INTERSOCIETY COLOR COUNCIL

NEWS LETTER NO. 107

JULY, 1953

News Letter Committee:

Faber Birren
I. H. Godlove
Deane B. Judd
Dorothy Nickerson

I. H. Godlove, Editor
127 Spring Garden Street
Easton, Pennsylvania

Dorothy Nickerson, Circulation Manager
Cotton Branch, PMA, USDA
Washington 25, D. C.

For matters of business
Address the Circulation Manager

Subscription price to non-members
$4.00 annually

NEW DEADLINE — This is a further reminder that deadline for receipt of material for the News Letters is the first day of the current month of the News Letter issue.

NOMINEES FOR ISCC OFFICES — In a letter dated May 25, we are informed that the following slate of nominees for office has been presented by the Nominating Committee, which consisted of I. A. Balinkin, I. H. Godlove and E. I. Stearns, Chairman. Each of the members of the slate have indicated their willingness to serve in the indicated capacity for the period 1954-55. Other names of course may be presented in accordance with the terms of the Articles of Organization and Procedure of the ISCC.

Chairman	Dorothy Nickerson
Vice Chairman	Waldron Faulkner
Secretary	Ralph M. Evans
Treasurer	Norman Macbeth
Counsellor	Walter C. Granville
Counsellor	Helen D. Taylor
Counsellor	Scott Wilson
Counsellor	Daniel Smith

NEW INDIVIDUAL MEMBERS — The following individual members were recently approved for membership by letter ballot.

Dr. Eugene Allen, American Cyanamid Co., Calco Chemical Division, Bound Brook, N. J. Particular interest: colorimetry of dyes and pigments; small color differences.

Marie Browning, Tulare County Planning Commission, 221 Center St., Visalia, California. Particular interest: color application to paper and construction materials; handling color in nature. Member of Landscape Architecture.

Charles R. Dockum, 324 W. 84th St., Apt. 111, New York 24, N.Y. Particular interest: design of instruments for mobile color forms and application to fields of education.

Norman Liman, The Lord Baltimore Press, 595 Madison Avenue, New York 22, N. Y. Particular interest: color problems in the graphic arts. Member of Packaging Institute.

John G. Watson, Ciba Co. Inc., P. O. Box 25, Village Station, New York 14, N. Y. Particular interest: spectrophotometry. Member of Optical Society of America.

BIBLIOGRAPHY

We would like here to repeat the call for bibliographical references sounded in our annual report. The Editor finds himself no longer able to find the time to assume the major share of the burden of culling all the necessary journals. It would be most helpful if references were sent in on 3" x 5" filing cards, especially if the order of arrangement used in the News Letter here followed.

PHYSICAL SOCIETY COLOUR GROUP

The seventy-third Science Meeting of this group was held at 3:30 p.m. on 20th May, 1953, at the Lighting Service Bureau, 2 Savoy Hill, London W.C.2. Papers were read by Dr. J. King, Department of the Government Chemist, whose subject was "Colour Changes and the Function of Colour Memory in the Use of Chemical Indicators"; and Mr. M. H. Wilson, Goethean Science Foundation, Clent, Stourbridge, Worcester, whose subject was "The Complementary Hues of After-images".

A ROSE BY THE WRONG NAME

We owe an apology, herewith rendered to Mr. Alexander E. Javitz, Special Features Editor of Electrical Manufacturing for our inadvertent error of giving his affiliation as "Electrical Engineering" when calling attention in our May issue to his article "A Rose by Any Other Name." Mr. Javitz has apparently forgiven us, for in a letter he writes: "I find each issue of the News Letter not only instructive but fascinating in its wide range of coverage." Mr. Javitz is one of those who has helped to make this coverage possible by his fine contributions.

CALIFORNIA STATE COLORS

Our attention has been called to copy of a letter from Mr. J. N. Bowman, Historian, Central Record Depository, Office of the Secretary of State, State of California, to Mrs. Margaret Hayden Rorke, Managing Director of the Textile Color Card Association. The letter, dated May 21, 1953 gives information concerning the exact State colors, blue and gold. The shades adopted by the Secretary of State are: Yale Blue, C.N. 70086, and U.S. Army Golden Yellow, C.D. 65001, of the TCCA colors. The specifications of the colors, taken from the NBS Journal of Research, R.P. 1700, March 1946, pp 237-240, are: blue: Y, .063; x, .204; y, .165; gold: Y, .449; x, .474; y, .458. Mr. Bowman, thanking Mrs. Rorke, writes: "The University of California has used Blue and Gold for over 60 years by tradition, and since it is a State institution the inference is that it and its affiliates (U.C.L.A., Santa Barbara, Davis, etc.) will also use the official State colors."

In view of the traditional California-Florida rivalry we should have information now on the Florida colors. We are reminded of a story. The Californian, visiting in Florida, picked up a melon and asked the Floridian: "Is this the biggest orange you can raise here?" The quick retort was: "Can't you recognize a little grape?"

NEW TCCA SEASONAL COLORS

Recent releases by Mrs. Margaret Hayden Rorke, Managing Director of the Textile Color Card Association of the United States, give advance information on the 1953 Fall Hosiery Colors and the 1954 Spring and Summer Colors for Woolens and Worsteds and

for Man-made Fibers and Silk. The new hosiery colors include Amberglint, Burnished Beige, Coppersheen, Sepia Brown, Brown Dawn, Mellotaupe and Smokelite, a gunmetal type. It is pointed out that these are in general darker than the hosiery colors of recent seasons. They are shown in long, flowing swatches of 15-denier, 60 gauge nylon.

The woolen and worsted colors number forty, of which the first group, called "Seatints", are pastels: Seashell Beige, Mauve Pearl, Ocean Moss, Coral Sand, Aqua-foam, Seasun, Water Pink and Azure Spray. A group of brilliant colors, called "Colors-on-the-Go", shown on a distinctive fleece fabric, include Exciting Yellow, Fiesta Pink, Flight Green, Gay Gold, Rancho Orange, Cruise Aqua, Joyous Red and Cheerio Blue. The third group includes twelve pairs of blending shades captioned "Duo-Tones". These include Pebble Blue, a Slate type and the harmonizing Dimblu; Boulevard Blue, a light navy, and the blending Heavenly Blue; Sun Turquoise and the greenish Jungle Blue; "rich golden" Cognac and Spicy Amber; Oatmeal Beige and the medium brown, Glacé Coffee. Asparagus Green and Lime Frappe are yellowish greens, while Green Butterfly and Mystic Green are greens with bluish undertone. Opaline Rose and Red Jelly are bright reds, while Pink Radiance and Rose Wine are bluer, the latter being a ruby type. The violine range is represented by French Mauve and Frosted Violet. Orange Flame and Red Sail are orange-tinted, while two "neutrals", Misty Dawn and Moonstone Gray complete the list of Woolen and Worsted colors.

Turning to the new colors for Man-made Fibers and Silk, again we find that forty colors are presented by the TCCA. The first group is described as comprising "delicate blossom pastels", and given the name From a Flower Garden. This group, shown on pure silk, includes Cream Magnolia, Blue Daisy, Pink Tulip, Moon Lily, Sunset Rose, Iris Green, Jonquil Yellow and Aqua Flower. Also shown on pure silk are the more exotic colors in more "lively tempo", captioned Tropic Fruits. They are especially smart for sports wear and for bright accents to town clothes. They include Pineapple Yellow, Exotic Blue, Pink Cherry, Blue Grape, Sweet Orange, Tropic Plum, Green Banana and Wild Apple. The name Duo-Tones is again used for a group of twelve pairs of harmonizing colors presented in acetate and rayon fabric. In this group, Sky Rose and Blush Ruby are reds of bluish undertone. In the beige and brown family are Beige Cameo and Cocoa Soufflé, while striking a more animated note are Brandied Apricot and Cognac. Blue Platinum is a cool slate blue which is paired with the lighter Naïve Blue; Smoked Opal and Azurmist lie between grayish blue and grayish mauve, while Porcelain Blue and Rendevous are true blues. In the purplish range are Mauve Shadow and Persian Amethyst. Silverlite and London Gray are neutrals; and French Endive and Green Acid are yellowish greens. Bluer greens include Spanish Emerald and Green Flair. Orangy pinks and reds are represented by Pink Shrimp and Flame Coral. The list is completed by Dawn Aqua and Deepsea Turquoise.

COLORS NEW AND OLD

Besides the news concerning the advance and confidential information about the TCCA seasonal colors, our attention has been drawn to two or three attractive leaflets or folds containing information about the various activities of this ISCC member-body. One of these, called "A Short Short Story", gives general information about the services of this non-profit organization, its nine foreign agents, the forty foreign countries represented in its membership, and the many diversified industries embraced in this membership. Another pamphlet lists (with cable numbers) the 21 colors of the Carpet and Rug Color Card, and the 83 colors of the Upholstery and Drapery Fabric Color Card, assemblies developed by the TCCA of the U. S., Inc. in cooperation with

the Carpet Institute, Inc., and the Decorative Fabrics Institute, Inc. Another pamphlet lists the 216 colors of the Ninth Edition of the Standard Color Card of America, created and issued by the Textile Color Card Association of the United States, Inc. As is well known to most of our members, a TCCA research associate at the National Bureau of Standards determined the tristimulus specifications of these colors, and from this their Munsell notations and equivalents in the ISCC-NBS method of describing colors.

DAYLIGHT IN GRADING OF FOODS

In a letter received from ISCC Treasurer Norman Macbeth, who recently returned from Europe, where he witnessed "many interesting developments", we learned of some new developments in this country in lighting for the grading of foods. The letter was a personal one not intended for publication, though now published with permission, so some details are lacking. Mr. Macbeth states that the Processed Food Division of the U.S. Department of Agriculture has adopted a newly designed piece of equipment to be marketed by Macbeth Corporation, to be known as the Macbeth-Munsell Disk Colorimeter. This is a housing having a standard source of 7500°K illumination, and two spinning disks developed by Munsell. Macbeth understands that these units are to be used in the principal laboratories of the USDA and will be their standard equipment for measuring the color of tomato products to begin with, and other processed foods later on. Progress in this field has been largely through cooperation with Dr. Wilbur Gould of Ohio State University, who favors visual measurement and control of fruits and vegetables in preference to instrumentation because of the simple practical aspects of the disk colorimeter method. An article by Dr. Gould is reviewed in this issue.

Macbeth's interest in the problem is connected with the need for a constant and reproducible light source for the disk grading. He has sold to the industry the idea of standardized illumination (along with the disk colorimeter) in the shape of the Examolite, similar to those Units now so generally used in the cotton trade for the grading of tomatoes and other agricultural products. Research work is under way now on problems involving tobacco, grain, fruits and vegetables, particularly tomatoes, and citrus fruits. Macbeth enclosed in his letter photographs taken at a Sunkist grading plant in California, where an Examolite was installed for grading citrus fruits. This preliminary installation on a small scale has met with very great success. A similar installation for grading California grapes in the fall of 1952 was similarly successful. "It is amazing to me," writes Mr. Macbeth, "how great is the interest expressed by so many industries where color was just an 'accepted problem' in the past."

SWING TOWARD VIVID COLORS

It has been said that one of the factors which retarded the dyestuff industry in its recovery from its recent recession, was the chance swing of popular favor toward pastel shades. These require for dyeing only a small fraction of the dye necessary for some vivid colors. According to an International News Service report from Chicago, dated June 29, the pendulum is swinging back toward more vivid, more brilliant or deeper shades. At the Chicago Summer Furniture Market, dramatic bright colors took the spotlight of fashion news. Magenta, lipstick reds, lime, royal blue, orange, lemon yellow, aquamarine, and citron were in the forefront along with black. Dull grays, greens, browns, dark wines and rusts took a back seat. Other popular colors were pumpkin, tangerine, apricot, lemon, persimmon, dull gold, turquoise, azure, electric blue, royal blue, peacock and yellow green.

Combinations that we used to think as clashing, like magenta and lipstick red, were

put close together, or combined in patterns. Mauve, pink, orange and red were employed all in one room against black and white.

COLOR AND COLOR-DIFFERENCE — Bulletin No. 131 of the Gardner Laboratory, Inc., Bethesda 14, Maryland, recently issued, has this title. It describes the functioning of the Gardner Hunter Color and Color-Difference Meter, and the Gardner Electronic Galvanometer, which can be installed in either the old or the new meter, gives a list of users (- it is still most popular in the paint and varnish industry). A number of precision measurement heads that may be connected to this instrument are also described.

The Editor takes occasion to remark in connection with this instrument, that in some rather extensive work done for an AATCC committee, measurements made by Hunter on the Color and Color-Difference Meter were in excellent agreement with measurements made by the Editor on the G.E. Recording Spectrophotometer.

PRINCIPLES OF COLOR PHOTOGRAPHY — This is the title of a new book by three Eastman Kodak Company experts: Ralph M. Evans, Director, Color Technology Division, W. T. Hanson, Jr., Head, Color Photography Division of the Research Laboratories, and W. Lyle Brewer, Supervisor, Physical Standards and Services Section, Color Technology Division. The book is published by John Wiley and Sons, Inc., 440 4th Ave., New York 16, N. Y.; 709 pages, 354 illus., 6 x 9¼; $11.00. Mr. Evans is too well known to our readers, as ISCC Secretary and former Chairman, author and frequent lecturer at ISCC and other meetings, to need any introduction here; and the connections of the other two authors with Kodak assures that their work will be of equally high caliber. While the editors have not yet had time to examine the book, we feel sure from the table of contents and the character of the authors that we can recommend the book heartily to anyone interested in the fascinating subject of color photography.

RICHTER AND THE DIN-FARBENKARTE — A note from ISCC member Walter C. Granville and a phone call from Dr. Henry Hemmendinger of Davidson and Hemmendinger, consultants, call attention to papers in the May 1953 issue of Die Farbe on the new German official color system. The editor-in-chief of this recently launched Journal is Dr. Manfred Richter, whose name has long been well known in the field of colorimetry. Several articles on the DIN-Farbenkarte are included in the May issue. Dr. Hemmendinger has promised to review the most important of these for our September issue. The issue was received too late for review in the July issue. Two articles by Dr. Richter are: "Das System der DIN - Farbenkarte", Die Farbe 1 (316), 85-98; and "Die Ausfuhrungsform der DIN-Farbenkarte", pp. 122.7.

LOVIBOND ACTIVITIES — Through the courtesy of ISCC Secretary Evans and of Dorothy Nickerson we have received several leaflets and bulletins describing recent applications of the Lovibond color system, produced and merchandized by the Tintometer Lts., The Colour Laboratory, Salisbury, England. The Lovibond glasses, which have been measured and calibrated at the National Bureau of Standards, are best known in this country in the oil industry, but they constitute a method of subtractive colorimetry very useful in many other industries. One of the pamphlets received here is an 8-page one giving Instructions for Using the Lovibond Schofield Tintometer for Measuring the Colours of Light Signals. On the last page of this is listed nine Lovibond publications by The Colour Laboratory, Salisbury, some of which we have previously described in these pages.

A leaflet describes "Chemical Analytical Methods, a handbook of colorimetric chemical analytical methods." Another describes "Chemical Tissue Tests for Determining the Mineral Status of Plants in the Field," by Dr. J. D. Nicholas of Long Ashton Research Station, Bristol University, while a third describes an Improved Field Kit, as originally developed by Long Ashton Research Station for Diagnosis of Mineral Deficiencies in Crops. A news release describes a new Lovibond Unit for High pH Values, involving for the first time in a comparator test a sufficiently stable and reproducible indicator for use with a Lovibond Comparator disk. This sheet lists some seven applications in various industries. The Editor found very interesting the transcript of an interview with Mr. G. J. Chamberlin, Managing Director, The Tintometer Ltd., broadcasted by the British Broadcasting Corporation from the Tintometer factory at Salisbury on the occasion of the British Industries Fair of 1953 occurring on April 27. Quite a number of interesting applications of color knowledge were mentioned; and the Editor thinks it likely he may be able to cull out of them the makings of a few Color Vignettes. Agent for Lovibond-Tintometer instruments and accessories in this country is Curry and Paxton, Inc., 101 Park Avenue, New York 17, N. Y.

EDITOR JAVITZ, COLOR AND GRANVILLE REPORT

Mr. Alex. E. Javitz, Special Features Editor of Electrical Manufacturing and an ISCC Individual Member, is apparently quite color conscious. He has not only become a regular contributor to our News Letter columns, but quite regularly contributes color items to the excellent journal with which he is affiliated. One of his most recent items in that publication, "Classification of Color Specifications," is a 4-page review of the March 18 report of ISCC Committee on Problem 7, "Style for Classifying and Listing Methods for Color Specification," read by Walter C. Granville, Chairman. Almost the complete report is reproduced by Editor Javitz, who says that he has omitted only portions that do not relate to electrically energized equipment or associated materials. The review gives detailed references. The first division, Systems of Color Specifications, contains sections: C.I.E. (old ICI) system, Munsell System, Other Color Spaces and Methods and Identification of Books, Instruments, and Methods. The second division includes Systematic Collections, Other Collections and Government Standards. The third division is Collections of Transparent Color Standards and the fourth is Names of Instruments Used for Color Measurements. The fifth division, Methods of Test Classified According to Material includes the sections: Ceramics and Plastics (opaque and semi-opaque), Ceramics and Plastics (transparent), Paint Finishes, Pigments and Miscellaneous.

The second item by Mr. Javitz is a brief one in the Research Horizons section of Electrical Manufacturing, page 8 of the July issue. It is headed New Design Field-Color Grading of Food, and refers to the March News Letter item in that field originating from the pen of T. J. Smith of Magnason Engineers, San Jose, California.

NEW FLOWER-COLOR CHART

Through the courtesy of Dorothy Nickerson we have received reprint of an interesting paper: A Simple Way of Describing Flower Colours, and a Flower Colour Chart, Bulletin from the Horticultural Department, Royal Veterinary and Agricultural College, Yearbook 1953 pp. 91-104; Copenhagen, Denmark. This is written in English by J. H. Wanscher. Included with it is a printed flower-color chart and mask. Essentially, the chart is a hue detector containing 21 bands of reference colors, each color being printed with a high density of ink dots at one end of the band varying progressively to less density of ink and more of white

paper background at the other end of the band. A high density of ink color is described as "strong," and varies through "light" to "very pale." The term "vivid" describes colors stronger than are illustrated by the chart. The 21 reference bands serve as the limit colors for the names of the 21 hues. The colors of the chart have been designated with the letters a to u, whereas the hue designations belong to the intervals between the color bands. Dr. Wanscher, in Miss Nickerson's opinion, has hit upon a way to obtain sensible color terminology that takes advantage of the great amount of work in color science that is already available; and he has done this with a minimum of expensive color reproduction. In his report he has coordinated much available work on the subject. He describes the Munsell system, the ISCC-NBS naming method, and gives Wilson equivalents. While many of the details, as described in his paper, may depart from a rigorous treatment of some of these subjects, nevertheless the general principles are sound; and his chart and report serve to provide the amateur or even the professional horticulturist with a good understanding of color charts and color-naming methods. The charts are inexpensive enough so that they can be produced with the paper itself as one component. They have been printed for wide distribution already in Scandinavian countries, and soon will be available through the American Horticultural Council in an American edition.

Besides the chart itself and its description, the Wanscher paper contains two or three items of interest to color workers. Table I shows in parallel columns the relationships between the 21 hue names used in the Wanscher chart, the H.C.C. number, the H. C. C. (Wilson) "color families," the ISCC-NBS and the Munsell hue names. A figure shows the relations between the terms vivid, brilliant, strong, deep, very light, medium (moderate), dark, very dark, very pale, pale, weak, dusky and very dusky, and the increasing attributes saturation (chroma, or grayishness) and lightness in the form of a "grid." An appendix gives the equivalents of these terms and the hue names in twelve different languages, including Icelandic but not including Russian.

D. N. and I.H.G.

NEWHALL STUDY OF NAGEL ANOMALOSCOPE

The Nagel Anomaloscope affords such a useful test of color vision that Dr. Sidney M. Newhall of Eastman Kodak decided to study its possible sources of error and their control. Each of five observers made five series of ten matches each with a Model I Anomaloscope, each series being at a different color temperature. The Rayleigh ratios (amount of green light to amount of red light for match of yellow) were then plotted against both color temperatures and lamp voltage. It was found that the average Rayleigh ratio varies almost linearly (inversely) with color temperature or with lamp voltage. In the range covered, there was an average change of about 0.01 in the ratio for every 30° change in color temperature, or every 0.26 volt change in lamp voltage. Since the relation of the latter two variables is almost linear, a voltmeter with voltage regulator provides a convenient means of control. References are given to the literature on the effect of field size on the Rayleigh ratio; and control of this variable is discussed. The present paper was published in the American Journal of Psychology 66, 135-7 (Jan., 1953).

I.H.G.

COLOR THERAPY IN QUESTION

"Color psychotherapy has aroused new interest in recent years and efforts have been made to re-establish the reputation of this declining field," writes Walter A. Woods in J. Applied Psychology 37, 126-8 (April, 1953). He then quotes S. V.

Kravkov (1941) and Faber Birren (in Color Psychology and Color Therapy, 1950) to the effect that they regard color vision as influenced by emotional states, Birren being influenced largely by K. Goldstein (1942). On the other hand, contrary findings were reported by H. Vollmer (1938) and by Lukens & Sherman (1940). Mr. Woods who is affiliated with the School of Clinical and Applied Psychology, Richmond Professional Institute, College of William and Mary, Richmond, Va., now publishes a study, "Influence of Ink Color on Handwriting of Normal and Psychiatric Groups," which places him on the negative side of the argument for the emotional effect of color, along with Vollmer and Lukens and Sherman.

A total of 132 observers was used, half of them college students and the other half patients in the State Mental Hospital at Larned, Kansas. Each subject was required to write the following statement in each of three colored inks, red, green, and black, with a penholder of the same ink color: Dear Joe, We received your letter and expect to see you next week. (Signature). The psychological reasons for this particular statement are given. The usual precautions, such as rotation of order, were taken. The results were such as "to leave no doubt that . . . . . differences due to color of ink used, order in which the sample is written, interaction between color and order, interaction between order and psychiatric classification, interaction between ink color and psychiatric classification, and interaction between ink color, order of writing, and psychiatric classification are those which might be expected by chance from a random sample of handwritings." Differences between normal and psychiatric groups, however, were significant; but the design of the experiment does not permit inquiry into the nature of these interesting differences.

The author concludes with the following statement: "Popular concepts concerning the influence of colored equipment or colored lights on motor performance (and possibly on emotional effect) must be revised until or unless more substantial evidence is uncovered to support these ideas. Nothing in the present experiment supports occupational therapy based on the influence of single colors."

I.H.G.

INTERFERENCE COLORS AND THE CHROMATICITY DIAGRAM

Through the courtesy of Professor I. A. Balinkin, who suggested the experiment, we receive reprint of an interesting paper, A Graphical Demonstration of White Light Interference. This involves a teaching device, an interference color slide rule. The paper is by Alan C. Traub, in Amer. J. Physics 21, 75-82 (Feb. 1953). We reproduce here the abstract of the paper which appears at its head, adding also that Figure 2 shows the usual C.I.E. chromaticity diagram having on it the locus of the interference colors reflected from a thin film on a glass surface as optical path difference increases from zero to 1200 mu.

"A teaching device is described which can be used in lectures on the interference of white light. The wave forms of four selected components of white light, in the violet, green, yellow, and red regions, are shown one above the other on a cardboard chart, inked in their respective colors. A sheet of clear plastic with an identical set of waves drawn on it is placed over the chart so that the two sets are in register. The combination represents a beam of white light as it arrives at the retina. A retardation of part of the beam is illustrated by displacing the plastic sheet laterally. Since the sine waves differ among themselves in wavelength, the various phase changes which result among the four components are shown quite clearly."

"The principle has been embodied in slide rule form with the wave trains appearing at a large plastic window. Five smaller windows indicate, respectively, path difference in millimicrons, dominant wavelength and purity of the resulting light when C.I.E. Illuminant C is used, and relative energies and resultant hue for the four components shown."

I.H.G.

ARTIFICIAL LIGHT FOR VISUAL COLOR EVALUATION OF FRUITS, VEGETABLES

This is the title of a paper by Professor W. A. Gould of Ohio State University, reprint of which was received through the courtesy of Norman Macbeth. The reference may be found in Food Packer for November, 1952. In the paper is described an installation and the use of a new color-evaluation room for grading products arrived at by a study at Ohio State in cooperation with Macbeth Corporation. The room was lighted with six Macbeth Examolites. "Color scores" obtained under these lights were compared with those obtained with natural north daylight and those obtained from readings on the Hunter Color and Color-Difference Meter. The paper, incidentally, mentions as a reason for using artificial lighting, the fact that "many food processing plants operate longer than daylight hours" and that "normal daylight varies tremendously during different times of the day. . . . ." A table of color temperatures of light sources illustrates the latter fact graphically. The paper, after citing six advantages in the use of Macbeth Examolite for artificial lighting for color grading, ends with the following conclusion, which we quote verbatim except for unsplitting a split infinitive:

"In conclusion, color is not only how you see it but how you light it. It makes sense to duplicate artificially the natural lighting conditions under which the grader has obtained his color memory and color experience in order to make the best use of this experience. By application of controlled artificial color corrected illumination, an industry-wide common demoninator for seeing and evaluating color can be established."

I.H.G.

REPORT ON NEUTRAL N-15 SUNGLASSES

We have received copy of another of the series of reports published by the Bureau of Medicine and Surgery, Navy Department, Visual Engineering Section, U. S. Naval Submarine Base, New London, Conn. This one, Memorandum Report 53-3, Report on Testing and Evaluation of Bausch and Lomb Neutral N-15 Sunglasses, was prepared by Beverly Hillman, Research Psychologist and approved by Lieut.-Comdr. Dean Farnsworth, MSC, USNR, Head, Visual Engineering Section. We quote here summary of the report as prepared by the author.

"A sample lens of the Bausch and Lomb N-15 sunglasses was given a battery of tests in this laboratory. The glass has been found to meet all requirements for general purpose sunglasses recommended by this laboratory. The spectrophotometric transmittance curve and the Judd average deviation index show that the lenses used in these glasses are very nearly flat neutral, thus insuring daylight duplication of colors. The high absorption of heat radiation is especially desirable in many naval and air situations."

I.H.G.

COLORIMETRIC SPECIFICATIONS OF MUNSELL REPAINTS

In the March 1953 issue of the Journal of the Optical Society of America (vol. 43, pp. 163-171) are given the tristimulus values, chromaticity

coordinates and Munsell renotations of nearly 600 repaints of the Munsell standard papers. The paper is by Dorothy Nickerson and Josephine J. Tomaszewski, of the Production and Marketing Administration, USDA, and Thomas F. Boyd, Industrial Test Laboratory, Philadelphia Naval Shipyard. Early spectrophotometric measurements, from which the colorimetric data were computed, were made by J. J. Hanlon, H. A. Sloviter and R. T. Cook in 1943 and 1944, the bulk of them being by T. F. Boyd and L. Goldberg in 1949 and 1950. The table of the data includes all regular Munsell standard papers made up to July 1950 that have not been reported previously. The job was one of tedious routine, but a necessary one because of the wide range of use of Munsell papers, including employment by governmental agencies and in tests by others involving governmental standards or specifications.

MATCHING AND "MACADAM ELLIPSES"

A paper by H. R. Davidson, formerly of General Aniline and Film Corporation, now of Davidson and Hemmendinger, color consultants, and R. D. Haire of the United States Air Force, Wright Field, Ohio, entitled "Marching USAF Silvertan Shade No. 193," appeared in the American Dyestuff Reporter 42, 253-7 (April 27, 1953). In this paper colorimetric specifications were given for 66 samples, viewed under two different illuminations, submitted as matches for the Air Force Standard of Silvertan Shade No. 193. It is indicated that less than half of them were accepted, and this study gives the reasons for acceptance or rejection. The so-called MacAdam ellipses (rather than ellipsoids in three dimensions, the third being the "Y values") were used as the bases of tolerance.

The best review of this interesting paper is embraced in the authors' conclusions, which we now quote: "We have shown that if a sample of USAF Silvertan Shade No. 193 examined under daylight illumination lies well within an ellipse about 1.7 times as large as the MacAdam visual sensitivity ellipse, if it lies well within an ellipse about 2.5 times as large as the visual sensitivity ellipse when viewed under tungsten light, if it does not differ from the standard in Y value by more than about ± 0.02, and if its spectrophotometric curve is nearly identical in shape with that of the standard, it will be accepted as a color match with the standard. If it fails in any one of these specifications it may be rejected. Although it is possible to have a sample accepted even though its curve shape differs from that of the standard, the dangers of such metameric matches have been pointed out. Improper choice of dyestuffs is apparently the most important cause of rejection on this shade. Much time and money could have been saved by the various manufacturers if they had obtained spectrophotometric measurements on the standard and the dyestuffs they proposed using before attempting to make the match."

I.H.G.

BIBLIOGRAPHY

I. Nimeroff; J. Opt. Soc. Amer. 43, 531-3 (June, 1953) Propagation of errors in spectrophotometric colorimetry

M. Richter; Die Farbe 1, (316) 85-98 (July, 1953) Das system der DIN-Farbenkarte

M. Richter; Die Farbe 1, (316) 122-7 (July, 1953) Die Ausfuhrungsform der DIN-Farbenkarte

L. A. Riggs, F. Ratliff, Janet C. Cornsweet, & T. N. Cornsweet; J. Opt. Soc. Amer. 43, 495-501 (June, 1953) Disappearance of steadily fixated visual test objects

J. H. Schulman & C. C. Klick; J. Opt. Soc. Amer. 43, 516-19 (June, 1953) Apparatus for automatic recording of reflection spectra

Louise L. Sloan & Adelaide Altman; J. Opt. Soc. Amer. 43, 473-8 (June, 1953) Aniseikonia and the Howard-Dolman Test

S. W. Smith & F. L. Dimmick; J. Opt. Soc. Amer. 43, 541 (June, 1953) Facilitative effect of red light on dark adaptation

Jean Terrien; La Spectroscopie, Presses Universitaires de France, Paris, France, 1951 128 pp. 27 figs. Price 150 francs. Review by E. C. Crittenden, J. Opt. Soc. Amer. 43, 541 (June, 1953)

A. C. Traub; Amer. J. Physics 21, 75-82 (Feb., 1953) A graphical demonstration of white light interference

J. H. Wanscher; Bulletin from Horticultural Dept., Royal Veterinary and Agricultural College, Year Book 1953 pp. 91-104 Copenhagen, Denmark; A simple way of describing flower colours and a flower chart

W. Weinstein; J. Opt. Soc. Amer. 43, 539 (June, 1953) Oblique transmission of multilayer thin films

AATCC, Fastness to Light Committee: Amer. Dyestuff Reptr. 42, P379-85 (June 8, 1953) A study of anomalous fading in the fade-ometer

J. C. Armington; J. Opt. Soc. Amer. 43, 450-6 (June 1953) Electrical responses of the light-adapted eye

H. R. Blackwell; J. Opt. Soc. Amer. 43, 456-63 (June, 1953) Studies of the form of visual threshold data

R. M. Boynton; J. Opt. Soc. Amer. 43, 442-9 (June, 1953) Stray light and the human electroretinogram

K. T. Brown; J. Opt. Soc. Amer. 43, 464-72 (June, 1953) Factors affecting differences in apparent size between opposite halves of a visual meridian

E. C. Crittenden; J. Opt. Soc. Amer. 43, 541 (June, 1953) review of La Spectroscopie, by Jean Terrien. Presses Universitaires de France, Paris, France, 1951. 128 pp. 27 figs. Price 150 francs

J. E. Garnsey; Gen. Elec. Rev. 56, 37-40 (May, 1953) Taming the rainbow

Beverly Hillman; Medical Research Laboratory, U. S. Naval Submarine Base, New London, Conn. Memorandum Rept. 53-3 Report on testing and evaluation of Bausch and Lomb Neutral N-15 sunglasses

L. M. Hurvich & Dorothea Jameson; J. Opt. Soc. Amer. 43, 485-94 (June, 1953) Spectral sensitivity of the fovea. I. Neutral adaptation

G. W. Ingle & L. Rudick; J. Opt. Soc. Amer. 43, 501-4 (June, 1953) Comparison of the MacAdam and the Adams-Nickerson Indexes of color differences

A. E. Javitz; Electrical Manufacturing (Research Horizons) p. 8 (July, 1953) New design field,- color grading of food

D. L. MacAdam; J. Opt. Soc. Amer. 43, 533-8 (June, 1953) Dependence of color-mixture functions on choice of primaries

W. R. Miles; J. Opt. Soc. Amer. 43, 435-441 (June, 1953) Effectiveness of red light on dark adaptation

S. M. Newhall; Amer. J. Of Psychology 66, 135-7 (Jan., 1953) Relation of the Rayleigh ratio to color-temperature