LSC Note
MHB
HJK
[illegible]
LP
DJC
KML

INTER-SOCIETY COLOR COUNCIL

NEWS LETTER No. 86

JANUARY 1950

News Letter Committee:

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

I. H. Godlove, Editor
General Aniline & Film Corp.
Easton, Pennsylvania

Dorothy Nickerson, Circulation Manager
Box 155, Benjamin Franklin Station
Washington 4, District of Columbia

For matters of business,
Address the Circulation Manager

Subscription to non-members:
$4.00 annually

ANNUAL MEETING MARCH 8, 1950. The Keystone Room of the Statler Hotel, New York City, will be headquarters for the annual meeting on March 8. Business and committee discussion sessions will be held in the morning. The afternoon session, an important one to which all who are interested are invited, will have as subject "Color as Used in Architecture, Design and Decoration." There will be four speakers, one from each appropriate member body: Mr. Scott Wilson for the American Designers' Institute; Mr. Waldron Faulkner for the American Institute of Architects; Mr. Karl Bock for the American Institute of Decorators; and Mr. Egmont Arens for the Society of Industrial Designers.

The dinner meeting, "ISCC Operation Rainbow," will be held under the direction of Mrs. Helen D. Taylor's dinner committee. Plans are such that no member will wish to miss this session. Following the dinner there will be an illustrated lecture "Seeing Light and Color," by Mr. Ralph M. Evans of Eastman Kodak, past ISCC chairman. This is a general lecture on color that has been given before a number of our member bodies, but never before a general Council meeting. It is an experience no colorist should miss.

LIGHT REFLECTIONS On the first day of a year in which we have become (in respect to the ISCC) an editor and counsellor only, and in which therefore it is not our pleasant duty to read copies of the multitudinous letters from the puissant pen of our indefatigable Secretary, consequently have at least a very little time available for musing, we look back on our two-year incumbency of the Chairmanship with mixed emotions. When we became chairman, there were 15 national member-bodies instead of the present twenty. We had little or nothing to do with the increase of 33% in two years; this rapid growth is nevertheless gratifying. But we are more pleased with the character of the recent additions; and with this we had perhaps just a little to do.

Back in the early days of the ISCC, though our avowed purposes centered around the "coordination of the color efforts of science, art and industry," we were almost wholly the scientists of government, the colleges and industry. We spoke the scientist's language only. Your editor took every opportunity to remind his

confreres of this fact in the early days. Indeed he probably made himself obnoxious harping so frequently on this note.

In a more dignified vein - for in the interim he had aged somewhat - he sounded the same note in the January, 1937, issue of the News Letter (his first as Editor) under the title "A Hueful Talk to You." Under the same title, he reprinted part of this in September, 1947, when a candidate for Chairman: his platform, so to speak. We requote a few lines.

"We shall forget we were scientists - or were we - and seek to deck out the dry bones and solid meat of our scientific facts about color with a garnish of color. We mean to wallow in the soft pleasant mud of scientific inaccuracy a little, hoping we'll be pardoned if we bathe in exactitude much more." .... "The scientist, you know, is a man, who will spoil a good story by telling the truth! We hope to introduce a few stories about color, or colorists, and fib gleefully, if we must." "Then we went on to say (in the 1937 article) how we hoped to entice readers (and members) especially among our non-scientist cousins in the industrial and design-and-art fields."

Lest our "Light Reflections" be, in another sense, too light, and in the wrong sense construed as reflections, we hasten to say that we have not the least thought of impugning our new friends with the stigma of being unscientific. If there is any adverse reflection, it is on us scientists who spoil the good story. But much more importantly, experience has shown that the differences between us are primarily those of language. Once we have learned the color language of our artist-decorator-architect friends, and they have learned ours, we may look for rapid progress together. The March "Operation Rainbow" should be one excellent opportunity for rubbing elbows and starting the learning of each others' languages. And we hope there will be many other opportunities.

But to return to our personal outlook and problems in the few lines which our brother editors may grant us - and we hope we have set a precedent for Re-flections (not so light!) at the end of the future administrations. We are forced to think of the future in terms of duties and committees. We started the year serving on a round dozen of the latter; these cooperated with other factors, no doubt, in sending us for a too-long sojourn in a hospital. We are now on 17 committees, counting an ISCC editorship, counsellorship and News Letter committee as only one! The book on color, which we were under contract to finish in 1949, is about one-fifth done. The chapter or section for the O.S.A. is far from complete. Papers delivered nine months ago are still waiting to be readied for the press; and research material for from six to a dozen more papers has been accumulated. We hope therefore that those who have read these reflections this far will be indulgent if we failed to answer letters. We hope we have been pardoned too for some tardiness in recent issues of the News Letter.

Periodically, we like to remind our readers that just as no half-dozen hard-working officers or handful of societies can make a council, no three or four editors can make a News Letter. A News Letter is a "peoples publication" par excellence. Please let us have your ideas as to what our News Letter should contain. In the past we have had many letters asking for continuance, along with "strictly news" items, of the bibliography; also nearly as many asking for occasional historical items, such as our "Christmas Colors" in this issue. What is your idea for other features?

In the last paragraph or two we spoke as Editor. Speaking now as an Ex-chairman and Counsellor our platform will be, now that we believe that we have a well balanced membership, to bend all our efforts in our small way towards making that felicitous personnel as fruitful as possible. To the new Chairman we direct the wish that he meet as many charming committee members as we have; but not that he meet and entertain as many bacteria and viruses.

I.H.G.

WASHINGTON AND BALTIMORE COLORISTS

On Thursday evening, December 15, the first of a series of round table discussions was held by this group. Almost 25 persons met for dinner before the meeting, adjourning after dinner to join the other members of the group at the nearby National Paint, Varnish & Lacquer Research Laboratories to discuss the measurement and specification of small color differences. Mr. Alfred C. Webber and Dr. F. W. Billmeyer, Jr. of the E. I. du Pont de Nemours & Company of Arlington, N. J. were guest speakers. They brought with them plastic models of both I. C. I. and Munsell color space, having developed these models in relation to work on small color differences in highly chromatic transparent plastics. Considerable data which were gathered in the general course of their studies were presented as the basis for discussion. It was agreed that this was one of the most fruitful sessions held in a long time.

On Thursday evening, January 5, the Colorists and the local chapter of the American Institute of Architects joined the local Illuminating Engineering Society in a meeting to which Dr. Deane B. Judd and Mr. Ralph M. Evans were invited to present reports given at the ISCC-sponsored color session of the French Lick meeting of the IES in September. Dr. Judd, in an excellent demonstration, discussed color terms and concepts. He began with the purchase of electric power by the consumer. By the time he had finished, practically all of the important terms had been described, as well as several methods of specification. How he could demonstrate in so clear a manner a subject of so dry a nature is something that probably only Dr. Judd could answer!

Mr. Evans discussed "Some Aspects of Vision and Illumination" in the form of an illustrated lecture. As is his usual wont, the lecture was excellent, and the pictures beautiful. Three points out of the many included in a report to the IES Color Committee (of which Mr. Evans is the 1950 chairman) were selected for discussion: (1) hue, saturation and brightness contrast (it was concluded that hue provides the variety, chroma subtility, but brightness the real contrast); (2) diffuse versus unidirectional illumination effects (demonstrations showed that the effects are startling); (3) reflectance versus brightness relationships (discussed as an important but very little understood problem). One of his concluding remarks is something to think about in relation to problems of color and illuminating engineering. "If in the daytime we are given a task to do, we do not simply accept whatever lighting happens to be available, and proceed. If possible, we take the task to a spot where the lighting is most suitable for the job. We do not often read a book in direct sunlight, but we do hold pieces of cloth there to learn whether or not they match."

THE CALIFORNIA COLOR SOCIETY

In a meeting of this society held at the Art Center School Auditorium, 5353 West Third Street, Los Angeles, at which new officers were elected, the speaker of the evening was Ralph M. Evans, head of the Color Quality Control Department of Eastman Kodak Company, past chairman of the ISCC and well known author, to whom we have

already referred as speaker in two previous items in this issue of the News Letter. The subject of Mr. Evans' illustrated lecture was "Depth Perception in Color Photography," a subject on which he is an authority; and as usual his presentation was very well received. The new officers elected at the meeting are: Mrs. Albert King, Chairman; Miss Elizabeth Franklin, Secretary; Dr. C. L. Graham, Vice-chairman, and Mr. H. G. Benriter, Treasurer. We have been informed by member Herbert B. Palmer that the society had several hundred guests at this "highly successful meeting."

We are also informed that another meeting of the society was scheduled for Wednesday evening, January 11, again at Art Center School Auditorium. The speaker was to be Mr. Walter C. Granville, in charge of the Color Standards Department of the Container Corporation of America (authors of the Color Harmony Manual, now in course of revision) and well-known chairman of the ISCC membership committee. His subject is Color in Relation to Human Comfort. It was described as an explanation of the psychological and physiological reactions of people as a result of the use of color harmony in interiors and exteriors. More about this, and about the December meeting at which Mr. A. H. King was speaker, in our March News Letter.

PHILADELPHIA-WILMINGTON COLOR GROUP

On the same evening that Mr. Granville was to speak to the California Color Society, Dr. Deane B. Judd of the National Bureau of Standards spoke before the Philadelphia-Wilmington Color Group at their seventh meeting. Dinner was held at Alden Park Manor in Germantown, and was followed at eight o'clock by Dr. Judd's lecture on the subject "Problems of Color Blindness, Color Vision and Small Color Differences," this being given in Rooms 207-9 of the Philadelphia Textile Institute, Henry Avenue and Schoolhouse Lane, Germantown, Philadelphia, Pennsylvania.

SPECTROPHOTOMETER-SERVICE CONFERENCE

A notice dated December 15, 1949, from the Apparatus Department, General Electric Company, 1 River Road, Schenectady 5, N. Y., states that this company is to hold another of its Spectrophotometer-Service Conferences on February 20, 21 and 22. The notice also inquires concerning individuals interested in attending a Color-Measuring Course, with noted guest lecturers, to be held in the early summer of 1950 at Union College. The February Conference will be sponsored by the Special Products Division and the General Engineering & Consulting Laboratory of G. E., and will be directed primarily to maintenance, operation and service of the G. E. recording spectrophotometer. It will not deal directly with applications. The following subjects will be discussed in detail: Theory of the Recording Spectrophotometer, Fundamentals of Trouble Shooting, Replacement of Mirror "J", Slit Adjustment, Cementing of the Photometer Prisms in Holder, Optical Alignment of the Photometer, Adjustment of the 120-Cycle Eliminator Circuit, Smoking the Sphere, Amplifier Output Measurements, Phasing the Grid Signal with the Thyratron Plate, Explanation of Adjustment of the Flicker Motor Phasing Circuit, 30-Cycle Noise, Installation and Care of the Flicker-Motor Bearings and Maintenance. The only prerequisite to the course is that the individual be concerned with the operation and maintenance of the recording spectrophotometer.

PHYSICAL SOCIETY COLOUR GROUP

The 49th Science meeting of this group was held at 3:30 P.M. on December 7th, 1949, at the Lighting Service Bureau, 2 Savoy Hill, London W.C. 2, at which meeting the subject of Camouflage was discussed by Dr. H. B. Cott of the University Museum of Zoology, Cambridge. Dr. Cott is a well known authority and author in this field. An advance abstract states that the optical and psychological principles upon which

visual deception depends will be considered, and the methods indicated by which it has been attained in nature. Reference is also made to the bearing of these principles and devices upon the practical problem of applied camouflage in war.

FARADAY — The following quatrain by Dr. E. Q. Adams, recently retired General Electric physicist and chemist, and author in the color field, was given to the Editor at the Buffalo meeting of the Optical Society of America in October. Unfortunately, the November issue was too crowded to use the lines; but of course anything about Faraday and from Dr. Adams is always timely. (Perhaps our technically informed readers will be kind enough to inform the Editor whether he is correct in calling four rhyming lines a quatrain when alternate lines do not rhyme.)

Was ever man so simple and so sage,
So crowned and yet so careless of the prize;
Great Faraday, who made the world so wise,
And loved the labour better than the wage.

TCCA ADVANCE NOTICES — Since our last issue we have received advance information from Margaret Hayden Rorke, Managing Director, of new official color collections promulgated by the Textile Color Card Association of the U. S. Two items deal with 1950 Spring Hosiery Colors and two with Men's and Women's Shoe and Leather Colors for Fall 1950. The new nylon hosiery colors are seven in number. Swatches of these, recently issued to cooperating members, will be followed by the Confidential Advance Hosiery Card for Spring 1950 and by the Regular Season Hosiery Card, along with fashion and merchandising notes for coordinating the new colors with the leading colors in costumes and accessories. Of the new colors, Visa is described as a versatile light brown blending subtly with all colors; Burntspice is a "lively sunbrown"; Coppersky, a "rich coppery version"; Suntime, a "glowing sunny shade"; Dawntaupe, an "attractive neutral"; Starhaze, a "misty bluish grey"; and Brownlustre, a "sophisticated off-brown." Literature distributed by the Association describes the harmonious correlation of these seven colors with wear and occasion types and with the other colors of the ensemble.

Turning to the shoe colors, 16 of these have been chosen for fall and winter, 1950, men's shoes by the Joint Color Committee of the Tanner's Council of America, the National Shoe Manufacturer's Association and the National Shoe Retailers Association in cooperation with the Textile Color Card Association. These colors are divided into three groups: (1) For smooth leathers: a new reddish brown, a new brown Cordovan type, a new golden tan and the repeated colors Brown Oak, British Tan, Tawny Tan, American Burgundy, Cherrytone and Natural Tan; (2) for grained leathers: a new warm brown and the repeated color, Golden Harvest; and (3) for brushed leathers, a new "coppery rust," a slate gray and the repeated colors Admiral Blue, Prairie Brown and Forest Green, along with Black.

The 1950 Fall Colors for Women's Shoes number 17, issued by the same four cooperating associations. Adopted for smooth leaders are a new wine color, a new Cordovan, and the repeated colors Café Brown, Cognac Brown, Admiral Blue, Cherry Red, Parkway Green, Turftan, Playred, Green Pepper, Golden Wheat and Cinnabar. For suede leathers are included the same new wine color (listed above), a new light nut brown, a new "coppery tone," a new lively blue and the repeated colors Café Brown, Parkway Green, Admiral Blue, Slate Grey, Playred, Turftan and Cinnabar, again along with Black.

MUNSELL COLOR COMPANY

Recently there has been published a small 8-page pamphlet, "Statement of Policy for the Munsell Color Company, a Directive from the Trustees of the Munsell Color Foundation." It may be remembered that the Munsell Color Foundation, a non-profit organization, was established in 1942 in memory of the creator of the Munsell Color System - Albert H. Munsell. One of the purposes for which the Foundation was formed is very similar to that of this Council: "To further the scientific and practical advancement of color knowledge, and in particular, knowledge relating to standardization, nomenclature, and specification of color; and to promote the practical application of these results to the color problems arising in science, art and industry." The Foundation has the duty to hold the common stock of the Munsell Color Company, Inc. and to vote the same in such a manner as will best accomplish the above stated purpose. The present Trustees are Deane B. Judd (appointed by the director of the National Bureau of Standards), President; Blanche R. Bellamy (representing the Munsell Color Company), Secretary; Dorothy Nickerson (appointed by the executive committee of the Inter-Society Color Council); Royal Bailey Farnum; I. H. Godlove; David L. MacAdam; and A. E. O. Munsell. The pamphlet briefly discusses the Concept of the Munsell System, the Current Munsell Standards and their Notation, New Productions of Munsell Material Standards, Alternate Samplings of Munsell Color Space, Service Work; and provides a Summary reading as follows: The chief tasks laid down by the Munsell Color Company are to develop and supply accurately controlled color standards at near cost and to supply literature for describing the Munsell System and its applications. It is felt that in this way the Munsell Color Company can best promote the teaching and use of a standard method of color notation based on the very natural method of visual color organization that is required for analyzing and solving most color problems.

MEN! DO YOUR COLORS MATCH COMPLEXIONS?

From Mrs. Helen Taylor we have a British newspaper item of this heading, received the day after Christmas. It states that British men are being advised about the colors which are most becoming to them. Robert F. Wilson, art director of the British Colour Council, in the first edition of "Cloth and Clothes," a new men's-wear journal, wrote: "A pale complexioned man with fair hair and pale eyes should wear very dark colors or very light ones.

"The same theory applies to hats. The abundance of pale, characterless complexioned men accounted for the popularity of the black bowler and Anthony Eden Homburg.

"Why not let us see fancy hat bands showing contrasting colored effects? I think we have had matching hat bands long enough."

ON THE REDNESS OF RED

The preceding item calls to mind an occasion in 1948 when members of the Council were publicly chided, by a very handsome and excellent guest speaker, for their aversion to the wearing of brightly chromatic articles of clothing. He challenged answer to the question: "Why are you people in the color field so afraid to wear color?" The handsome interrogator, it may be said, was wearing a brilliant orange-pink cravat resplendent between his broad shoulders. As the current chairman at the time, your homely Editor thought it incumbent on him to answer, though not to deny, the implied onus of personal neutrality.

We answered in terms of our own history, expecting then as now that we would be pardoned the personal note, inasmuch as our own case was the only one familiar

enough to us to speak about it authentically. The causes, we said, for our own drabness of apparel were both traditional and practical; but we held out great hopes for the younger generation, as we shall show. We were born half a century ago of parents themselves not so far removed from the pioneer stage of the union when life was hard and "colorful" but not, for many practical reasons, filled with color. To his family home, acquired over a century ago in Old St. Louis, Father had brought Mother as a bride. It was a massive structure, one a geometer would call a rectangular parallelopiped (of big sandstone blocks), "ugly as sin - if sin is ugly." Aside from the "back parlor," sandwiched between the "front parlor" and the music room, there was little (chromatic) color except in the nursery and play room. On the few state occasions, about once a year, when the big oaken doors were opened to let in a little light to the back parlor, we could see revealed some deeply colored drapes and overstuffed (and probably over-ornate) furniture. In the playroom and nursery only we children could find lively colors. Here an artist had covered every wall and ceiling with vivid pictures of fire-engines rushing to fires, steamboats steaming under the Eads Bridge, pioneers fighting the Indians. But of course we were never indoors if we could be outdoors; and color was not associated with our most pleasant moments of play.

But further, just as we were told in those days that children should be seen but not heard, we were also told that it was ourselves who should be seen, not brilliant distracting color in our clothes. This, we think, was a relic of pioneer days, and arose from practical reasons. For families then were often of patriarchal size; in our case, in addition, if there were only one or two guests for dinner, we would ask Mother what was wrong, was Father sick? The dozen or so people at every dinner table of course required much servant help. Though food and labor were cheap, mere numerical problems in those days obviously required substantial incomes or else curtailment, as we shall see. Though Father's ideas made most of his friends millionaires, his interests ran along other lines. Moreover, he had organized a Society for the Promotion of Art (Art, at least, in capitals); but in his later years this had become a Society for Buying Meals for Indigent Artists. The only persons we ever saw wearing bright color at dinner were, we children thought, rather queer: artists, musicians and writers. Chromatic color was thus not associated in our minds with our heroes, such as Indian fighters, Teddy Roosevelt, policemen or John L. Sullivan.

Thus the expense of big families tended to lead to our being clothed in neutral colors; and psychological reasons permitted our being reconciled to them. For grayish colors could be adapted to harmonize with practically any other ensemble colors and with moderate incomes. Rich colors required a more extensive wardrobe; otherwise we might only look ludicrous, like a few of the more indigent artists who were apparently what we would now call exhibitionists. Neutral colors had thus a very practical basis.

Besides this, Father always taught us the beauty of dignity and reserve. But in spite of his active sense of humor, it availed us nothing to remark: "How can anyone with my face have dignity."

But the times have now changed! One need only spend a few hours at a highschool football game or on a college campus to be sure of this. He-men now wear pink and orange shirts with utter abandon. Moreover, in this day of vitamins among the younger generation there is much more of each of them on which to put more color. It is common when our son's college friends drop into our apartment for ping-pong to see three out of four of them covered with brilliant red sweaters (our son, over

6' 4" tall, among them). Then we cannot help but observe that six square feet of red is clearly redder than four square feet of red. Take heart, non-colorists, we colorists too may still live to wear lively color -- though perhaps not so much of it as our sons.

I.H.G.

GARDNER APPARATUS

Though dealing primarily with paints, lacquers and varnishes rather than color broadly, we would like to call attention to a number of leaflets recently received that describe apparatus in this field developed by the Henry A. Gardner Laboratory, Inc., 4723 Elm Street, Bethesda, Maryland. One of these deals with the new P4 Glossmeter; it is a 60° Glossmeter stated to accurate to 2 %. Another is the Interchemical Direct-Reading Wet-Film Thickness Gauge, a precision instrument for measuring the wet-film thickness of paint, varnish, lacquers and related products very simply with an accuracy of 0.01 mils. The Interchemical Adherometer, developed in the Research Laboratories of Interchemical Laboratory, is designed to measure the stripping force required to remove a paint film from the surface of a metal test panel. For the panels, the Laboratory is offering a supply of tin panels, 30-31 gage Bright Dry Finish Coke Tin Plate cut 3" x 5"; also a line of clean steel panels (general laboratory and Automotive-Body cold-rolled steel). Another item is the Arco Microknife, a precision-built instrument for testing scratch hardness and adhesion of paints and other coatings. An 8-page pamphlet describes a line of improved Bubble Viscometers and tube holders along with useful related data. A leaflet describes two types of low-cost, general-purpose, accurately controlled water baths; and finally another describes a new model self-illuminating "pen" microscope, "no larger than your fountain-pen," for examining films and other general purposes. Persons interested in these products may obtain information about them from the Gardner Laboratory at the above address.

COLORIMETRY OF TITANIUM PIGMENTS

An interesting paper in this field by Deane B. Judd, J. Research Natl. Bur. Stand. 43, 227-35 (Sept. 1949) (RP 2024), is entitled A Comparison of Direct Colorimetry of Titanium Pigments with their Indirect Colorimetry Based on Spectrophotometry and a Standard Observer. It was recently reported by A. E. Jacobsen, working with titanium pigments, that the ICI standard observer apparently does not weight the far blue region of the spectrum in accordance with visual perception, weighting the portion below 430 mμ too lightly. It was pointed out by Judd in 1935, in connection with his uniform-chromaticity-scale triangle, that his empirical formulation for chromaticity sensibility broke down badly for two observers unless the standard luminosity function be replaced by the Gibson-Tyndall experimental mean in about the same far blue region. It was pointed out by G. Wald in 1945 that the reciprocals of the absolute foveal thresholds, although agreeing fairly well in other parts of the spectrum, depart widely in the short-wave end of the spectrum from the ICI luminosity function.

A table in the present paper compares the Wald data with the Gibson-Tyndall data and with the standard luminosity function. From the table it may be seen that Judd's indirect evidence and Wald's direct determinations indicate that the Gibson-Tyndall experimental mean was given too little weight in adopting values for the standard luminosity function. Thus these two reports are in qualitative agreement with Jacobsen's. The present paper reports on a repetition, by somewhat more refined methods, of Jacobsen's study of titanium-pigment paints. The difference between a pair of such paints was measured by spectrophotometry and then by seven observers using a visual colorimeter. Four of the seven observers corroborated

Jacobsen's conclusion; three checked closely the standard observer. A modified standard observer based upon the spectral luminosity determinations of Gibson-Tyndall and Wald has been derived and is shown to account closely for the settings of the group of four observers that disagreed with the standard observer. It is presumed that the settings of Jacobsen's observers would likewise be accounted for by the modified standard observer. It is further "suspected that if the ICI standard observer is to be maintained in its present status of general acceptability for commercial colorimetry, it may have to be modified so as to weight more heavily the short-wave extreme of the spectrum." It is concluded that further data relating to the luminosity of the spectrum in the indicated region should be gathered to form an adequate basis for this modification.

FROM NEW LONDON — We have from time to time referred to the publications from the pens of our well-known members, Dr. Forrest L. Dimmick and Lt. Comdr. Dean Farnsworth and their associates at the Medical Research Laboratory of the U. S. Naval Submarine Base, New London, Conn. Indeed, so considerable has been the Laboratory's output that we have been unable to keep pace with its interesting reports. We refer in particular to the Medical Research Laboratory's "Reports" neatly bound in yellow paper covers printed with a yellowish brown. At present we have space only for the titles:

Report No. 146, The Effect of Low Color Temperature Illumination and Red Illumination upon Subsequent Dark Adaptation, by R. T. Mitchell, constitutes pp. 27-38 of Volume 8 (Aug. 1949). No. 147, A Battery of Pass-Fail Tests for Detecting Degree of Color Deficiency, pp. 39-68 (Aug. 1949), is by Comdr. Farnsworth, Harry G. Sperling and Priscilla F. Kimble; No. 148, A Method for Calculating the Effect of Filters on Color Vision, pp. 69-83 (Sept. 1949), is by Dr. Hermann von Schelling.

Report No. 150, Mapping the Central Scotoma of the Dark-Adapted Retina: Comparison of a Moving Stimulus with a Stationary Presentation, pp. 94-112, is by Louise Shutler MacMartin and Dr. F. L. Dimmick. We have also from Dr. Dimmick's pen a brief report on the Colour Vision Conference held at Cambridge, England in 1947. Here is contained a brief discussion of the Just Noticeable Difference in vision experiments and its relation to "equality" or "Match." The publication appeared in volume III of Documenta Ophthalmologica (1949), pp. 237-9.

BOUMA'S BOOK — A recent pamphlet describes "Physical Aspects of Colour," written by Dr. Pieter Johannes Bouma not long before his untimely death in 1947. This 312-page book by the brilliant young scientist of Philips Research Laboratory and the University of Utrecht originally sold for the Philips Technical Library price of $5.50 but is now priced at $4.00 in this country. It contains 14 chapters, 113 illustrations and 15 tables of data. The leaflet describing the book further may be obtained from the American distributors, Elsevier Book Company, Inc., 215 Fourth Avenue, New York 3, N.Y.

CHRISTMAS COLORS — No doubt all of our readers know that, except for items "strictly news," composition and writing occurs considerably in advance of reading in the News Letter. For example, we are writing this as we sit at home during the Christmas holiday season, patient observer while various parts of our body serve as battlegrounds for bacterium and virus, on one side, against penicillin and sulfa drugs, on the other. Our mind is still on Christmas. As "Christmas colors" we think now not merely of the red and green of holly and poinsettia plants but of the reds and greens of pine trees and Christmas decorations and reds and greens broadly.

Over a course of years we have frequently referred in this pages to the use of red by early man. Primitive man, being a keen observer, noted that when too much red blood was spilled by lance, stone mace, fang or claw, life ebbed. Red substances were therefore life-giving; and thus, early man provided lasting life for the deceased in the hereafter by burial of the remains in red ocher or by painting the bones with similar materials.

Such was the treatment of the skeleton originally called the Red Lady of Paviland, who turned out to be no lady at all, for later work showed "her" to be a young gentleman. In issues of a dozen years ago, we listed other cases of red-ocher burials in Europe. A very notable one was at Ofnet, Bavaria, where there were found 33 crania and jaws severed from the bodies in two pits, like eggs in a basket, all neatly facing toward the setting sun and all stained deep red. The chief element in the Proto-Aryan Nordics of the European steppes (those recognized by their cord-decorated pottery) buried their dead under mounds containing graves known as ocher graves. The practice was not confined to Europe, for the non-negroid people who developed the East African Aurignacian culture had it. And red ocher was found with a mixed folk represented in the Upper Cave where the more ancient Peking Man of China had been discovered.

All these instances we believe we have mentioned in previous issues. It may not be amiss now to add a few others which have come to our attention. In southern Russia, at Mariupol, near the mouth of the Kalmus River on the shore of the Sea of Azov, a number of skeletons were found lying in rows and covered with red ocher, in association with Early Neolithic implements. In the Zamil-Koba cave in the southern Crimea, excavated by the State Historical Museum of Moscow, were found a stone palette and a large rubbing stone bearing traces of red ocher. The excavator stated that these hunters of deer and wild pig of the time (13,000 - 8,000 B.C.) "were familiar with dyes and their bodies were probably decorated by painting or tattooing." In the early Natufian culture level at El Kebarah in Palestine, pieces of mortars and pestles of basalt and limestone were sometimes colored with red ocher.

These last are general pigment uses (mundane) rather than burial uses; in most of the following we return to the latter. In the red-and-black painted pottery culture of wester Honan (China) discovered by the Swede J. G. Anderson, and dated by him at 2200 - 1700 B.C., the human bones were painted with red ocher. In the Neolithic stone-bowl culture of Njoro, Kenya (East Africa), dated at 4000 - 3000 B.C., objects and bodies were preserved by digging a shallow hole in the floor, placing the body and grave-goods in this, covering with soil and red ocher, and then lighting a fire on top to bake the bodies and char the rest.

So far we have neglected America, to which we now turn. In South America, we find flexed burials associated with red paint in the Chavin (Pre-Inca) culture of Peru along with ceramics and objects of bone, shell and stone, all incised and carved. Among all the older Indians of America, who for thousands of years were long-headed, the Red Ocher people who followed the Black Sands folk of Illinois stood out because they were round-headed. In the Williams Cave of the Guadalupe Mountains, Culberson County, Texas, there was a ball of purple paint along with shells and baskets covering two child burials. Another (cradle) burial was covered by a basket; still another basket nearby contained painted sotol strips. The body was wrapped in soft hide, painted red. A bag of charms was on the cradle. A third was a bag burial of an adult in a bag of deer or antelope hide painted red, and contained charred bones. The culture was that of the Hueco Cave Dwellers.

Another use of Red (and sometimes black) pigment by Cave Man, Bushmen and Australians was to leave "negative" imprints of the hand, usually the left, on cave walls, by throwing the pigment with the right while the left was held against the wall, reserving a portion of it. In many cases, finger mutilation was associated with these hand prints. In the "positive" type, the hand was smeared with pigment and applied to the wall. The human hand is still important in ritual usages, in blessing, in cursing and in saluting.

So far we have stuck mainly to red, though we have mentioned purple and black. Turning to green, we may perhaps mention first the slate palettes of the Badarian and Amratian cultures of Egypt, which were used for grinding not only the red mineral hematite (red ocher when clayey) but also for the green malachite. The latter, an ore of copper, was also used to paint the eyes, and was very popular in early Egypt. According to G. Elliot Smith, the author of the "life-giver" theory of red, green was also a life-giver, because it was the color of the new life that manifested itself when the fertilizing green waters of the Nile awakened the apparently dead grains of barley to reveal their new life. He states that powdered melachite was made adhesive by admixture with resin. Elaborately engraved palettes were among the most common objects of Predynastic graves. The mummy of Ranefer, a noble of the Pyramid Age, had the pupils, eyelids and eyebrows all represented in green paint. Smith and his disciple Dr. Perry believe that continued accidental association of malachite with fire finally led to the discovery of copper, a metal shining like gold. And the slag produced in smelting copper ore revealed how to make glazes; and out of this practice emerged the invention of glass. Thus they would have color lead to invention!

The Egyptian mother-goddess, Hathor, was the Lady of Turquoise. The Egyptian turquoise was obtained, like Egyptian malachite, from Sinai. The early Mexicans, who had no turquoise, went to New Mexico and Arizona to work the turquoise supplies there. The Pueblo Indians, the descendants of the old turquoise miners, still prize it and, according to Dr. Perry, sometimes call their mother goddess Turquoise Old Woman. Finally, we have from America an item dealing with both red and green colors. At Chichen Itza, city of the Maya of Yucatan, in the temple of the god Kukulcan was found a box containing turquoise plaques, coral necklaces, etc. In an inner chamber was a throne carved out of a single block of stone to represent a jaguar, painted a vivid red. The jaguar's spots and eyes were represented by inlays of apple-green jade.

I.H.G.

BIBLIOGRAPHY

E. B. Evans, C. F. McCue & W. A. Woodrow; J. Inst. Petroleum 35, 221-44 (1949); Color measurement (review and applications in petroleum industry, with glossary).

R. M. Evans; "An Introduction to Color"; John Wiley & Sons Inc.; New York and Chapman & Hall Ltd., London (1948); Price $6.00; review by A. C. Hardy in J. Opt. Soc. Amer. 38, 874 (Oct. 1948) and by J. Cohen in Science 108, 728-9 (Dec. 24, 1948).

J. Ewles & G. C. Farnell; Proc. Phys. Soc. 62A, 216-24 (April 1949); Luminescence of wetted solids.

U. Fano; J. Opt. Soc. Amer. 38, 921-9 (Nov. 1948); The theory of imperfect diffraction gratings.

R. M. Fanstone; Amer. Photog. 43, 414-5 (1949); Drefaycolor process

R. Feinberg & S. E. Wirt; J. Appl. Psychol. 31, 406-12 (1947); Visual acuity in relation to illumination in the ortho-rater

L. N. Ferguson; Chem. Rev. 43, 385-446 (Dec. 1948); Relationships between absorption spectra and chemical constitution of organic molecules

L. N. Ferguson & T. C. Goodwin; J. Amer. Chem. Soc. 71, 633-7 (Feb. 1949); Absorption spectra of azines and dianils

G. R. Fonda & F. J. Studer; J. Opt. Soc. Amer. 38, 1007-14 (Dec. 1948); Optical properties of zinc-fluoride phosphors

J. W. Forrest, W. J. Kreidl & T. G. Pett; J. Opt. Soc. Amer. 37, 986-7 (Dec. 1947); Color variations in glasses containing iron.

J. W. Forrest, N. J. Kreidl & T. G. Pett; J. Opt. Soc. Amer. 38, 554-60 (June 1948); Color variations in glasses containing iron.

C. E. Foss; Amer. Ceram. Soc. Bull. 27, 55-6 (1948); Representations of color space and their applications.

G. T. diFrancia; J. Opt. Soc. Amer. 39, 324 (April 1949); Retinal cones as antennas

E. Freeman; J. Opt. Soc. Amer. 38, 532-8 (June 1948) 38, 971-6 (Nov. 1948); Illuminant-stable color-vision test, I; II, experimental-statistical evaluation.

R. A. Friedel, M. Orchin & L. Reggel; J. Amer. Chem. Soc. 70, 199-204 (Jan. 1948); Steric hindrance and short wave length bands in the ultra-violet spectra of some naphthalene and diphenyl derivatives

P. Fröhlich & L. Szalay; Research (London) 2, 245 (1949) Permanent orientation of dye molecules caused by illumination

J. W. Gabel & E. I. Stearns; J. Opt. Soc. Amer. 39, 481-3 (June 1949); Auxiliary working standard equivalent to magnesium oxide on a General Electric spectrophotometer

J. B. Gallant; Amer. Dyestuff Rptr. 37, 319-21, 326 (May 17, 1948); Origin of the coal-tar dye industry

F. Gately; Amer. Cinemat 29, 267, 278-80 (Aug. 1948); The new "Spectra" measures color temperature

K. S. Gibson; J. Opt. Soc. Amer. 38, 67-8 (Jan. 1948); Questionnaire on illumination

Y. LeGrand; Rev. Opt. (Theor. Instrum.) 28, 261-78 (May 1949); Just noticeable color differences as related to Young's theory

S. V. Grum-Grzhimailo; Mem. Soc. russe minéral 75, 253-6 (1947); Chem. Zentr. 1947, I, 1167; Chem. Abstr. 43, 6028 (Aug. 25, 1949); "Alexandrite color" of crystals

J. P. Guilford; J. Soc. Mot. Pict. Engin. 52, 197-210 (Feb. 1949); System in color preferences

L. N. Hadley & D. M. Dennison; J. Opt. Soc. Amer. 38, 483-96 (June 1948); Reflection and transmission interference filters; II, experimental comparison with theory, results

H. M. Haendler; J. Opt. Soc. Amer. 38, 417-9 (April 1948); Monographs for spectral band width of the Beckman DV spectrophotometer

J. Hamilton; Text. Manuf. 74, 82-3, 110-11, 181 (1948); Harleston color system: application

A. Hammad; J. Opt. Soc. Amer. 38, 611-6 (July 1948); 39, 157-61 (Feb. 1949); Scattered and rescattered sunlight

R. M. Hanes & S. B. Williams: J. Opt. Soc. Amer. 38, 363-77 (April 1948); Visibility on cathode-ray tube screens: the effects of light adaptation

W. T. Hanson Jr. & F. A. Richey; J. Soc. Mot. Pict. Engin. 52, 119-32 (Feb. 1949); Three-color subtractive photography

A. C. Hardy; J. Opt. Soc. Amer. 38, 874 (Oct. 1948); Review of R. M. Evans' "An Introduction to Color"

A. C. Hardy; J. Opt. Soc. Amer. 38, 650 (July 1948); Applicability of Judd's color-tolerance formula in the case of titanium pigments

A. C. Hardy & E. C. Dench; J. Opt. Soc. Amer. 38, 308-12 (April 1948); Electronic method for solving simultaneous equations (including three-color and four-color equations)

A. C. Hardy & F. M. Young: J. Opt. Soc. Amer. 38, 854-8 (Oct. 1948); In defense of Beer's Law

A. C. Hardy & F. M. Young; J. Opt. Soc. Amer. 39, 265-70 (April 1949); Correction of slit-width errors

A. C. Hardy & F. M. Young; J. Opt. Soc. Amer. 39, 460-62 (June 1949); Colorimetry by abridged spectrophotometry

L. Harris, R. T. McGinnies & B. M. Siegel; J. Opt. Soc. Amer. 38, 582-9 (July 1948); Preparation and optical properties of gold blacks

W. Harrison; Trans. Illum. Engin. Soc. (London) 14, 145-73 (1949); The colour of fluorescent lamps

W. Harrison & P. Meaker; Illum. Engin. 42, 153-79 (1947); Further data on glare ratings.

H. C. Harsh, R. M. Haff & F. J. Kaszuba (to General Aniline & Film Corp.); U.S. Pat. 2,447,462 (1948); Dye solutions for coloring negatives

H. C. Harsh, R. M. Haff & F. J. Kaszuba (to General Aniline & Film Corp.); U.S. Pat. 2,458,905 (1949); Dye solutions for coloring negatives

E. Hellnig; Z. wiss. Photog. 44, 58-76 (July 1949); Progress in the field of Tristimulus evaluation I (new procedures described and compared with weighted-ordinate method)

H. Helson & W. C. Michels: J. Opt. Soc. Amer. 38, 1025-32 (Dec. 1948); Effect of chromatic adaptation on achromaticity

H. M. Haendler; J. Opt. Soc. Amer. 38, 417-9 (April 1948); Nomographs for spectral band width of the Beckman DV spectrophotometer

A. Herczog & K. Wieland; Helv. Phys. Acta 21, 436-44 (Dec. 20, 1948); Laws concerning the alteration with temperature of a continuous absorption spectrum

M. Herzberger; J. Opt. Soc. Amer. 38, 324-8 (April 1948); Performance of an optical system as the sum of the contributions of its construction elements

G. C. Higgins & K. Stultz: J. Opt. Soc. Amer. 38, 756-8 (Sept. 1948); Visual acuity as measured with various orientations of a parallel-line test object

Y. Hirshberg: Trans. Farraday Soc. 44, 285-9 (May 1948); Absorption spectra of phenylated anthracenes

G. A. Horton: Illum. Engin. (N.Y.) 43, 989-1014 (Nov. 1948); Modern photometry of street-lighting luminaires

G. A. Horton; Illum. Engin. 54, 475-9 (Aug. 1949); Photometry of floodlights

E. O. Hulburt; J. Opt. Soc. Amer. 39, 211-5 (March 1949); Night-sky brightness measurements in latitudes below 45°

E. O. Hulburt; J. Opt. Soc. Amer. 39, 409 (May 1949); Green segment seen from an airplane

A. Huld; Ingenioren 57, 481-90 (Sept. 4) 497-505 (Sept. 11, 1948) (in Norwegian); On the theory of color (vector space, photoelectric and C.I.E. system

Y. C. Hurd; Illum. Engin. 44, 555-7 (Sept. 1949); Photoelectric brightness meter

Inter-Society Color Council; "Comparative List of Color Terms"; Jan. 1949; published by the Color Council, Washington, D.C.; 94 pp.; brief review by J. L. Forrest in J. Soc. Mot. Pict. Engin. 53, 103 (July 1949)

J. H. Jacobs; Brit. Kinemat. 13, 109-19 (1948); Processing of colour films

F. W. Jobe; Amer. J. Optom. 25, 107-16 (1948); Analysis of visual performance in relation to safety

A. E. Johnson; Rayon & Synthetic Text. (formerly Rayon Text. Mo.) 29, 125-8 (Sept. 1948); Color problems in drycleaning

L. A. Jones & G. C. Higgins; J. Opt. Soc. Amer. 38, 398-405 (April 1948); Photographic granularity and graininess; IV, visual-acuity thresholds; dynamic versus static assumptions

M. T. Jones & F. T. Bowditch; J. Soc. Mot. Pict. Engin. 52, 395-406 (April 1949) Optimum performance of high brightness carbon arcs

D. B. Judd; J. Research Natl. Bur. Stand. 42, 1-16 (Jan. 1949); Response functions for types of vision according to the Müller theory.