Inter-Society Color Council *Newsletter*

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COLOR DEFINITIONS: 17TH CENTURY STYLE

White: that which discharges a copius light equally clear in every direction.

Black: that which does not emit light at all or which does it very sparingly.

Red: that which emits a light more clear than usual but interrupted by shady interstices.

Blue: that which discharges a rarefied light, as in bodies which consist of white and black particles arranged alternately.

Note: The blue of the sea arises from the whiteness of the salt mixed with the blackness of pure water.

Green: nearly allied to blue.

Yellow: a mixture of much white and little red.

Purple: a mixture of a great deal of blue and a small portion of red.

The above definitions are attributed to Dr. Isaac Barrow, friend and tutor of Sir Isaac Newton, by R. A. Sawyer in Experimental Spectroscopy (3rd ed., Dover, 1963).

COLOUR DEFECTIVES AS ART STUDENTS

R. W. Pickford, in an article in the Journal of Bio-social Science, (1, 1969, 3-13) has reported on studies that show no significant difference in the frequency of red/green deficiency among art students than among the population as a whole. Of 223 students at a school of art, one woman and six men were classed as defectives. While this rate of incidence (5.36%) for men is lower than the 7.8% found among 989 men by Pickford in the West of Scotland in 1951, the difference is not statistically significant. The rate of incidence among the women (0.9%) was a little higher than the 0.59% observed by Pickford and Brown among 676 women and girls in 1951, but again the difference was not statistically significant.

One of the males was classed as a deuteranope; the other five were deuteranomalous, either simple or extreme. The female was classed as extremely protanomalous.

Interviews were held with each of the color defectives for the purpose of discussing the problems of their art and color vision. Each student brought at least one example of his painting. The summaries of the interviews are quite interesting and can be examined in Pickford's article. Only some examples will be presented here.

One of the cases of simple deuteranomaly had not known of his defect until tested in the research program. Among his four examples of oil paintings were two landscapes in warm browns and greys, one of which had a little green in it. When asked to point out the green, the student indicated a fawn-coloured area. When he was asked about his choice of ideal colouring in a painting, he selected the landscape which contained no green.

One of the cases of extreme deuteranomaly presented eleven gouache paintings, of which six were landscapes, mainly in greys and browns, with little green. He called the grey "green" in some cases.

The female showed four oil paintings, in one of which was a brown pear which she called "pale green."

Pickford has found that many colour defectives show a capacity to adapt the use of colour successfully in their art, often in a way that allows their defect to pass unnoticed or helps them to deceive themselves.

ADDITIONAL ANNUAL REPORT.
INDUSTRIAL DESIGNERS SOCIETY OF AMERICA
DELEGATES, RAYMOND SPILMAN, CHAIRMAN

The following comments by I.D.S.A. practicing designers on the trend and use of color in commercial and industrial situations has been compiled to give I.S.C.C. members a cross-section of color usage in the color-to-people world.

In past years, we have catalogued members' color comments into specific color usage areas; however, some of the correspondence is interesting in itself, so we have treated this year's comments as "Letters to the Editor," slightly briefed. Also, we think it is interesting to note the wide scope of color use and

decisions and responsibilities many designers assume as part of their regular design practice.

LETTERS TO THE EDITOR

Major appliance trends toward Avocados and Harvest Golds are being reflected increasingly in housewares. Stronger shades, rather than muted, are becoming more and more prevalent. In addition, accent colors of Flame Red, Bright Blue, and Spring Green are of high merchandising interest.

Carroll M. Gantz
THE HOOVER COMPANY

All products: Wood graining

Cameras: Over $25. -- black and chrome

Tape Recorders: Portable: black and chrome above $75. Op art below $75. Home: Walnut and wood tones -- swing toward lighter colors.

Machine Tools: Shades of gray-green

R. Deschamp
Deschamp, Mills Associates

In the field of major domestic appliances I have noticed a trend toward the use of dark wood-toned or charcoal trim as neutral accents to the colors used on the main shell of such items as refrigerators, freezers, washing machines, dryers, etc. In this country the solid wood work top seems to be becoming ever more popular, and in Europe it is interesting to note that stainless steel tops in a neutral finish have been very popular on certain counter height appliances.

In the area of stoves, ovens, it is interesting to note the increasing use of black tinted glass oven doors.

Small appliances seem to be continuing to use pastel colors for the larger areas of the appliance contrasted with strong accents of warm or cool colors. The use of gold lettering and designations on charcoal, brown or silver backing appears to be becoming popular for name-plates. Although not generally used at this time it would appear that the use of black chromium on metal surfaces in contrast with plastic colors will be coming to market soon.

Commercial panel mounted indicators and controllers seem to be using more muted colors to establish corporate color identity. These colors are generally relatively neutral so as to be acceptable on various color panel backgrounds, which range from light grey through greens and brown to black.

Robert H. Hose
Robert Hose Associates

Consumer Products Color Direction

Bright, strong, clean colors both metallic and non-metallic.

Color usage -- off white -- with Browns/Golds, Greens/Blues using strong almost pure accent colors.

Coarse, polished bright metallics are predominant here.

Office Equipment Color Direction

Brighter but softer, mostly metallic color usage -- off white -- with Gray-Brown/Gold, Green/Blue with small accents of pure colors.

Fine soft metallics are used here.

The metallics are favored on painted surfaces because of their ever-changing character, depending on lighting and viewing angle.

J. E. Kapilla
SCM Corporation

Color in glass -- housewares -- etc.

Avocado -- continues strongest
Golden Amber -- weak second
Harvest Brown -- coming up strong
Lime Green -- building
Lemon Yellow -- poor

Avocado continues a phenomenal run in the industry with, as yet, no perceivable replacement.

Arthur L. Harshman
Indiana Glass Co.

1. Residential, acoustical and decorative ceilings (tile and lay-in panels) -- white continues to be the only color, with off-white or beige used to accent textural patterns. Texture is the predominant method of decorating the surface. The few printed patterns still being marketed tend to use soft muted tones and patterns, again in off-white, oyster, bone and beige on white backgrounds. Little color change is expected.

2. Fiberglas-reinforced plumbing fixtures (tub-showers and shower stalls) -- these tend to follow the colors used by the large manufacturers of the conventional enameled steel and cast iron fixtures. White may tend to be slightly more of a factor in FRP fixtures, since there are several independent manufacturers who do not wish to complicate their inventories by stocking color units. All manufacturers charge the builder $5 to $8 extra for color, which further limits its use. More color used as accents within white or beige units can be expected to appear within the next two years. Simulated natural materials patterned areas, introduced by

laminating in printed sheets or by silk screening, or by adding vinyl or aluminum inserts can also be expected.

Merritt W. Seymour
OWENS-CORNING FIBERGLAS CORP.

As a practicing Industrial Designer I feel that in many of the product and graphic problems I have been involved with that strong, vivid color such as reds, oranges and vivid blues are of best acceptance; however, in office equipment, I feel that the neutral tones such as beiges and medium grays lend themselves best to most any interior scheme. Again, color is a personal choice, but I tend to lean toward the warmer colors in my design work.

I think that this is a wonderful opportunity for a beginning designer, such as myself, to be able to receive information on color and color usage from the experience of other practicing designers.

If it is possible, I would appreciate a copy of the published report resulting from this survey. Please send it to the above address.

Thank you.

Robert M. Kahute
George A. Beck Associates

The individual problem pretty well dictates the correct color or combination of colors.

Color specifications, of course, are coloured to some degree by the designer's intuitive choice of what is right for the problem and/or consumer preference testing.

A difficult subject on which to generalize.

Cornelius Sampson
San Francisco, Calif.

In reviewing our experiences in color selections both in product design and interior architecture, the following distinctive trends are manifest in light of this survey.

Not since the early 1930's have the trends in color for products and architecture been generated in Europe. We have come full circle, with our European counterparts strongly entrenched in the business of trend setting. Italy seems, at this point, to be setting the pace in both areas of product design and related color selection.

A look at the American automotive industry's "overnight" adoption of extremely intense colors, born in Italy, reflects their deepening interest in the European trend. Color selection for furniture and lighting are also being guided by this influence.

In our own design work another significant factor seems worth mentioning. I have received broad acceptance of the design/marketing theory which guides basic design decisions towards a specific area of sophistication in a marketplace. We have found (in reference to the memo's second paragraph calling for opinions on the use of colors for specific product areas) that a particular color selection can be used across a broad spectrum of product types, but remembering that the products will be sold to a similar group of people within a market segment.

We find that we are employing pure colors and in most cases more intense hues. Also, our value ranges are greater, with whites becoming whiter and middle grays dropping to the darker ranges. This trend has been successful in our work on office machines, in electronics equipment, audio visual products, and interiors.

Markets are becoming far more segmented, which allows the designer greater freedom. I feel most of the design work that we are involved in is for a young and/or sophisticated market with their requirements, particularly in color, quite similar. The "average man" has become less of a factor in design and we can now avoid the broad cliches which once tried to make an item all things for all people.

I hope these thoughts will be of help to those compiling our study.

Richard H. Penney
New York, New York

Color Trends in the instrumentation area:

Traditionally, colors have been restricted to values of gray . . . with accents of red, blue, yellow (in that order). There is, however, a fast moving trend toward values of green. At the F.A.S.E.B. show in Atlantic City last April, 20% of all products displayed appeared in green. (Total number displayed: 1,500 products).

Trend: The conservative approach to color in this industry is giving way to a literal explosion of color across the board! Although it will remain in subtle "pastel" values, the spectrum will be the limiting factor.

Dave Malk
Beckman Instruments

In the computer field I believe there is an industry-wide appreciation of color, albeit a conservative one, i.e., computer products typically are gray with color accents. Many computer manufacturers are using large colored panels and, in some cases, fully colored computers. Some manufacturers are of course more sophisticated in the use of color than others. IBM, for instance, in coloring its machines uses colors which are far in advance of a single color approach common in the industry a few years ago. A few manufacturers such as NCR are approaching each family system with

a distinct color. Univac has created distinct belt line color accents on severe gray cases. In short, present practice indicates that future trends will be to use color in limited amounts and (usually) in small areas.

At Digital Equipment Corporation we, too, are using color, but I think somewhat differently, and in using it differently perhaps we will modify the industry trend. We, too, are using color to code various product lines, for example, yellow-browns for small computer products; blues and reds for medium scale computer products; bluegreens for large computer products; and bright greens for computer peripherals. We are now getting to the point where we are having to mix colors for new product lines. For example, olive greens and magentas. In addition to using color to differentiate products, we are using it to distinguish various functional differences such as the switch functions on consoles. Finally, we are trying to utilize the first two segments in combination to transmit a complete approach to color through all of our product lines. That is, while different colors are used in each of our product lines, we try to use them consistently so that a distinctive DEC look is transmitted to the buying public. We believe that these bright, fresh colors, all drawn from Container Corporation's The Color Harmony Manual, are distinctively different as we use them and are indicative of the way color will be used in the computer industry as well as the capital equipment market in general in the near term.

James B. Jordan
Digital Equipment Corporation

I find that in the medical electronic instrument field we use muted colors -- beige, pale green, off-white, soft blue -- altho one of my instruments -- a blood sample analyzer -- did end up dark red (the advertising boys decided that blood red was appropriate for it!). Looks handsome at first glance, but will not be easy to work with for any length of time.

Trim and detailing on this instrument are dull black and a small amount of stainless steel and brushed satin aluminum.

Harold Dsenis
LISTON SCIENTIFIC CORP.

Housewares:

Color use in housewares differs according to the market. High production, low cost items tend to be colored in the most popular colors -- Avocado, Harvest Gold are hot -- white and black are staple. Beiges are out. There is lots of wood grain, mostly Walnut being used on all surfaces, regardless of color background.

New colors -- oranges, reds, blues, etc., appear mostly in higher priced, decorator cookware, pseudo-gourmet and accent pieces for the table.

Sporting equipment, particularly wheeled goods, have discovered the candy colors (fluorescent gold -- blue -- green -- red and purple).

Table-top appliances, except for the gourmet Oriental, tend to be conservative -- golds, avocado, white, burnt orange.

The nature of our mass production marketing philosophy rules out exciting color because such colors make a positive statement; hence can only be used in color keyed areas, or by people who have a feel for color.

There is hope for more color in housewares as marketeers discover and can profit from special groups -- colored people (who love and can use bright color effectively), gourmets, American style -- much color and pattern, etc.

Raymond Spilman
Stamford, Connecticut

CMG FALL MEETING

"Color -- The First Resort" is the theme of the semi-annual meeting of the Color Marketing Group in Miami Beach, Florida, November 16, 17 and 18, 1969 at the Marco Polo Hyatt House.

Co-chairmen for the meeting are Beatrice West, Beatrice West Studios, Inc., and Everett R. Call, National Paint, Varnish and Lacquer Association.

For further information, contact Mr. Everett R. Call, (202) 462-6272.

Program of the Fall Conference

Scheduled Speakers and Topics:

Nov. 16 --

STUDENT SEMINAR -- Speakers: Albert O. Halse, associate professor of architecture, Columbia University and author of "The Use of Color in Interiors" and Alexander F. Styne, lecturer, Department of Architecture and Electrical Engineering, University of Miami, who will speak on "Illusions in Color Perception." CMG will meet with students to discuss careers and color.

SPECIAL PRESENTATION: "The Colorful Florida One Seldom Sees" by Jose Martin, director of color and print design, Allied Chemical.

Nov. 17 --

Report by Louis A. Graham, manager, color and dyeing section, Research Center, Burlington Indus-

tries, Inc.; "Color 69 International," Stockholm, Sweden.

"The Universal Color Language -- Color Communications for All" by Alexander F. Styne, lecturer, Department of Architecture and Electrical Engineering, Univ. of Miami.

Luncheon speaker: Richard R. Volz, senior vice-president, Coats & Clark's Sales Corp., "Color is a Many Splendored Thing."

"House & Garden Colors Two Decades Ago and Two Decades Ahead" by Annett Francis, merchandise editor, House & Garden.

Dinner. Speaker & Fashion Show: Gomer H. Ward, manager, retail marketing, Textile Fibers Department, E. I. duPont de Nemours & Co., Inc., "Color -- The Launching Pad of Fashion."

Nov. 18 --

"The Use of Color in Interiors" by Albert O. Halse, associate professor of architecture, Columbia University.

PANEL: "Is Color the First or Last Resort?" Moderator -- Ruth L. Strauss, president, Ruth L. Strauss, Inc.

MEMBERS OF PANEL: Emily Malino, consultant to Monsanto -- "Color Communicates"; James Merritt, director of color and design, David & Dash -- "Miami -- The Color Capitol of the World"; Alice Papazian, fabric consultant -- "Keep Your Colors in Tune with the Times."

Luncheon Speaker: Robert H. Scott, vice-president, Outboard Marine Corp., "Nautical Color Due for an Explosion -- If."

STYLE SHOW: "Color & Fun Fashions" by Jantzen, Inc. Commentator, Alice Papazian.

Dinner Speaker: Brook Stevens, president, Brook Stevens Associates, industrial designers. "Tomorrow's Products -- Color Them Cheerfully."

COLOR MARKETING GROUP ANNOUNCES SPEAKERS BUREAU

James R. Radcliffe, U.S. Plywood-Champion Papers, Inc., N.Y., N.Y., says that the organization of the Color Marketing Group's Speakers Bureau, of which he is Chairman, has been completed. Lists of speakers on color and color marketing subjects will be available to any person or organization requesting them. The speakers are active in color technology and color marketing, including professional colorists, stylists, advertising and sales promotion executives, and sales representatives in the field of color.

The Speakers Bureau is one part of the Color Marketing Group's educational program for encouraging more responsible and effective use of color.

PRESIDENT OF SCANDINAVIAN GROUP TO PRESENT KEYNOTE ADDRESS AT FSPT ANNUAL MEETING

Martin E. Schleicher, President of the Federation of Societies for Paint Technology, has announced that Dr. Knud Christensen, President of the Federation of Scandinavian Paint and Varnish Technologists, will present the Keynote Address at the 47th Annual Meeting of the Federation at the Conrad Hilton Hotel in Chicago, November 5-8.

Dr. Christensen is Vice-President in charge of Research & Development of Sadolin & Holmblad A/S in Copenhagen, Denmark, with whom he has been associated since 1942.

Dr. Christensen is a member of the Board of the newly-formed Scandinavian Paint and Printing Ink Research Institute, headquartered in Copenhagen. He has been a member of the Danish Academy of Technical Science since 1948, served as Chairman of the Danish branch of the Scandinavian Federation, and also was Secretary of the Danish Council for Scientific and Industrial Research for a number of years.

He will speak at 11:00 a.m., Wednesday, November 5, in the Waldorf Room of the hotel.

GATF SEMINARS ON COLOR AND COLOR REPRODUCTION

Seminars on color and color reproduction will be presented by the Graphic Arts Technical Foundation on Oct. 20-22 and Dec. 8-10, 1969 at their headquarters in the Oakland section of Pittsburgh.

Designed for those experienced in color reproduction and process color work, the GATF Color Reproduction Seminar will immeasurably aid those working with process color reproduction to understand the latest techniques and concepts of color reproduction and apply these to their work. The Seminar covers all phases of color reproduction, including camera techniques, filters, masking, inks, papers and the press.

The Color Seminar will go into:

A historical review of growth and developments in color reproduction; principles of subtractive color reproduction; the color spectrum, light filters and ink selection; color separation and the need for color correction; GATF color surveys in lithography, photo-

engraving, and gravure; causes and correction of color reproduction problems; the color matrix and the concept of balanced inks; single-stage masking, two-stage masking; use of GATF guides in judging color separation; black printer corrections; how to measure, judge and improve trapping; color accuracy in overprint color; graying effect in halftone color tints; mask curve shapes; control of three-color grays; influence of paper on color reproduction; paper surface efficiency; color diagrams and their use; GATF's Color Circle, Color Triangle and Color Hexagon; color diagram coordinates; correcting for color balance; scanners, screenless printing, color research.

Instructor for the seminar is Francis L. Cox, GATF Director of the Technical Services Department. Further information can be obtained from the Special Programs Department, GATF, 4615 Forbes Avenue, Pittsburgh, Pa. 15213.

IFT NEWS

John N. Yeatman, Director of the U.S.D.A. Color Laboratory at Beltsville, Md., will be the new chairman of the delegates from the Institute of Food Technologists. Gordon Mackinney, the retiring chairman, will remain on the delegation.

The projected survey of IFT member interests and needs indicates a primary interest in research on color of foods, secondarily in quality control; also that it is abundantly evident that the anticipated ISCC report on spectrophotometers and colorimeters this Fall is badly needed for the information and guidance of many members.

TAPPI OPTICAL METHODS COMMITTEE MEETING

The TAPPI Optical Methods Committee will meet at the Sheraton Hotel in Rochester, N.Y. on September 30 in connection with the TAPPI Testing Conference. At the conference there will also be a session where papers will be presented on optical methods. Included among the papers will be one on 6500°K as a standard light source for spectrophotometric determinations of reflectance and color.

Committee discussion will cover new standards and instruments for the determination of opacity, results of a round robin to arrive at a standard for multiple-filter colorimetry, the calibration of absolute reflectance standards, and standard methods for determining the reflectance of paper and mineral pigments.

John M. Patek

NEW COMPANY TO HANDLE TINTOMETER SALES IN USA

A new company, Lovibond of America Incorporated, has been formed to handle U.S. sales of the range of products made by the Tintometer Ltd., of Salisbury.

The range includes colorimeters and comparators for chemical analysis.

Up to now sales in America have been handled by Hayes G. Schimp Inc. of 870 Willis Avenue, Long Island. The new company will have the same address and Mrs. Betty Czemba, daughter of the Schimp company's founder, will be its president.

THE COLOUR GROUP (GREAT BRITAIN)

The elected committee for the 1969-70 session of the Group is as follows:

Chairman: Dr. R. A. Weale
Vice-chairman: Dr. S. T. Henderson
Hon. Secretary: Mr. I. T. Pitt
Hon. Treasurer: Mr. F. Malkin
Hon. Assistant Secretary: Miss M. B. Halstead
Hon. Assistant Treasurer: Mr. J. A. Keitch
Chairman, Midland Section: Mr. R. Brocklebank
Chairman, Northern Section: Professor R. H. Peters
Chairman, Scottish Section: Mr. I. Gailey
Ordinary Members: Mrs. D. I. Morley, Mr. M. E. Wakelin, Professor W. D. Wright, Mr. D.W. Kahan, Mr. G. E. V. Lambert, Dr. C. A. Padgham

The next science meeting of the Group, to be held on Oct. 8, 1969, will be devoted to reports on the AIC and CIE meetings held recently in Stockholm.

The 2nd AIC congress is to be held in York in 1973.

John Pickup is taking over as Editor of the Journal of the Colour Group from J. M. Adams.

The July 1969 issue of the Journal contains a most interesting account, prepared by Ralph Brocklebank, of the May 1968 meeting of the Group on the subject of "Colour Classification." Included in the issue are papers by: G. J. Chamberlin on "Lovibond and his Colour Scale"; Donald Pavey on "Working with the Methuen Handbook"; Manfred Richter on "Some Thoughts on Colour Systems in General and on DIN 6164 in Particular" (condensed by Mr. Brocklebank); and W. N. Hale on "New Developments in the Munsell System."

SOVIETS ESTABLISH COLORIMETRIC STANDARDS

"Moscow -- Soviet scientists are working on a colorimeter which will produce about a thousand shades of

color. The first model of this 'atlas of colors,' as it is called, was carried on board the spaceship Soyuz-3 and cosmonaut Col. Georgi Beregovoi used it to observe the color of clouds, the earth's surface, the day and twilight horizon, and the sky.

"The instrument consists of a small wooden box filled with thin colored plates the size of a match box. Each plate is a model, verified and certified in accordance with the single international colorimetric system. It will become the basis of color standardization in the USSR national economy and will be extensively used in industry, color photography, cinematography and television."

(Reprinted from the June 1969 issue of Industrial Research, with permission.)

SHEPPARD'S HUMAN COLOR PERCEPTION

Human Color Perception: A Critical Study of the Experimental Foundation, by Joseph J. Sheppard, Jr. (American Elsevier Publ. Co., N.Y., 1968, pp. xvii + 192) has elicited considerable interest and varying opinions. Reviews by four ISCC members have appeared in three different journals:

Evans, Ralph M. J.O.S.A., 58, 1968, 1422.
Hurvich, Leo M. and Jameson, Dorothea. Amer. Scientist, 57, 1, 1969, 143.
Nimeroff, I. Physics Today, June 1969, 81.

If enough interest is indicated by N.L. readers, it is possible that these three reviews could be republished in a subsequent issue.

LIGHT, COLOUR and VISION REVISED

The second English edition of Yves Le Grand's Light, Colour and Vision (Chapman and Hall, London, 1968. xiv + 566 pp. illus., $11.25. U.S. Distributor, Barnes & Noble, New York) has been reviewed by Robert M. Boynton in Science (14 March 1969, p. 1187). According to the reviewer, the new edition is similar in many ways to the excellent and widely used 1957 English edition, but there are also many changes. "An enhanced understanding of the physics of human vision" is promised by Professor Boynton to those who take the time to study this book.

RESEARCH AT THE INSTITUTO NAZIONALE DI OTTICA

Selected abstracts from the List of Publications on Physiological Optics of the Instituto Nazionale di Ottica for 1965-1966 were reproduced in N.L. #190. From a similar list for 1967-1968, the following twelve, from a list of fifty-three, have been selected as being of the most general interest to N.L. readers.

(A.F.G.R. stands for: Atti Della Fondazione Giorgio Ronchi.)

LUCIA RONCHI and G. SALVI: The failure of additivity law as revealed by the fusion conditions of various red-blue mixtures. A.F.G.R., Vol. XXII, N. 1, p. 69, 1967.

The failure of the additivity of the response to red and blue stimuli is put into evidence by determining the fusion condition of a mixture where red and blue amounts are varied within a wide range. For observer L. R., and for foveal vision, the slope of the cff vs log L_C plot is found to be independent of color; the luminance, at fusion is found to be more-or-less independent of color for those mixtures for which the blue amount exceeds the red one. For those mixtures which contain more red light than blue light, an anomalous behavior is tested which confirms the view that the contribution to brightness for blue is not relevant, and, in addition, it shows the failure of additivity law. In extrafoveal vision, and for observer L. R., the blue cff vs log L_C plot is found to be steeper than the red one. The slope of this same plot, for various mixtures, follows a different behavior, according to whether the amount of blue exceeds the amount of red, or vice versa; in the latter case, the lesser the amount of blue, the lesser the slope. At lower frequencies, in the range investigated (from 17 through 37 cps), critical luminance shows a behavior analogous to that said above for foveal vision. The other observer (G. S.) behaves in a different way with respect to L. R. The discrepancy is reduced if L. R. changes criterion she adopts for determining the fusion condition.

The amount of the discrepancy is difficult to be quantified, since the shifts in the criterion adopted for determining the fusion condition may induce profound changes in slope. In conclusion, the statement that the slope of cff vs log L_C plot does not depend on the color of the stimulus is found to have a validity other than general.

ANNA MARIA ERCOLES and R. TITTARELLI: Further study of an entoptic effect following strong illumination. A.F.G.R., Vol. XXII, N. 3, p. 361, 1967.

When a brief and intense stimulus, in Maxwellian view, impinges on the central retina, at the off-set of the stimulus, the observer sees a thin bright annulus that, starting from the peripheral retina shrinks until it disappears into the after-image of the stimulus. Annulus brightness, its radius when it is at its maximum extent and its duration have been measured as a function of the intensity of the stimulus impinging on the eye. It has been found that the annulus brightness as well as its maximum radius and its duration decrease with the decreasing of the stimulus luminance. Shrinkage rate of the annulus depends on its duration. The hypothesis is advanced that the bright annulus is the manifestation of an inverse process to that of the diffusion of excitation from the directly stimulated area towards the peripheral retina. Qualitative differences

in the appearance of the annulus seen by the two observers are emphasized.

R. TITTARELLI: Photochromatic interval as a function of spot size: A controversy. A.F.G.R., Vol. XXII, N. 3, p. 369, 1967.

The photochromatic interval, that is, the region between absolute threshold and color threshold, is known to be a function of the size of the test-spot. By using a procedure based on color identification, Walraven has recently found that while at the extremities of the spectrum the size of the above said interval is but little influenced by the size of the test-spot, in the yellow-green region it increases with spot size. Our experiments, performed with an analogous procedure as that used by Walraven, lead to an opposite conclusion, in that, in the middle of the spectrum, the greater the size, the smaller the photochromatic interval. The effect is discussed, and, in addition, some practical implications are suggested.

MARIA TERESA ZOLI: La nitidezza foveale cromatica soggettiva. A.F.G.R., Vol. XXII, N. 3, p. 391, 1967.

Aim of the research is to determine whether the color of the structure in examination influences the subjective sensation of sharpness. A circular test-spot of 5° diam. projected on a gray background of about 20° has been taken into consideration. For a single observer, the luminance increment required for the detection of the test (differential contrast threshold) and to perceive its contour (differential sharpness threshold) have been determined for 6 values of the background luminance ranging from about 0 to 13.6 nit. Three test-colors, obtained by placing on the optical pathway of a lamp the Wratten filters 25, 47, and 61 have been examined. At scotopic and mesopic levels the test is generally more easily detected and perceived as sharp when it is colored than when it is grey as the background. It seems that color does not add any information at photopic levels. It is the Author's opinion that the colored test is only considered sharp when the luminance level is such that perception, or at least a sensation of color, is possible.

The possible explanation of the particular effects which have been verified at non-photopic levels, for the different colors, is suggested.

LUCIA RONCHI and E. M. GLORIA: Test-spot size and fixation distance as factors influencing the depth-of-field of the human eye. A.F.G.R., Vol. XXII, N. 4, p. 525, 1967.

The depth-of-field of the human eye has been determined by using as target a dot, darker than the background, of variable size. The experiment has been performed at three different fixation distances: 7m, 1.5m, and 0.18m. The depth-of-field is found to increase when spot size is increased up to a certain limit (about 20'). In addition the depth-of-field is found to increase in a relevant way when fixation distance is decreased. The transition from far-to-near-point involves an increase from 0.01 (or less) to 1 or 2 diopters. As far as we know, such a finding does not find any counterpart in the literature. It follows that the so-called hyperfocal distance can no longer be evaluated, as it is currently done, in terms of the reversal of the depth-of-field value, as determined at any fixation distance. The influence on depth-of-field of the shape of the target has been investigated by using as target a pair of dots, placed either vertically or horizontally. This allows to put into evidence the influence of astigmatism (say, "physiological," being our subjects emmetropic) on depth-of-field determinations. Finally, our findings are discussed with reference to the recent Crane's model on visual accommodation.

M. MALONE and F. CARTA: Statistical investigations on the achromatic isopters in normal individuals. A.F.G.R., Vol. XXII, No. 5, p. 635, 1967.

The authors have examined, in 68 boys, the achromatic thresholds for the coloured targets of the Goldmann's perimeter. The following conclusions have been reached: 1) for the red target a bimodal distribution of the population exists; 2) the correlations between the behavior of the subjects with the three different targets depend on the absolute visibility threshold and on the particular type of the visibility threshold for the red.

LUCIA RONCHI and G. SALFI: Flickering entoptical halo for various color mixtures. A.F.G.R., Vol. XXII, N. 5, p. 690, 1967.

The observer's eye is presented with a small test-spot, in Maxwellian view, flickering at a given rate. The task consists in determining the apparent size (D), of the halo, of entoptical origin, which also appears as flickering, for various values of intensity (I) of the central spot. In a previous experiment, the rate of growth of the flickering halo has been found to be greater for blue than for green and red lights, and has been found to be minimum for white light. Color mixtures of variable composition are used.

In the case of red-green mixtures, the slope of the log D vs log I plot has been found to be independent of the composition of the mixture.

In the case of red-blue and of green-blue mixtures, some peculiar effects are tested, which are tentatively explained either in terms of failure of additivity of near-threshold stimuli, or by minding to some directional sensitivity effects.

Finally, a parallel is drawn between the findings of the present experiments and some electroretinographic data. In particular, attention is paid to the fact that the slope of the electroretinographic intensity function is greater for blue than for green and red lights (at least when a small focal spot is used), just like it happens

for the log D vs log I plots. As a conclusion, the attempt is made to evaluate the size of retinal area which takes part in ERG response, at various intensities.

F. SCHUPFER and RITA FINI MARCONI: On the variability of visual performance. A.F.G.R., Vol. XXIII, N. 1, p. 76, 1968.

There are some arguments in favour of the idea that visual performance follows a cyclical behavior which is characteristic of the individual examined, and, for our two cases at least, is but little dependent on the task performed.

G. DEL SIGNORE: B-wave suppression decay in flickering ERG and associated time constants. A.F.G.R., Vol. XXIII, N. 1, p. 85, 1968.

Flicker ERG experiments have been performed with white and red lights (6328 A from a He-Ne laser), in order to investigate about the decay of suppression of an ERG response, induced by a preceding stimulus. For white light, a decay time constant of about 450 msec has been found. For red light, the time constant relative to the b_1-wave has been found to be about 300 msec, that relative to the b_2-wave, 450 msec.

LUCIA RONCHI and A. DALL'ERA: Visual response to a time step of luminance. A.F.G.R., Vol. XXIII, N. 2, p. 235, 1968.

The present paper consists of two parts. In the first one, data produced in the available literature and concerning the perceptual events which follow the onset of a step of luminance are produced, by paying particular attention to the course of brightness sensation. In the second part, an experiment performed by us is described, dealing with the course of brightness sensation during the time interval which follows the rapid adaptive effects, and lasts until steady state is attained. In the literature we read that "during this time, brightness decays and sometimes fluctuates." Our data confirm this view, and show that the occurrence of oscillations depends both on the observer and on physical parameters of stimulation, such as wavelength and intensity. Finally, the attempt is made to account for the recorded behaviors by comparing the brightness responding system to a second order linear physical system of variable damping ratio.

A. WIRTH: Patologia oculare ed arti figurative. A.F.G.R., Vol. XXIII, N. 4, p. 445, 1968.

The influence of eye pathology on the pictoral art is reviewed and discussed. Particular emphasis is given to refractive errors, senile lens changes and defective colour vision.

V. RONCHI: Aspects actuels des théories énergétiques de la vision. A.F.G.R., Vol. XXIII, N. 5, p. 589, 1968.

A great number of studies have been made on the influence on vision of a well illuminated environment; above all they point out the sensation of comfort felt by the observers and a better performance of their work. The good results are evidently due to a favourable action of radiation on the retina, which improves the quality of the sensation in general, and in particular the sharpness of the images. We cannot estimate the feeling of comfort of measuring instruments; we can only establish some statistics based on particular opinions. The improvement in the performance of work can, instead, be measured with great accuracy; thus, since a century, many studies have been carried out with numerous results recorded with great accuracy. The fact that direct vision of fine details cannot be attained without a good illumination was at first explained by a physiological theory on a cellular structure of the retina. Later, a physical theory thought to be able to give an explanation based on the ondulatory structure of optical radiations. These theories, though almost generally accepted and included in classical texts, must be considered insufficient and surpassed, since the mechanism of physiological "nistagmus" has been brought into evidence, and above all since the energetic structure of the optical resolution has been demonstrated in an absolute manner. All this is fully in agreement with the modern theory of informations. All such studies have pointed out the importance of good illumination to obtain a better performance from the visual apparatus.

COULEURS

Issue #72 of Couleurs (Revue officielle du Centre d'Information de la Couleur et de l'Association Francaise de Colorimétrie) contains three very interesting articles on the use of color. The first by S. Dumarest is entitled "Climates, colors, and architecture"; the other two, both by Jean-Paul Favre, are entitled "Package color and the creation of associations" and "Memory for package colors."

In his article on architecture, M. Dumarest states two fundamental principles for the use of color in buildings:

1. It seems essential to harmonize the fundamental color of an edifice with the dominant color of the soil (earth or rock) on which it stands.

("Fundamental" is defined by M. Dumarest as the color of the major part of the exterior. It is that which conditions the general character of the structure and the choice of colors for the ornamental areas, such as columns, windows, balconies, loggias, etc.)

2. But it is equally important to give consideration to the architectural whole, relative to the total surroundings as they result from the interaction of local natural light, the nature of the soil in general, and the dominant aspects of vegetation or neighboring con-

struction -- in short, all that which gives to a landscape its individual character, in full daylight and during its most representative season.

While these two principles have no doubt lost something in the translation, they should serve, at least, to suggest the nature of the author's thesis. M. Dumarest discusses at length the contrasting nature of two representative regions (Tuscany and the Netherlands) and their influence on architecture. He also provides examples of how his principles can be applied in the use of modern materials.

In his articles on package color, M. Favre cites experimental evidence concerning associations between package color and products and discusses rules for using color effectively in packaging. In one study, different package colors were found to produce widely different opinions about the quality of the same enclosed product. In another, brown was found to be inappropriate as a package color for cocoa!

COLOR GLAZING CONCRETE ON THE JOB

A technique for forming a colored glaze on concrete has been developed by a Russian architect, Mr. Nikolai Korsak. An oxyacetylene flame is used to "paint" a thin glass-like surface layer, similar to that formed on ceramic tile, immediately after the forms are removed.

An ordinary oxyacetylene welding set, with a wide-nozzle torch, is used to melt minerals in the concrete and form the glaze. The flame, played gently and evenly over the surface, causes a color change after two minutes, and the oxygen-acetylene ratio determines the color produced. With only slightly more oxygen than acetylene, the result is a white, light blue, or green-dotted-with-yellow glaze. When even more oxygen is added, the glaze is yellow, but when the two gases are used in equal proportions, the color is brown.

The glazed layer has not flaked off under freeze-thaw cycling and is said to impart a surface durability three times greater than that of untreated concrete.

(This is adapted from an article in New Scientist, 8 August 1968.)

MISCELLANY

Cosmetic Witchcraft

An act of Parliament passed in 1770 imposed the same penalties as were then in force against witchcraft on those women who used make-up in order to further matrimony.

(From the Journal of the Colour Group, No. 13, Nov. 1968.)

"Crazy Wheels"

Goodyear is making bicycle tires in colors other than black -- "Crazy Wheels" it calls them. This name was selected in preference to Looney Loops, Wheely Poppers, Screamers, and Happy Boots.

Choice of colors is: Wild Orange, Fab Yellow, Mod Green, Tough Red, and Cool Blue.

(From New York Times, July 7, 1969.)

Or Do You Prefer Maverick's (Ford) Colors?

Hulla Blue, Anti-EstablishMint, Freudian Gilt, Thanks Vermillion, and Original Cinnamon?

REPRINT ENCLOSED WITH THIS ISSUE

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