data obtained for the five white light adaptations, a slight increase in the size of the just noticeable colour difference with decreasing colour temperature being observed. To enable the data to be more correctly represented in the u, v chromaticity diagram, which is only defined as uniform for daylight adaptation, the colorimeter was modified to enable colour appearance shifts to be measured using a binocular matching technique. An appearance shift matrix was computed from the experimental results that could be applied to the sets of discrimination data obtained with adaptations other than daylight to give the relative appearance of the data in daylight adaptation. This enabled the data to be plotted in the u, v chromaticity diagram and the results considered in terms of absolute uniformity. The results for the white light adaptations showed that the data could be directly represented in this way since the discrimination data were invariant to the appearance transformation for any particular sampling point. This was also true for the results taken using dark adaptation but not true for the results observed using coloured adaptations.

Observations on Colour in Visual Information
B. Gilmartin, City University London

This talk described a series of experiments comparing human performance between chromatic and achromatic visual information, relating to its selection from the environment; processing of the information; short and long-term storage of the material, and subsequent retrieval of the information from the memory stores.

Simplified stylised visual presentations were used which were amenable to Information Theory methods, each of which dealt with different aspects of information transfer. Work was done on choice reaction time to coloured stimuli, magnitude estimation of the length of a coloured rectangle, and visual search time using coloured characters. Further work was done on long and short term memory of coloured and achromatic information and on arousal using a galvonic skin resistance method. Three colours were used in the experiments (red, blue and yellow – all of approximately equal luminance and saturation) together with black, also high and low contrast levels were obtained by using white and grey surrounds. In some experiments 36 males and 36 females were employed; all in a 20 - 25 year age range.

Finally a field experiment was devised to determine whether the utilisation of colour, functionally, in general typographical information would lead to greater retention of that information.

A differential hue effect was demonstrated in the transfer, storage and retrieval of coloured information. The colours rank in terms of information transfer as follows, red (highest), blue, yellow and black (lowest). Red seems to rank as the colour with the greatest attention catching quality. Regarding information storage and retrieval, blue material gave consistently higher retention scores for both males and females. The ranking of colours for female retention gave; blue (highest), yellow, red and grey/black, whilst for males; blue (highest) red, yellow, and grey/black.

Data on colour preference were consistent for both males and females, giving the following order of preference; blue, red, yellow and grey.

The field experiment was relevant to commercial aspects of visual communication. Significantly improved retention with coloured information is shown for both males and females for immediate, two hour and two week retention periods.

It is suggested that the introduction of colour into visual communication would improve an average overall efficiency by between 10 and 15%, with the greatest improvement with females.

Report of the 94th Meeting in April, 1973 Colorimetric, Spectral and Goniophotometric Properties and Uses of Ceramic Colour Standards – Dr. F.J.J. Clarke

Dr. Clarke traced the development of the ceramic colour standards from 1966 when ICI, having just introduced their "Instrumental Match Prediction" (IMP) system, realised the importance of checking their instruments for reproducibility and accuracy.

Approaches to BCRA and NRL resulted in the formation of a "working party" whose task was the selection and evaluation of ceramic tile standards. Initially 15 commercial wall tiles and 4 special grey tiles were examined for stability, uniformity, fluorescence, and thermochromism. Malkin's work at BCRA showed that the tiles were essentially uniform over the central region (the tiles were finally 4 in. x 4 in.) and stable to 1 j n d. Spectrophotometric evaluations were made at NPL and the fluorescence and thermochromic properties of the tiles were checked using reversed optics with a tungsten halogen source at 3250 K and a hydrogen lamp. Fluorescence was not found to be a problem but thermochromism was present in several tiles (yellow, pink and brown).

Eventually 12 tiles were selected, 9 coloured and 3 greys (60%, 26%, 5½% reflectance – reference, average of large number of freshly pressed magnesium oxide standards).

Dr. Clarke went on to describe the use of the ceramic tiles for diagnostic purposes in colour instrumentations. The linearity of an instrument could be checked using the grey tiles while the spectral responsivity could be checked using the colour standards coupled to an inverted matrix technique.

The principal S and P polarised goniophotometric data were shown for the 12 standards, from the basic data the angular variation of luminance factor can be found for any practical conditions met with in real instruments.

Dr. Clarke concluded his talk with the development of a technique for deriving correction factors for instruments based on goniophotometric considerations.

J. A. Keitch.

International Comparison of Instruments using the Ceramic Colour Standards – Preliminary Report from WP8 Colour Standards – F. Malkin

In a talk liberally illustrated by highly informative slides and therefore somewhat difficult to do full justice to in a report of this type, Mr. Malkin reported on the preliminary findings of a questionnaire circulated to purchasers of the ceramic tiles. Although some 500 sets had been sold only 50 replies containing data on 70 instruments had been received so that the conclusions reached were not quite so conclusive as he would have wished.

The analysis of replies received showed that the primary use of the ceramic colour standards was in connection with product control, being used for instrument checks on an average of once a month. (Extreme cases were daily and yearly). In the majority of cases the checks were on instruments within an organisation (there were 7 recorded cases of external comparisions). 12 replies were from users who were interested in determination of absolute accuracy; in a few cases they were used as hitching posts and, also in a few instances, for setting up TV cameras, for architectural purposes, etc.

Additional standards that had been requested by users were matt samples, a near white, and 1% black.

The remainder of Mr. Malkin's talk was devoted to results that had been obtained on specific groups of instruments. In all instances the data was handled in terms of colour differences (using NPL calibration data as a standard).

The use of the three grey tiles for linearity checks showed that spectrophotometers were no better than colorimeters in this respect, and that the spread of results reported were some 5 - 8 times the spread for the standards themselves.

Mr. Malkin was of the opinion that while the calibrated standards were essential for accurately checking the linearity of instruments, the uncalibrated sets provide an adequate check on the chromaticity values yielded by most instruments.

An analysis of the chromaticity determination showed a dependence on the colour of the tile, the results for the light green tile being much larger than expected, while for the yellow tile the spread of results was some 10 times the variation of the standards.

Mr. Malkin suggested that the spread associated with chromaticity determinations could in some cases be due to failure to include or exclude all the specular component.

In general, the results of the present survey are in agreement with those previously obtained at Imperial College and by the I.S.C.C. Colorimetry Committee.

J. A. Keitch

British Colour Group Bibliography

After our recent work on the Bibliography published also for ISCC in the *Journal of Color and Appearance,* we understand that the following periodicals will be covered.

If you see any errors or omissions please let me know. If you can offer to cover the omissions that would be even better.

D.I. Morley, The Metal Box Co. Ltd., Twyford Abbey Road, London, N.W.10. 7XQ.

Journal

American Ink Maker.
Applied Optics.
American Paper Industry.
American Chem Soc Div Org Coatings & Plastics
Ann Rev of Psychol.
Amer J Optom.
Appita.
Atip Null.
American Laboratory.
American Scientist.
Animal Behaviour.
American Jour of Psychology.

British Printer.
B.K.S.T.
B.A.S.F. Review.
British Ink Maker.
British Plastics.
Bulletin Elec Tech lab.
Brit J Ophthal.
British Med Bull.
British J Physiol Opt.
Bull Soc Sci Photogr Jap.
Berichte Der Deutschen Keramische Gesell.
Bull La Sociedad Espanola De Ceramica.
Brit J Ind Med.
Bull Amer Ceram Soc.
Bull Soc Francaise De Ceramique.
Bull Inst Vit Enam.
Behaviour.
Brain Research.
Color Engng.
Converter.
Canadian Pulp & Paper Industry.
Chemical & Engineering News.
Ceramics.
Ceramic Age.
Ceramic Ind.
Ceramic News.
Chem & Ind.
Canadian Journal of Psychology.
Child Development.
Design.
Das Papier.
Endeavor.
Engineer.
Engineering.
Experimental Brain Research.
Food Techn.
Flag Bulletin.
Gravure.
Glass & Ceramics.
Glas-emil-kevamo Technik.
Glass Industry.
Glastechnische Berichte.
Industrial Photogr.
Ind Commercial Photogr.
Image Technology & Eng.
Institute of Meat Bull.
Industrie Ceramique.
J. Paint Technol.
J. Soc Dyers Colsts.
J. Oil & Col Chemists Assn.
J. Opt Soc Amer.
J. Inst Telev Eng Japan.
J. Illum Eng. Inst Japan.
J. Physiol.
J. Gen. Physiol.
J. Exp Biology.
J. Appl Physics.
J. Sci Fd Agric.
J. Fd Sci.
J. Comp Neurol.
J. Col Appearance.
J. Anim Sci.
J. Genetic Psychol.
J. Exp Anal Behav.
Japanese Pulp & Paper.
J. Textile Inst.
J. Soc. Sci Photogr Jap.
J. Brit Kine Telev Soc.
J. Soc. Leather Trades Chems.
J. Amer Ceram Soc.
J. Brit Ceram Soc.
J. Can Ceram Soc.
J. Ceram Ass Japan.
J. Ceram Ass Japan.
J. Comparative & Physiological Psychology.
J. of Neurophysiology.
J. of Psychology.
J. of Applied Psychology.
J. of Gen Psychology.
Keramische Zeitschrift.
Lancet.
Lithoprinter.
Lichttechnik.
Light & Lighting.
Lighting Res & Technol.
La Ceramica.
Modern Plastic.
Medical Officer.
Mats Res & Standards.
New Scientist.
Norsk Skogindustri.
Neuropsychologia.
Optical Spectra.
Opt Pura y Apl.
Oyo Buturi.
Optical Technology.
Paint Technology.
Photographic Sci & Engng.
Pulp & Paper Mag (Canada).
Paper Trade J.
Phot Appl in Sci Tech & Med.
Perceptual & Motor Skills.
Pulp & Paper.
Pulp & Paper International.
Paperi Ja Puu.
Paper (Paper Maker & World Paper Trade Review).
Packaging.
Physics Today.
Perception & Psychophysics.
Phipips Res Reps.
Philips Tech Rev.
Proc Brit Ceram Soc.
Psychological Bull.
Psychological Review.
Psychopharmacologia.
Psychophysiology.
Physiology & Behaviour.
Psychonomic Science.
Research/development.
S.M.P.T.E.
Studies of Color.
Scientific American.

Science.
SPE Journal.
Svensk Papperstridring.
Southern Pulp & Paper Manufacturer.
Spectrovision.
Silikat J.
Silikaty.
Silicates Industriels.
Silikattechnik.
Sprechsaal.
Scan Jour of Psychology.
Tappi.
Trans Ophthal Socs of UK.
Textile Chem Solst.
Trans Brit Ceram Soc.
Trans Ind Ceram Soc.
Vision Research.
Verres Et Refractaires.

STOP PRESS

Acta Psychologica.
British Journal of Psychology.
Journal of Experimental Psychology.
Journal of Genetic Psychology.
Perceptual and Motor Skills.
Physiology and Behaviour.
Quarterly Journal of Experimental Psychology.

Meetings 1973-74

3 October – 3 pm – Report on AIC and CIE meetings Various Speakers.
7 November – 3 pm – Report on Edinburgh Colour Vision Symposium – A. Hill, H.C. Yorke.
5 December – 3 pm – The new Hunter Colorimeter: M.B. Lloyd. The new ICI Colorimeter: A.C. Perry. The Neotec Internal Quality Analyser: R.D. Elliott.
9 January – Institute of Opthalmology – 3 pm – Digital filtering in an on-line spectrophometer data system: F.J.J. Clarke. A practical instrumental pass/fail system for colour control in textile dyeing: S.M. Jaeckel, C.D. Ward.
6 February – City University – 3 pm – "Problems": W.D. Wright.
*6 March – Marks & Spencer – 3 pm – Metamerism and Fastness: I. Glasman, et. al.
3 April – City University – 2 pm – Industrial Quality Control: Dyeing and finishing: M. Spencer. Surface finishes of business machines: R. Marson. Pharmaceutical Industry, Plastics Industry, Foodstuffs Industry: Names to be announced.
8 May – 2:45 pm – Annual General Meeting. 3 pm – Ancient and Esoteric Colour Symbolism: K. Critchlow. Colour: Inspiration and Symbolism: T. Blackie.
June – Summer Visit. To be arranged.

*Joint Meeting with S.D.C.

Except where stated these meetings will be held at Imperial College, Physics Dept., Prince Consort Road, London, S.W.7.

Scottish Section

24 October – Edinburgh College of Art – 4 pm – Photobiology: W. Frain-Dell.
12 December – Paisley College of Technology – 4 pm – Measurement of Appearance (Glass, colour and other attributes): M.B. Lloyd.
20 March – Glasgow College of Building & Printing – 4 pm – Advertising and Graphic design: E.J. Cooke.
1 May – Glasgow College of Technology – 4 pm – Annual General Meeting. Members short papers and discussion

Northern Section

17 October – U.M.I.S.T. – 6:30 pm – To be announced
21 November – Bradford University, Lecture Theatre 511, Chemical Technology – 3 pm – Critical review of AIC York: Several Speakers.
20 February – Leeds University, Dept. of Chemistry and Dyeing – 6:30 pm – Research in Colour: B. Rigg, E. Coates.
20 March – U.M.I.S.T. – 6:30 pm – Annual General Meeting. Contrast and Adaptation: R. Brocklebank.

JAPAN COLOR PLANNING CENTER

The Color Planning Center (CPC), founded in December 1968, is the first institute in Japan designed to give complete information on color. The establishment of CPC resulted from the demand for such an institution from academicians, industrial groups, artists, architects, researchers, and consumers concerned with color. CPC's aim is to make information on color easily available to all those who are interested, not only in Japan but throughout the world.

CPC's monthly publication, "Color Communication", (the first issue was published in October 1969) is a general and comprehensive medium dedicated to research and information concerning color. This information is collected from various fields covering science, design, art, and industry. It is then screened by a network of pioneering researchers, writers, engineers, and designers. From our 44 previous issues, we present to the ISCC English abstracts of several articles to introduce the magazine to your members. Authors, titles, and abstracts of the articles are as follows:

No. 41-p. 10 Chijiiwa, Hideaki (Musashino Art College). The Recent Tendency of the Color Preferences of People (1)

The author did research on consumers' color preferences for the Chushokigyo Shinko Jigyodan (Minor Enterprises Promoting Organization) in summer 1972.

Research Subjects: Male (local public service workers, company employees and art students). Female (housewives and art students). Total 492 people, ages 16-55.

Materials: Munsell color charts; 45 colors (10 hues) and the colors gold and silver.

Objectives: 1. color preferences in general. 2. color preferences in choosing objects. 3. colors used most consistently.

Time: July and August, 1972

This research shows that the average Japanese tends to prefer clear and warm colors. The top-ranking seven colors are: 1 – 5YR7/14 (111), 2 – 5R4/12 (108), 3 – N9.5 (98), 4 – 5Y8/12 (91), 5 – 5GY7/10 (62), 6 – 5B8/4 (58), 7 – 5Y9/4 (58). As the author supposed that Japanese people prefer rather pale, cold colors, this result was quite unexpected. Previous research done by Tsukada (1962), Hashimoto and Aiba (1955, 1956) and Hakuhodo Research Center (1964) showed the color preferences tended to be light, pale and cool-feeling like white, blue, pale yellow, and pale green. The comparison of the research done in 1963 and 1972 is (in percent for male and female):

Colors	Research			
	1963		1972	
	Male	Female	Male	Female
Pale, Light	26.1	29.0	24.1	24.8
Medium	19.5	21.2	12.6	11.5
Pure, Vivid	25.4	19.4	42.3	37.2
Dark, Dull	15.6	14.8	10.9	11.4
Achromatic	13.6	15.6	10.1	14.8

It was stated that the average Japanese person today prefers orange, red, and yellow. However, people in their 50's do not necessarily fall into the same pattern. Their preferred colors, especially women are pale, clear colors. (There is not enough data about male preferences to make a supposition.)

From the facts above, when one has to decide colors for some consumer products, he can prepare at least two colors, a bright, pure color and a pale, clear color. We should also note the differences between male and female color preferences. Men tend to choose pure and rich colors, while women prefer pale and achromatic colors.

In recent studies of color preferences, an attempt is made to define the significance of qualities of color according to their psychological effect. These studies are based on the level of significance as analyzing factors. From the reports of national and international studies, the criteria of significance (preferred qualities) are listed below:

1. conspicuous, clear, and distinct
2. bright
3. pleasant, cheerful, healthy, happy
4. refined, pretty, good
5. natural, familiar, realistic
6. new, fresh

Depending on the differences in time, region, age and sex, slight differences in preferences can be observed. However, the colors which refer to those meanings are generally preferred colors. In other words 1. and 2. correspond to human perceptual ability, 3. and 4. to emotional factors, and 5. and 6. to empirical factors. As a result of this research, the preferred colors in the upper ranks are more or less in the above three classifications. Actual color planning starts from which kind of color one chooses in the above three classifications.

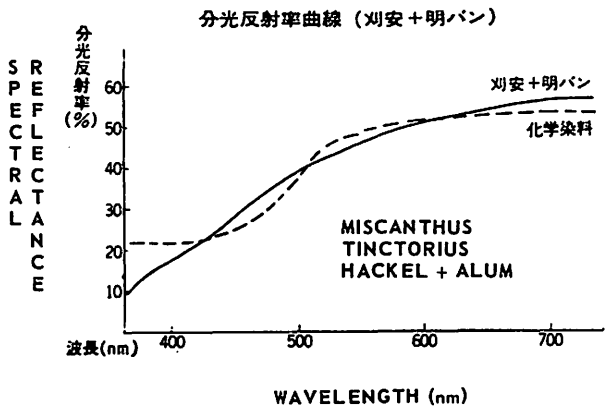
Part I is about general color preferences, so that some might argue that this data is not for actual use for color planning. However, I think those colors show people's experiences and their recognition of color. They seem to represent the colors they are using in their everyday lives. This was a series of two articles. The second part, published in issue No. 42, deals with the color preferences of 30 individual consumer products of clothes, kitchen goods, household goods, leisure goods and accessories.

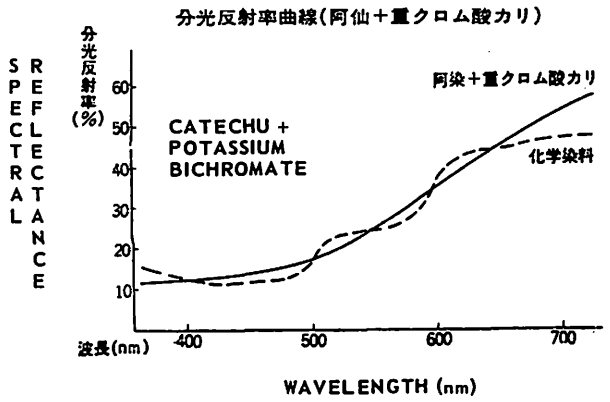
No. 40-p. 1 Panel Discussion: Kusaki-zome (Botanical Dyeing) and the Color of Today

Mr. Sachie Minato, who is engaged in optical research on the color of "kusaki-zome", discussed with Prof. Yamanobe, the authority of dyed materials, and Mr. Takeuchi, the dyer, the characteristics of this traditional way of dyeing. In modern Japan, synthetic dyes are mainly used, and the actual botanical dye remains to please the interest of a small number of people.

The disadvantages of botanical dyes compared to synthetic dyes are first, the difficulty of mass production, and second, they are not as colorfast as synthetic dyes. The advantages are that the color of the botanical dyeing material does not exhibit too much metamerism; it appears to be seen almost the same under any light source, where most colors by the synthetic dyeing process change color appearance according to the different kinds of light.

Comparison of Two Synthetic Dyes





In addition, with botanical dyes, it is not possible to produce bright, distinct, pure colors. It produces, rather colors of lower contrast, so-called "shibui-iro". Because of this characteristic, it usually makes good color combinations.

Since the complete preservation of exisitng Kusakizome is impossible, it is necessary to do research on its spectral reflectance for recording purposes and for reproduction. The importance in the study of botanical dyes does not lie in the preservation or the pure reproduction of it, but rather, in how to develop its magnificent quality to meet today's demand.

No. 36-p.1 Unagami, Masaomi (Executive Director, Color Planning Center), Color As Education

The study of color has been neglected as compared to the study of form, and it was considered as a secondary or incidental factor. However, color is one of the most important factors in human perception. We believe an increase in the knowledge of color will be useful for the positive development of man's culture. In order to promote the understanding of color, CPC has produced and edited a series of 160 color slides, "Color Study Series—A Guide to the World of Color", at the request of Bijutsu Shuppansha in 1972. It consists of chapters on Light and Color, Eyes and Perception, Color Designation, Reproduction of Color and Color Control, Appearance of Color, and Color in Human Environment. Designed to show visually the various aspects of color science, the slides are accompanied by brief explanatory texts. It was produced to serve as educational material for junior and senior high school students. However, it was completed as a series covering the higher levels of color science. It can also serve as a general information source.

No. 35-p.1 Panel Discussion: City Appearances and Color

In the traditional cities of Japan, such as Nara, Kyoto, and Kanazawa, the preservation of scenery is now the subject of heated discussion. Mr. Ueda (University of Kyoto, Dept. of Architecture), Mr. Tanaka (Graphic Designer), Mr. Miwa (Environmental Designer) and Mr. Nakamura (Ceramist from Kanazawa) discussed the preservation of traditional city appearance and its color, as well as the appearance and the color of the modern city. This discussion arose from one incident in which a Ryokan (Japanese style inn) was built in the center part of the traditional city of Kanazawa. Its exterior part was painted in bright grass green with vermilion on the window frames, the drain pipes, and the sign of the inn. (The article by the architect of this building was published in issue No. 34-p. 6). The building caused strong disagreement within the community, since the people felt this striking color broke the harmony of the appearance of that area. This did not, however, violate any building regulation.

From this discussion the panelists came to the conclusion that to keep the color harmony of the environment does not imply the creation of regulations by the city government to preserve the city appearance as it is, but rather, to raise the consciousness of the people living in each community to create a better environment. Also, it should not involve only the owner of the building and its architects. The color planning could be done easier and more systematically in the case of new towns, as many are beginning to be built around the existing big cities. To create a harmonious color environment, and at the same time, an individual appearance for the block, one way is to use one tone of a highly saturated color. A recent good example is the hotel which was built in the center of Tokyo (The color planning was done by Mr. I. Tanaka, see the article in No. 2-p. 10). Other examples are in the cities of San Francisco, Paris, Siena, and a city in the Philippines.

No. 19-No. 26 Mukai, Shutaro and Kawazoe, Yasuhiro (Musashino Art College), An Approach to Visual Methodology—A Start From Phenomena;

This is published as a series of eight article. These are constructed from a case study done by the authors at Musasino Art College. This study was aimed to give students wide opportunities to experience the nature of color and form which exist in the objective world, and to discover the relationship of the objective, outside world and the subjective world of perception, using the results of previous studies as a base reference. We believe the recognition of the objective and subjective world will help students to find their own creative process.

No. 19-p. 6 Approach to Visual Methodology 1 Seeing Colors with Ones Eyes Closed – Afterimage of the Sun

Everyone has experienced an afterimage in our everyday life. After our eyes are exposed to a strong light stimulus, we can see the flood of vivid color images in our eyes when we close our eyes or turn our eyes into complete darkness. Since the afterimage leaves us with a somewhat confused impression, Berry described the afterimage as a "Flight of Colors" when he observed it in 1922.

However, when it is observed more closely, the sequence of colors occurs in a certain order. John Lott Brown reports that the order of color changes is as follows, first the white afterimage of the stimulus source, then the color changes into blue, green, then red, and disappears with blue or green. This description coincides with the results of the four-year observations we made with students. In addition, when we use the sun as a stimulus source, we can observe vivid yellow. C.A. Young named the afterimage the "Recurrent Image" since the complementary colors appeared alternately. Furthermore, the complementary color appears around the afterimage as a light halo. This halo has slight

color variations as it spreads towards the outside. As the light halo starts to flow into the center of the afterimage, the complementary colors switch their positions. Our objectives of these observations and study were first, how we perceive color by observing the phenomena happening inside our system. They are actually happening inside of us whether we realize it or not. Second, by memorizing these subjective colors which are described as a "flight of colors", we can reproduce them on a two dimensional surface. Furthermore, we can convert these color reproductions into graphic images. (Color plates of the reproductions and the graphic patterns are accompanied by the article.)

No. 26-p. 1 Minato, Sachie (Chiba University, Dept. of Industrial Design), CPC Test on Color Sense

Color is made known to us through our faculties of color sensation, color perception and aesthetic evaluation. The CPC Test on Color Sense explores and assesses these three faculties by applying eight specific tests: The Farnsworth Dichotomous Test, The Metamerism Test by D & H Color Rule, and The Color Discrimination Test for Color sensation; The Color Memory Test and The Color Identification Test for color perception; and three tests on Color Schemes – one on choice and two on formation of house exteriors and manufactured goods respectively, for aesthetic evaluation.

(This paper was presented by the author, at the 2nd Congress of the International Color Association held in York, England, 1973.)

Please address all correspondence concerning "Color Communication" to: Color Planning Center, 1-7-6 Bakurocho, Nihonbashi, Chuoku, Tokyo, Japan.

EDITOR'S NOTE:

These abstracts were contributed through the courtesy of Masaomi Unagami, Executive Director of the Japan Color Planning Center.

BLUE-BLINDNESS: BEHIND SCHOOL-DAY BLUES?

One reason some children have difficulty in school may be that they can't see the color blue. Dr. Humphrey Sassoon and Margie Tolder of the Texas Research Institute of Mental Sciences were studying a group of children at a Houston parochial school when they discovered by accident that half of the three-year-olds perceived the color blue less acutely than other colors. The deficiency was found less and less often in the older age groups, falling to 11 percent among the ten-year-olds. A child who has the problem sees a sentence written in blue so faintly that he has to read it letter by letter and loses the sense of it before he has finished.

Since the color is used in many materials – blue ink, blue-lined writing paper and purplish ink on tests – blue-blindness can be a major handicap. Dr. Sassoon, now with the Federation of American Societies for Experimental Biology in Bethesda, Md., is baffled as to the cause and possible cure of the condition and hopes to study the matter further. Meanwhile, he notes, most children seem simply to grow out of it.

From *Woman's Day*, March, 1973

NOTE: The Editor questions the use of the term "Blue-Blindness" and would welcome reactions to this brief article.
R.W.B.

HUMAN FACTORS LETTER TO THE EDITOR

Because of the related, and, in some cases, overlapping interests of our respective professional organizations, it is likely that many of our members would be interested in holding joint membership in both. Pursuant to the interests of the members of your organization who would like to become members of the Human Factors Society, we would appreciate having this invitation published in the next issue of your Newsletter.

I would greatly appreciate receiving any response to this proposal and in working closely in the future on other projects which serve the interests of our respective membership.

A. Carl von Sternberg
Chairman, Membership Growth Committee
Essex Corporation
303 Cameron Street
Alexandria, Virginia 22314

PICASSO

"I have always maintained that every artist is a propagandist," wrote George Orwell, ". . . he is trying directly or indirectly to impose a vision of life. . . ."

The vision imposed on the world of art by painter Pablo Picasso, dead recently at age 91, was one of distortion that elevated the irrational and obscene to lofty heights. No man in modern time did more to undermine aesthetic beauty and flowing form than Picasso. If he was great, it was a greatness for propagandizing the cult of the ugly, the deformed and the destructive.

Pablo Picasso was a special breed among artistic hypocrites. He embraced Communism but lived like a capitalist and bargained like a hard-headed businessman. "Art is a salable commodity," he once observed. He went on to make this admission: "When I am alone, I do not have the effrontery to consider myself an artist, not in the grand old sense of the word. . . . I'm only a clown, a mountebank. I have understood my time and I have exploited the imbecility, the vanity and the greed of my contemporaries."

One must laugh with Picasso at the way he managed to con the entire world into accepting and paying handsome sums for doodlings, scribblings and grotesque renderings on canvas elevated to the status of art. The vast outpouring of praise for Picasso at his death tells us how completely the old Spaniard had conned the so-called cultured, edu-

cated and artistic of his time. Picasso was the P.T. Barnum of the art world.

The tragedy of Picasso was that he had great gifts as a young artist. His earlier works when he was in his 20s make this much clearer. However, wealth and fame, not artistic excellence and craftsmanship, was his motivating force. One must admire him for the audacious hoax and fraud he fostered for almost four decades. One must loath him, on the other hand, for what Picasso helped do to art. He and others destroyed painting and nobility, substituting instead deformity and depersonalization. When one wonders why the world around us seems so decadent and destructive, one principal source of this moral and aesthetic decay is the mental illness called modern art.

Those bowing down to Picasso and praising him as great at his death are bowing down to intellectual barbarism and are paying homage to institutionalized insanity.

From Jeffrey St. John, CBS Radio Network, and reprinted from Spectrum, April 1973.

COLOR OF SAFETY

Have you thought about what color car provides the greatest highway safety?

According to a Swedish color expert, who surveyed more than 30,000 auto collisions, black was the most dangerous color while pink was the safest.

Next to black, the most dangerous colors were all shades of brown and gray. It is thought that dark and dull hues were more susceptible because they are the hardest to pick out against a background of trees or buildings, and the most difficult to perceive at dusk. Light or bright color cars almost always stand out against the background.

Reprinted from the August issue of Safety Newsletter, published by the National Safety Council.

NEWS FROM ROCHESTER INSTITUTE OF TECHNOLOGY

The 1973 edition of The Quality Control Bibliography on the applications and uses of quality control in the graphic arts industry is now available from the Graphic Arts Research Center (GARC) at Rochester Institute of Technology.

The report contains 326 quality control article abstracts, author names, the publications, dates, and volume and page numbers, that have been selected from publications received at GARC's Information Services section.

Included in the various categories are article abstracts for planning quality control, implementing quality control programs, test methods of specific products, equipment used for quality control, and statistical quality control.

Specific subject categories and content of the Report are: Quality Control Planning – plans, programs and suggestions for approaching quality control in the various production areas of a printing plant; Applications and Methods – case histories showing establishment of quality control programs, and practices and techniques in the following categories: General – production and management aspects, Preparatory Operations – copy preparation, photography, and platemaking, Pressroom Operations – presswork control for major printing process, and Bindery and Finishing Operations – quality control procedures for the end product.

Also, Printing Materials: quality control and test methods for the materials used in producing the printed product, under the categories of paper and substrates, ink, and chemicals; Instruments, Devices and Standards – use and application of various instruments, control devices and standards available to the printer; and Statistical Quality Control – statistical methods and procedures applied to graphic arts.

Included in the report is a Quality Control Tool for the Graphic Arts Metric size chart, that lists representative printing control devices, charts and test objects. The chart lists products, the type of control for use in graphic arts photography, platemaking, pressroom, and evaluation of paper-ink-press systems, as well as product evaluation and instrumentation requirements, format, costs, and product distributors.

Photocopies of the original articles described in the bibliography can be ordered from the GARC Information Services. The charge for handling and first-class postage is $1.00 per article plus $.25 per photocopy page.

Further information on the report, which sells for $10 prepaid may be obtained by writing: Information Services, Graphic Arts Research Center, Rochester Institute of Technology, One Lomb Memorial Drive, Rochester, New York 14623, or by calling (716) 464-2736.

U. S. NATIONAL COMMITTEE OF INTERNATIONAL COMMISSION ON ILLUMINATION

Announcement has been made of the availability of the Proceedings of the 17th Session of the International Commission on Illumination (CIE). The 17th Session was held in Barcelona, Spain in September 1971 and featured 49 papers on lighting prepared by experts from all parts of the world.

Some of the subjects covered at the conference included visual performance, color rendition of light sources, aesthetics in lighting, interior and exterior lighting practice.

The Proceedings have been published in two parts:

CIE Publication 21A includes the Minutes of the opening and closing plenary meetings, reports and discussions at the technical meetings, summaries of the preprinted papers and integral versions of the non-preprinted papers.

CIE Publication 21B is a three volume set containing all 49 preprinted papers. Individual papers are easily removable from a stiff binder.

Copies of either CIE Publication 21A or 21B can be obtained from Mr. Benn J. Hartman, U. S. National Committee, CIE Publications Committee c/o FLASCO, 1635 Flower Street, Glendale, California 91201. The price of CIE 21A is $30; 21B $20 postage paid. Payment should accompany the order.

HIGH CHROMA–DURABLE COLORS

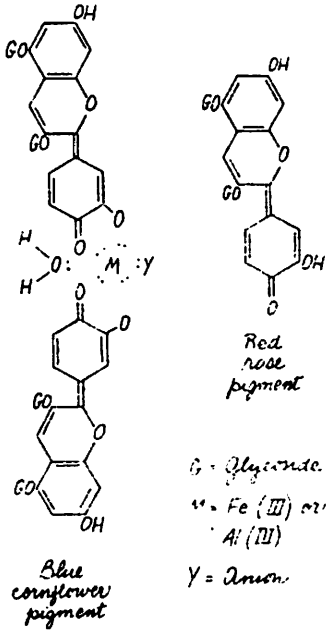
To produce durable high chroma colors that yield a soft, velvety look while being bright, catchy, and stimulating requires the use of high transparency and costly pigments. A pigmentation system was developed, blending inorganic and organic pigments with aluminum, which produces these "aesthetic" colors while yielding previously unattainable 24-month exposure durability, plus overcoming formulation difficulties and cost restrictions. While this metallic/nonmetallic system, referred to as a ceramic, is not a cure-all for every type of color in demand by the automotive industry, it does provide a desired, salable product as evidenced by the increased number of colors currently in production.

Sol Panush
Celanese Coatings Company
Reprinted from the J. Paint Tech., June, 1973, Vol. 45, No. 581, p. 39.

COLOR COORDINATION IN FLOWERS

Roses are red
Conflowers blue.
An atom of metal
Dictates the hue

Most of the red and blue pigments in flowers belong to a class of chemicals called anthocyanins which are derivatives of benzopyrylium chloride linked to cyclic sugars called glycosides. Although the color is related to chemical structural features, such as number and placement of hydroxyl groups, the presence of a metal atom has a still more dramatic effect. For example, the red pigment in roses and the blue pigment in cornflowers are nearly the same except that the cornflower pigment is complexed with an atom of iron or aluminum (see formulas). Flowers that do not contain a metal atom cannot have blue varieties.
Reprinted from Chemistry, September, 1973, p. 7.



FEDERATION OF SOCIETIES FOR PAINT TECHNOLOGY

Federation Publishes Updated Version of "Basic Coatings Technology Program"

The "FSPT Basic Coatings Technology Program," an updated and expanded successor to "Organic Coatings I," has been developed by the Educational Committee of the Federation of Societies for Paint Technology.

The Program is a complete and thorough course in Coatings Technology and consists of 140 pages of material arranged in logical sequence of presentation (see "Contents" listing).

Copies are now available from the Office of the Federation of Societies for Paint Technology (121 South Broad St., Philadelphia, Pa. 19107) at a price of $8.00 to members and $11.00 to nonmenbers.

FSPT Offering Literature Survey on Mildew Defacement of Organic Coatings

A special literature survey on the subject, "Mildew Defacement of Organic Coatings (MIDOC)," is now available from the Federation of Societies for Paint Technology.

The work was done by the Federation's Paint Research Institute, which sponsored a "MIDOC Encounter Session" between a group of microbiologists and a group of paint scientists in April 1971. The purpose of the meeting was to initiate a research program designed to uncover the fundamentals of the mildew defacement of organic coatings.

As a result of the encounter session, a contract was granted by PRI to Battelle Memorial Institute to conduct a literature survey on the subject.

Part I of the survey covers the biology of *Aureobasidium pullulans* and contains information to which few paint scientists have had access. It states that the main objective of the work is to examine all available published information on *A. pullulans* in order to develop means to control its growth. Part II, covering the Microbiological Deterioration of Coatings, summarizes the types of deterioration, bacterial and fungal; the microorganisms involved, as well as the paint materials; and control measures.

The survey cites from 709 references and organizes published information into lucid statements of the current understanding of this important area.

A description and summary of the survey was published in the June 1973 issue of Journal of Paint Technology.

Copies of the survey (132 pages, 8½ x 11 in.) may be ordered from the Federation Headquarters Office at 121

South Broad Street, Philadelphia, Pa. 19107. Price is $25.00 per copy to FSPT members; $35.00 to nonmenbers.

A pessimist is the fellow who blows out the light so he can see how dark it is.

GRAPHIC ARTS TECHNICAL FOUNDATION

GATF, in 1972, witnessed a converging of a series of social, political and technological trends which are creating new and serious problems both for graphic communications industries and for GATF.

These are problems for graphic communications because they affect our business, restrain our freedom to act, and impose new burdens and responsibilities upon us. They are problems for GATF because it is the Foundation's responsibility to identify these forces, to delineate their impact upon our industry, and to establish programs to help our members to respond to these challenges.

What are these trends? What are their implications to our industry? And, what has GATF done to meet such challenges?

First of all, look at the labels under which they come to us! Federal Food and Drug Act! Occupational Safety and Health Act! National Air Quality Act! Equal Employment Opportunities Act! Federal Hazardous Substances Act! Resources Recovery Act!

These are acts of the Federal Government, which are supplemented by many state and local statutes and ordinances. All of these and others are reflecting, rightfully or wrongfully, social and cultural demands that come directly from a society of over 200 million people; they are regarded by many as the inherent rights of people to work and live in an environment that is safe, healthful, and equitable.

Nor is this situation a simple one! Consider that the only proven air pollution technology, excepting solvent recovery in gravure, is based on incineration with natural gas or fuel oil. If we go down this road, we head immediately into the problems of energy. Will we be able to get greatly increased quantities of natural gas or fuel? This can lead us into international economics. With much of our energy resources coming from abroad, how much will be available to us in terms of the balance of trade deficits and other possible dollar problems?

All of these are considerations which must be taken into account when we, as industry leaders, try to fulfill our obligations.

Accordingly, how do we meet these problems and find solutions which are effective and do so at a cost to us which allows us to remain competitive in the market place.

Pollution, as you know, is one of our problems, occupying the headlines over the past several years. Whether it be air, water, noise or solid waste, pollution is a problem for each of us.

We have seen the passage by the Federal Government of the National Air Quality Act of 1967 and the Clean Air Amendments of 1970, which have imposed a deadline for compliance of July, 1975, for the country as a whole; however, implementation plans by states and metropolitan areas, in some cases, are calling for earlier deadlines . . . Chicago and New York by December, 1974; Philadelphia by January, 1974, and Los Angeles, right now.

Our industry, as with others, is faced with these deadlines. We must come into compliance with the law, finding solutions to our difficulties along the way.

GATF has been directly concerned with pollution projects since 1967, when it established an Air Pollution Information Center. For several years, the Foundation worked on the problem quietly, feeling too little knowledge was available at the time and that it would be inappropriate to expose our industry to what was then largely a political and emotional issue.

Working under two Federal grants, as well as with industry funds, GATF has since gained considerable information and knowledge concerning pollution.

In 1972, the Foundation moved into a high-key position, with better than 65 percent of its research manpower devoted to the problems of ecology and occupational safety and health.

GATF, working with a Web Heat-Set Committee, has developed considerable information on sampling and analysis of stack effluent for graphic arts processes. This information has been distributed to its members, giving them a basic understanding so that they may attack the problem with technical awareness and, in addition, informing its members how they may do their own emission sampling. Further, the Foundation established in 1972 a sampling and emission service for its members.

GATF – An International Organization

The Graphic Arts Technical Foundation is the only organization in the world presenting research, technical, and educational programs in graphic communications to an international membership.

The Foundation is comprised of about 1,100 member companies in some 40 countries throughout the world – in the United States and Canada, in Western Europe, in the Near East, in Australia and Southeast Asia, in Africa, and in Central and South America.

GATF's activities are global in scope. Its staff representatives, in providing technical consulting, seminars, conferences, and other Foundation services, have been invited, in just the last two years, to such countries as England, Sweden, France, Holland, Denmark, Germany, Italy, Switzerland, Spain, Australia, Mexico, and Canada. GATF has run a number of workshops over the past decade in England. It has done technical plant audits in Mexico and technical consulting in France. Staff members have delivered papers and addresses in Sweden, England, and Austria. In addition, over 200 representatives of companies in countries other than the U.S. and Canada visit the GATF Technical Center in Pittsburgh, Pa., each year. Representation on its Research and Education Committees is truly international. Indeed, in the last two years, the Foundation's Board of Directors held its first meetings beyond the borders of the U.S. – Vancouver, British Columbia, Canada, and in Bermuda.

The GATF Sponsored Man Program – a six-month or longer period of training and education at the GATF Technical Center – has attracted representatives from a variety of countries. Most recently, Baraka Press of Nigeria had two of its employees enrolled in the program. In the past, participants in the program have included representatives of member companies in Sweden, India, Spain, Australia, England, and France.

In 1974, the Foundation will celebrate its 50th Anniversary. An International Conference on Graphic Communications Technology will be held during November, 1974, in celebration of this event. It is GATF's firm resolve to make this Conference truly international in scope and in participation. We invite all of our members throughout the world to be with us on this occasion.

We do so, for in the final analysis, GATF has become an international meeting ground for all in graphic communications. Through the Graphic Arts Technical Foundation, there is a distillation of technical information and knowledge that is beneficial to graphic communications throughout the world.

Foss Color Order System Available to GATF Members

A revolutionary new color chart is now being made available to members of the Graphic Arts Technical Foundation.

Based on a color order system developed by the internationally-known color expert, Carl E. Foss, it represents the most significant advance in color chart design in many years. A GATF Research Progress Report, written by Mr. Foss and Gary Field, of the GATF Research Department, has already been issued to GATF members. It describes the new color chart, which is the product of research by Mr. Foss of the Munsell Color Division, Kollmorgen Corporation, and the GATF Research Department.

The new color chart is helpful both as a communications tool and a production tool. A color chart is like a fingerprint of a press. When it is prepared, using a company's own paper/ink/press combinations, it can show customers exactly the colors they can use. It is a useful device for the camera or scanner operator and for the dot etcher, to help them provide the customer with the color he wants. It can also become a production standard for the pressman.

The primary value of this color chart is that it's easy to use. The colors are all in a recognizable order, and one doesn't have to look all over the sheets any more.

There are only two color chart sheets, not a booklet of 20 or 30 or more pages, and, in those two sheets, there are nearly 6,000 colors. The spacing between the steps is equal with as much emphasis on light as on dark colors. It's easy to visualize the contribution of the black printer to the overall color. Finally, the color chart includes the GATF Gray Balance Chart and the GATF Color Reproduction Guide, which are helpful in combination with the color chart for those who believe in a systems approach to color.

The chart is available exclusively to GATF members until June, 1974. Any company belonging to the Graphic Arts Technical Foundation can purchase the master film sets for $175. When the chart becomes available to non-members of the Foundation, the master film sets will cost them $350.

To order, contact: Order Department, Graphic Arts Technical Foundation, 4615 Forbes Ave., Pittsburgh, Pa. 15213.

GATF Releases 1970-72 Color Survey Results

The results of a color survey conducted by the Graphic Arts Technical Foundation, conducted over the period of 1970-72, have recently been released in a GATF Research Progress Report.

The color survey has two basic objectives: to provide the graphic communications industries with information concerning the current state of color reproduction, materials, and methods and to provide information on which to base future GATF research and educational activities in the color reproduction field.

The study of color reproduction and printing methods indicated an expanded use of color scanners and four-color presses. Also revealed were the predominance of color transparencies for originals and of positive working plates for color printing. Analysis of printed samples indicates a slightly smaller color spread of primary color than the previous surveys. Printed primary densities and secondary color hues continue to show a wide spread.

This report is intended for all those interested in color reproduction methods and color printing studies in the graphic communications industries.

Research Progress Reports are not available to non-members of GATF until one year following the publication date.

GATF Introduces a New Test Image

A new test image, a Ladder Target, which indicates variations in the amount of slur and doubling along its length, has been introduced by the Graphic Arts Technical Foundation.

The target provides clues which help to locate and to identify the causes of slur or doubling and which, in turn, lower the reproduction quality of halftones. The Ladder Target is designed to give a qualitative measure by visual inspection, but areas in the target are large enough to be read with a densitometer providing numerical measure of slur, doubling, gear streaks, wash marks, and the effect of undercolor on slur.

Textbook on Stripping – Black and White Is Available

The complete textbook for the apprentice in the art of black and white stripping has been updated and revised by GATF and is now available from the Foundation's Order Department. This text seeks to guide the apprentice in building his knowledge and experience in simple stripping practices. It details the recommended procedures and cautions against common difficulties. Many specialized applications and shortcuts are described. Illustrations are used profusely to explain the recommended techniques for each operation.

To the advanced stripper, this text presents stripping as a production process. It recommends the establishment of quality levels and working tolerances. It also suggests efficient procedures intended to keep stripping as up to date as the manufacturing processes in the other major industries.

An extensive coverage of basic mathematics, layout preparation, and measurements is provided in this text. These are intended to provide a valuable reference source to the stripper as well as to the other skilled craftsmen in out industries.

The book may be purchased by GATF members for $4.75; by non-members for $9.50.

BOOK REVIEWS

Handbook of Sensory Physiology, Vol. VII/4. Visual Psychophysics. Edited by Dorothea Jameson and Leo M. Hurvich. Springer-Verlag, Berlin-Heidelberg-New York, 1972, Pp. x+812; 297 figs. Price $78.70.

The book is a collection of articles on a large number of topics in the general field of visual psychophysics. The topics range from threshold measurements and dark adaptation through acuity and color vision to metacontrast and electro-physiology. In all, 28 different topics are discussed, each by a different author (with the exception of the editors, Jameson and Hurvich, who each wrote one article and jointly wrote a third). The selection of authors for the specific topics is excellent; almost without exception the authors are well known and particularly associated with the topics about which they are writing. Thus, Barlow writes about dark adaptation; Blackwell, luminance-difference thresholds; Heinemann, brightness contrast; Westheimer, acuity; Wright, color mixture; Crawford about Stiles-Crawford; and Riggs, electrical measures. In general, the chapters are of high quality, well written, and representative of the facts in the specific fields.

Although the authors and chapters are of uniformly high quality, there is no uniformity of depth of coverage of the topics. I wonder whether the authors were free to develop their topics as they saw fit or if their interpretations of editorial instructions could be so diverse. Some of the articles represent massive and studious collations of all of the data in the field; indeed, many reviews of the literature start with references prior to 1800. Some articles review and interpret their given topics in such a manner that a relative newcomer to the specific field (but not, however, new to the study of vision) could find an adequate description of the phenomenon and of the major parameters that affect it. Other authors, in contrast, present detailed discussions of sophisticated, minor issues or their own theories.

For example, a student of vision who wished to learn about the Stiles-Crawford effect could read the article by Crawford and become quite knowledgeable about the general field. Similarly Heinemann's article on brightness induction is a well-organized review of the literature in which can be found answers to almost any empirical question concerning the effects of numerous variables. The chapter by Riggs and Wooten on the relations between the ERG and the VECP is as good (or better) a summary of the field as can be found in books devoted to the subject.

In contrast, the first three chapters of the book (on dark adaptation, threshold quantal problems, and signal-detection theory) require an extensive background of knowledge for comprehension. They are related, in that all three deal with the theoretical account of the nature of absolute thresholds, i.e., whether they are quantum limited or signals necessarily detected against intrinsic noise or "dark light." Each presents a complex discussion of the issue and comes to a different conclusion.

The chapter by Weisstein is a good example of the tack taken by many of the authors; it presents a good summary of the literature in the beginning and then an extensive presentation of her own theory to account for the data in the end.

The chapters written by the editors illustrate the different concepts employed in writing by the various authors and serve as an example of the whole book in microcosm. The chapter by Hurvich on color-vision deficiencies is a detailed account of the extensive literature on this topic; the material is well organized and clearly presented for someone not too familiar with the field. Jameson's chapter, also, presents an excellent summary of the theoretical issues of color vision, with a clear statement of the relations between three absorption pigments and the concept of hue coding, before, launching into a more-detailed account of the Hurvich and Jameson theoretical position. On the other hand, the chapter by Jameson and Hurvich on color contrast and after images presents no general information or description of the phenomena at all but, instead, an elaborate analysis of the failures of trichromatic theory to account for the data. Finally, none of these three chapters presents any summary of the information presented.

The last statement, in fact, represents the only serious fault, which runs through the book as a whole: the lack of summaries or conclusions for the topics presented. For the vast majority (there are a few exceptions), the data are given or the points of view are presented, and the chapter ends – period. The reader is continually left with the wish that the author had made some attempt to organize or summarize the state of knowledge in his field; for, who is presumably better equipped to do so than this expert? We are left with the impression that the authors were intent on showing how many questions are left unanswered.

It is, of course, possible for the reader to take issue with many statements made in the book. For example, this reviewer would criticize Baumgardt's reliance on the presentation of "blanks" in a threshold experiment (has he not heard of Type II errors?) and with LeGrand's notion of the "sensitizing" effect of red light and Jameson's "red-green-blind dichromasy of the midperiphery" (there are much more extensive data against both of the last two propositions than for them). The possibility of disagreement is, of course, natural for a book of this scope; in fact, it is a credit to the book and the authors that there are so few statements with which to disagree.

In summary, the book represents an excellent collation of data and in some cases provocative theories to handle the data in diverse areas within the field of vision. Jameson and Hurvich state that it is intended for students of vision;

the reviewer would add that it is for serious and, in view of the price, affluent students of vision.
Jo Ann S. Kinney
Reprinted with permission from JOSA, *63*, 900, 1973.

Picasso: The Artist of the Century. Text by Jean Leymarie. Viking. $37.50. **Willem de Kooning Drawings.** Text by Thomas B. Hess. New York Graphic Society. $27.50.

Leymarie's is an outstanding work for its historical-critical text and extravagantly beautiful illustration. De Kooning, the master among the New York Abstract Expressionists, is well served by Hess's selection from his superb drawings, fifteen of them reproduced in color plates.
Guy A. Cardwell
Reprinted from The Key Reporter, Summer, 1973, p. 6.

PRODUCTS AND SERVICES

Expanded Collaborative Reference Program for Color and Appearance Offered By NBS-MCCA

The Collaborative Reference Program for Color and Appearance after a successful first year of operation under the joint sponsorship of the National Bureau of Standards and the Manufacturers Council on Color and Appearance is being expanded with new features and additional tests.

In addition to the existing tests for 60° ASTM gloss and color and color difference, new methods added include 20° and 85° ASTM gloss and a materials research test. As part of upgrading the testing the National Bureau of Standards and the National Research Council of Canada have agreed to act as a dual referee in the 60° gloss test, which is an important step in establishing an accuracy or reference point for glossmeters.

Two major objectives of the program are (1) to provide a means whereby a participating laboratory may periodically check the level and uniformity of its testing in comparison with that of other laboratories and (2) to improve the reliability of test results both within and among laboratories.

For a descriptive brochure and application interested participants can contact either:

Dr. T.W. Lashof
Collaborative Reference Programs
National Bureau of Standards
Polymer Building, Rm. B362
Washington, D.C. 20234
(301) 921-2983

Mr. Charles G. Leete
Manufacturers Council on Color and Appearance
9416 Gamba Court
Vienna, Virginia 22180
(703) 938-4345

LETTER TO THE EDITOR

Our firm has good connections with the Council of the German Industrial Designers (VDID). Through this organization we came into contact with the industrial designers in Germany.

In our discussion we often were confronted with the fact that the choice of the most suitable color shades for the different fields of application is a great problem.

We are manufacturers of color pigments and color preparations which can be used for many purposes such as for the coloring of plastic articles. We noticed that in many cases our advice on the evaluation of new products is very much appreciated. We are sure that we would be able to give objective information also to the members of your council in connection with their coloring problems.

G. Siegle & Co., GmbH, 7 Stuttgart, 30 Postfach, 300620, West Germany

HUNTERLAB APPOINTS REPRESENTATIVE IN MEXICO

Hunterlab, of Fairfax, Virginia, a manufacturer of instruments for the measurement of color, gloss and other attributes of appearance, announces the appointment of Rema, S.A., Mexico 7 D.F. as its exclusive representative in Mexico. Rema, S.A. is prepared to furnish literature and technical information on the Hunterlab Colorimeters, Glossmeters and other equipment. It can also arrange to use the service of the Hunterlab Appearance Measurement Laboratory in Fairfax, Virginia. Rema, S.A. is located at Apartado 7-865, Mexico 7 D.F.

TEXTILE INDUSTRY OFFERED ADVANCED COLOR SYSTEM

A new pigment matching system designed to both meet and exceed requirements within the textile manufacturing industry has been announced by the MACBETH COLOR & PHOTOMETRY DIVISION of Kollmorgen Corporation.

The new unit, called the KCS-18/36, combines the company's automatic Color-Eye" color measuring device with a sophisticated digital computer, a teletypewriter and a software memory system capable of storing more than 500 pigment calibrations. The combination, according to company officials, achieves color matching services in the shortest possible time.

Specifically, the KCS-18/36 can do much more than determine if a particular dye lot is within specifications and meets customer tolerances. The system can provide data that can be utilized to improve the manufacturing process.

The new unit is easy to operate and has a push button control panel. Selecting the color sample he wants to match, the operator merely allows it to be "characterized" by the Color-Eye device.

The remainder of the pigment matching is done either automatically or in a combination of computer/operator decisions. The computer can calculate a series of pigment formulas, keeping them within pre-selected and reasonable limits. In addition, the operator can program specific amounts of pigments into color match formulas.

The system also facilitates the correction of production batches to bring them on shade. Using information pro-

grammed into it, the KCS-18/36 can automatically correct off-shade situations with required changes in formula and pounds of pigment needed to be added. The entire operation, however, can be easily switched from computer control to operator control when more practical.

An operator of the device can select print-outs of reflectance at 19 wavelengths. This is augmented by curve plotting of predicted spectrophotometric reflectances on a teletypewriter.

For more information, contact: General Sales Manager, Color Systems Sales Center, Dixie River Rd., Charlotte, N. C. 28208.

ZINC INSTITUTE ANNOUNCES NEW BROCHURE LISTING EDUCATIONAL MATERIALS AND FILMS

The Zinc Institute has announced the availability of its recently published 12-page brochure listing the various information and educational materials the association offers. Titled "Publications & Films", the publication lists nearly 200 zinc-related feature articles, product brochures, design concepts, case histories and film presentations.

Two films are listed both in English and in French (suitable for showing in French-speaking Canada.) The two films are "Freedom By Design", a 27-minute color presentation to inform manufacturing engineers, industrial designers and design engineers about zinc die castings; and "The Extraordinary World of Zinc", a 27-minute color presentation discussing how zinc, the metal, is used and how it affects our everyday lives.

The 12-page brochure "Publications & Films", is available free from: The Zinc Institute, Inc., 292 Madison Avenue, New York, N.Y. 10017.

MARTIN MARIETTA CHEMICALS

Martin Marietta Corporation announced that it will spend $5 million on a new production facility for its sulphur dyes. Construction work has begun on the project at the Sodyeco Division of Martin Marietta Chemicals at Charlotte, North Carolina.

Sulphur dyestuff, of which Martin Marietta's Sodyeco is the leading U. S. producer, is used primarily for cotton and viscose rayon textiles. The new facility will replace and upgrade existing facilities for sulphur dyes, most of which are produced in liquid form.

This is another step in the Corporation's program to expand its facilities and sales. Earlier this year, Martin Marietta brought on line at Sodyeco a new plant to raise production of disperse dyes for synthetic fibers, and also announced an arrangement with Sandoz A. G. of Basle, Switzerland, to expand Sodyeco's marketing of sulphur dyes internationally.

Coupled with the brand new disperse dye plant, this sulphur dye manufacturing facility will put Sodyeco in a position to continue its growth as a supplier of dyestuffs here in the United States and in emerging markets throughout the world.

POLYCHROME REGISTRATION FILM OFFERED IN TWO COLORS

Polychrome Corporation has introduced a line of red- and blue-colored registration films with optional negative or positive photosensitive coatings. The dimensionally stable polyester films can be exposed, processed and dried, ready for use, in approximately two minutes using conventional exposure units.

Development is accomplished without trays under normal lighting conditions in a flat sink with the use of only one non-volatile developer solution for each of the films. During development, these water-based solutions react chemically with the film's emulsion, thus eliminating erratic mechanical stripping action and formation of sludge encountered with solvent-based developing solutions.

Polychrome Registration Film simplifies and speeds stripping operations because it contrasts sharply with color separations. This quality gives the stripper precise visual indications, allowing for hairline registration.

Although developed primarily for color-separation stripping, Polychrome Registration Film can also be used for stripping any multi-burn and step-and-repeat flats or for checking plates and press sheets for accuracy and completeness. In art preparation, the film can serve as a precise guide for layouts. Maximum dimension of the film is 30" x 40".

DIANO ANNOUNCEMENTS

Corporate Headquarters Moved to West Bridgewater, Massachusetts

Diano Corporation has announced relocation of its corporate offices from Mansfield, Mass. to 234 West Center Street, West Bridgewater, Massachusetts 02379.

Operation of Diano's Optical Systems Division will continue at its present location in Mansfield, Massachusetts, as will the Diano Industrial X-Ray Division in Winchester, Massachusetts, and the Diano NDT Products Division in New Haven, Connecticut. Formation of the NDT Products Division is the result of Diano's recent acquisition of substantially all of the business of the Industrial Sales Division of Picker Corporation.

"Pushbutton" Systems for Spectrophotometric and Colorimetric Measurements

Diano Corporation has announced the availability of literature describing their AutoMate Systems for spectrophotometric and colorimetric measurement. The Systems, comprised of large and small sphere spectrophotometer/colorimeters interfaced to computer controllers, offer completely automatic color measurement for a wide variety of industrial and laboratory applications with the speed and accuracy required for today's "result oriented" color measurement and control applications.

For your copy, request Bulletin 340 from: Diano Corporation, 75 Forbes Blvd., Mansfield, Massachusetts 02048.

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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.