INTER-SOCIETY COLOR COUNCIL

NEWS LETTER NO. 30

JULY 1940

I. H. Godlove, Editor-in-Chief
Charles Bittinger, Editor for Art
C. E. Foss, Editor for Industry
D. B. Judd, Editor for Science

AMERICAN CERAMIC SOCIETY DELEGATES

Although we gave the reference in the last News Letter to the appointment of ten delegates from the American Ceramic Society, we would now like to have you meet them individually. To each of them we say WELCOME and extend the hope that they may take an active part in the Council's working family. Of the ten delegates, only Mr. Hunter and Mr. Robertson have been delegates previously. Voting delegates are starred.

Woldemar Weyl*, CHAIRMAN, Dept. of Ceramics, Pennsylvania State College, State College, Pa.
R. F. Brenner, Anchor-Hocking Glass Corp., Lancaster, Ohio
H. D. Callahan, U. S. Quarry Co., East Sparta, Ohio
F. P. Hall, Onandaga Pottery Co., Syracuse, N. Y.
R. S. Hunter*, National Bureau of Standards, Washington, D. C.
J. H. Koenig, Hall China Co., East Liverpool, Ohio
C. Robertson*, E. I. du Pont de Nemours & Co., Inc., Perth Amboy, N. J.
J. D. Tetrick, Baltimore Enamel & Novelty Co., Baltimore, Md.
A. S. Watts, Lord Hall, Ohio State University, Columbus, Ohio
C. H. Zwerman, University of Washington, Seattle, Wash.

INDIVIDUAL MEMBERS

We are glad to welcome the following individual members whose applications were acted upon at the last meeting of the Executive Committee:

E. D. Coleman, Coleman Electric Co., 310 Madison St., Maywood, Ill.
S. N. Cummings, Pylan Products, 799 Greenwich St., New York, N. Y.

ASSOCIATION FOR COLOR RESEARCH

The Chicago A.C.R. was addressed on June 5 at Art Center, 410 South Michigan Avenue, by Mrs. Louise Bolender, Home Furnishing Co-ordinator and Stylist for Carson Pirie Scott & Company. According to the advance announcement which was headed "Champagne Colors for Beer Incomes", Mrs. Bolender was to outline a "recipe for operations"; that is, how and why to select colors and combine them. Mrs. Bolender is said to be a brilliant and witty speaker, nationally known for her color coordination work organized for department stores.

EXECUTIVE COMMITTEE MEETS

Your Executive Committee met in Washington on June 10. With the exception of one member, there was a full committee in attendance. Matters of general policy were discussed. You will be glad to know that your Executive Committee was quite unanimous in its plans for the Council future. It seemed to the committee that Dr. Gage had outlined very well the purposes of our form of organization when he told the Society of Motion Picture Engineers at their recent meeting in Atlantic City that the Council "functions as a joint committee on color of the member societies, favored with the advice of the individual members."

There were two matters of importance discussed at this meeting which should be noted by each member. First, final plans for the jointly sponsored symposium on color which is to take place on September 11 at the annual convention of the Illuminating Engineering Society at Spring Lake, New Jersey. The program is given elsewhere. It is hoped that all members who can will plan to be present at this meeting. Second, it was voted to hold the Tenth Annual Meeting of the Inter-Society Color Council in Washington during March of 1941. The annual meeting will be held during the week in which a joint symposium on color in testing materials will be held with the American Society for Testing Materials at their March 1941 meeting.

MÜLLER THEORY

Dr. Michael J. Zigler, Professor of Psychology in Wellesley College, ably presented an unusually important paper on Theories of Color Vision at the April 16, 1940, meeting of the Seminar of the Department of Psychology, Johns Hopkins University. The talk was largely confined to a detailed presentation of G. E. Müller's complicated theory, which seems to be the only one so far presented which fits all or nearly all the accepted facts. Dr. Zigler's talk had been announced at the preceding meeting of the Washington colorists with the result that a number of noted color experts were present; and a long and highly interesting discussion followed. Dr. Judd suggested the possibility of quantifying the Müller theory.

THE COLORQUERY AND VISIONNAIRE

Question No. 14. Why is a piece of cloth darker when wet than when dry? For the answer see the end of this News Letter, before the bibliography.

COLOR AND WAR

The last of the current series of meetings of the New York Individual Group of the I.S.C.C. was held on the evening of July 2 at one of the Longchamps Restaurants in New York. Dr. I. H. Godlove of E. I. duPont de Nemours & Co. spoke on the subject of "Organic Colorants". His talk opened with the history of the development of coloring materials from the earliest times. The principal differences between "pigment" colors like paints, dyes and inks, as contrasted with "structural" colors (the blue of the sky, bird plumage, butterfly wings, etc.) were pointed out and the mechanism of light absorption by pigments and dyes was treated from both the physical and chemical points of view. Production of color was described as a warfare for electrons between "have" and "have not" atoms or groups (reduced atoms or auxochrome groups and oxidized atoms or chromophore groups, respectively). Salt formation mechanizes the forces (intensifying color). The analogy was carried to a sort of color-enhancing "fifth column" activity and decrease of isolationism. Illustrations were shown of significant changes in the colors as well as the properties of dyes which result from very slight changes in the chemical structures. Dr. Godlove's remarks were enthusiastically received (so an associate Editor wrote;--chief Editor's note); and represent another in the series of talks planned to cover different phases of color. The subjects treated so far during the past season were: Color Vision, Color Photography and Color Chemistry. The Group expects to reconvene in the fall and continue its color program.

COLOR SYMPOSIUM

Joint I.E.S.-I.S.C.C. Color Symposium. The Inter-Society Color Council is sponsoring jointly with the Illuminating Engineering Society a color symposium at the annual meeting of that body which will be held at Spring Lake, New Jersey, the week of September 9th. The color symposium will be presented on Wednesday (September 11th) afternoon at two o'clock E.D.S.T. The speakers and subjects will be as follows:

Bases of Color Vision- LeGrand Hardy
Color Determination- Parry Moon
Color Systems and Their Inter-Relation- Deane B. Judd
The Illuminant in Color Matching and Discrimination-
Dorothy Nickerson

As it will be seen from the above list of papers and authors, the symposium should prove to be a very worthwhile meeting. It is hoped that members of the Inter-Society Color Council will make it a point to be in attendance. They are assured a hearty welcome by the illuminating engineers. The papers will be preprinted and sent to delegates and members of the I. S. C. C. and also to members of the I.E.S. in attendance at the Convention. They will be formally published in the September issue of the I.E.S. Journal, ILLUMINATING ENGINEERING. The Illuminating Engineering Society would welcome the attendance of any Inter-Society Color Council members who are interested in attending other sessions than the color symposium. The complete program of the Convention may be obtained from Mr. F. G. Horton, Executive Secretary, I.E.S. Headquarters, 51 Madison Avenue, New York. The meeting will take place at the Sussex and Essex Hotel.

VISUAL CAPACITY

Professor Michael J. Zigler and his research assistant Dr. Alfred H. Holway are preparing a set of volumes on The Theory and Measurement of Visual Capacities. These volumes are to include a treatise on dioptrics, a consideration of peripheral and central nervous processes, and a comprehensive survey of the facts and theories of human vision. The survey will present and evaluate much of the material accumulated by G. E. Müller, A. Gullstrand, M. von Rohr, and by investigators in the optical workshops of America and Europe. This undertaking has been aided by generous grants to the authors from the administration and the alumnae of Wellesley College.

FASHION TRENDS IN COLOR

The following note was written by Mrs. Elizabeth Burris-Meyer upon request. Theoretically, the year 1940 would be an excellent one in which to comment objectively on the fact that color in fashions and home furnishings will or will not follow a public response to the war psychosis. Actually, the latest and most ruthless form of war has moved so rapidly that little or no effect will be noticeable in the color of our clothes for this fall. But this fall certain well defined color trends are following cycles which they will complete from their own impetus. Fabrics and leather colors for this fall, as a matter of fact, were pretty well determined before Rotterdam was laid waste. Then, too, England is still delivering fabrics even if there are no more shipments from France. By late fall or mid-winter the story will probably be quite different. The colors which will be noticeable this fall, however, are not inconsistent with the changed state of mind brought about by war and rumors of attack, so there is no reason for them to be interrupted. (1). Black will sell in the largest volume in all price lines, not because of a deeper feeling of sadness or apprehension or mourning, but because women who have been wearing a variety of colors for the past few years feel that black looks new, once more seems "colorful" and interesting. To be sure, black may be worn more generally and is cheaper to accessorize, but these practical points are still merely incidental. Black is always good in fashion, but this year it will be a leading color. (2). Brown, particularly a dark, yellow-brown, will probably be the second color in volume; 1st, because of a trend toward more casual clothes- with simple lines and less decore - which started last winter. This trend is due directly to the influence of the war, first on the French dressmakers, and more recently on ours. Just as the French tried to avoid the uniform look in their clothes (because military clothes and sad colors were depressing

to their men returned on leave) so our designers will doubtless try to bring out colors which are casual, but not extremely severe. Casual clothes look best in browns and blues. Brown has been a high fashion color for Spring for the past three years. It is logical then that it should be a volume color for fall because of the new casualness in dress and because it is naturally and traditionally a fall color. (3). Neutrals (grays and beiges) will play an important part in the fall color picture, too, because gray and grayed pastel dresses are so generally wearable under the short fall fur coats. The trend toward gray, like that of black, which was noticeable three years ago in high-priced clothes, is again part of the general inclination of the customers away from the overwhelming array of colors which they have been seeing in clothes. The customers, without realizing it, have simply de-devoped what might be called a modified mass retinal fatigue as regards color in dress - except for: (4). Patriotic colors - flag reds and blues, and greens whose acceptance is due to a definite reaction to current events. And due to increase in the number of mid-winter vacations, bright reds and blues will be worn for evening clothes and resort wear and will serve as an excellent tonic or antidote to the increasing somber hues of day time clothes.

EVERYDAY USE OF COLOR IN BUSINESS

An interesting article by Arthur S. Allen, colorist and designer, appeared under this title in Dun's Review for May 1940, pages 25-30. Two pages are in color; and it is stated that one of them is to appear in a forthcoming edition of Encyclopoedia Brittanica. The article discusses the old and new color schemes used in packages and wrappers, examples being the Lifebuoy soap package, Packers Olive Oil shampoo, Kre-Mel dessert, Morton's salt, Franklin cane sugar, Minute tapioca, Listerine tooth paste, General Electric's Mazda lamps, Kingan & Co's hams and Underwood Co's line of soups and foods. Simplification is the keynote; for example, two colors suffice in place of the previous 4-color or 5-color schemes. The theory of disc spinning to mid-gray or to the "major color" at five value, is discussed; and the use of strong value and other contrasts is stressed. It is stated that by these methods the number of required color renderings of a design for Congoleum-Nairn was cut from the usual 20 or 30 down to 5 or 6. Among examples of "monochrome" and "analogous" color schemes may be included a doughnut package for Town Talk Bakers, Worcester; while a complementary scheme is illustrated in the package of "cuplets" for Flako Products of New Brunswick. Unfortunately, in the reviewer's opinion, the article is marred by some poor color reproduction. In a "color tree" the "yellow-red" is nearly yellow, the "blue-green" near the neutral axis is almost purple, and there are sharp breaks elsewhere. The general layout, however, is good.

SCOFIELD PROPOSAL FOR COLOR SPECIFICATION

This is the title of Project No. 3 on which Subcommittee XVIII, on the Physical Properties of Materials, of Committee D-1 of the A. S. T. M. is engaged. The proposed method was laid before the subcommittee by Mr. Francis Scofield of the National Paint, Varnish and Lacquer Association. It was considered at two meetings of the subcommittee on April 11 and June 26, when it was discussed by 15 or 16 members and several visitors. Mr. Scofield's proposal and the minutes of the two meetings were kindly forwarded to us by Mr. M. Rea Paul, Chairman, with a letter dated July 9 in which he outlined the status of the project. Mr. Scofield maintains that the system which he proposes has the following advantages: (1) it is defined in terms of the I. C. I. standard observer representative of normal human vision, (2) the mixture diagram yields uniform chromaticity-scales so that it is readily adapted to the expression of color tolerances and the measurement of amounts of color difference between stimuli, (3) the

coordinate axes follow the general arrangement of the Munsell color solid so that position in the color solid is readily recognized from the coordinates, (4) the color coordinates may be computed approximately in a few brief steps from measurements of samples with a photoelectric tristimulus colorimeter such as the Hunter multipurpose reflectometer, and (5) the coordinates may also be computed from spectrophotometric curves of the samples.

Discussion brought out the fact that the multiplicity of color systems exists because no present system is entirely satisfactory. The system is believed to have the advantages claimed; but there is doubt as to whether it is easier to visualize the color from the coordinates of the Scofield system than from those of the I. C. I. or U. C. S. systems. The system may be superior to any in present use, but it is questionable whether the advantages are sufficiently marked, for example in comparison with the U. C. S. system derivable from the I. C. I., to warrant the introduction of a new system of color specification to replace a recognized standard. It might conceivably be of importance in the specification of color tolerances. Researches now in progress at the National Bureau of Standards, Eastman Kodak and General Electric laboratories will supply data in about two years that are expected to yield a very great advance in methods of specifying color and color tolerances. These researches are directed toward the discovery of a coordinate system yielding improved correlation with the Munsell color solid. Whether it is worth while in the meantime to take advantage of the limited gains promised by the Scofield proposal, is a question to be decided. It is generally believed that the Munsell steps are too wide; and in this respect the Scofield proposal would be an improvement.

The suitability of the Hunter multipurpose reflectometer as a tristimulus colorimeter is being studied by Scofield, Hunter and others. In this connection, it was pointed out that there are several difficulties in its use. In precision it is about on a par with visual estimation; and it is cheaper than the recording spectrophotometer, so that its use with the present system would increase the use of numerical data. But the instrument must always be used with sub-standards; and discussion brought out that it would be necessary to have sub-standards whose trilinear coordinates were within 0.005 of the desired value if an accuracy of 0.0005 is to be obtained. This would require a tremendous number of sub-standards; and the question of the possibility of obtaining sufficient suitable sub-standards was raised. After consideration of the foregoing and other questions, a committee was appointed to prepare an article on the system for the A. S. T. M. Bulletin, further action to be delayed until after the publication of this detailed account. The committee consists of Mr. Scofield, Chairman; and Messrs. R. S. Hunter and D. B. Judd of the National Bureau of Standards and W. E. Scott of E. I. du Pont de Nemours & Co., Inc.

THE ITALIAN MASTERS

Recently, your Editor conducted a party of friends through the exhibition of Italian Masters lent by the Royal Italian Government to the New York Museum of Modern Art. This exhibition was assembled originally for the Golden Gate International Exhibition in San Francisco. No exhibition including only 28 works, especially none without works by Giotto, Giorgione, or Veronese, or even Piero della Francesca, may be considered as a complete survey of Italian painting up to 1750. Enough was shown, however, to make the exhibition a notable event in the history of the revelation of Renaissance and Baroque art to Americans interested in painting. We had been able to spend several days studying the 342 paintings entitled "Masterpieces of Art" at the New York World's Fair, and were greatly pleased with what we saw; also two or three days with the more modern paintings in the French, British and other foreign and the American Art buildings at the Fair. We also spent some time with the

Modern Art exhibition running concurrently with the Italian Masters. These two respective floors of the Museum of Modern Art serve so well to illustrate remarks in our series "Color in Painting", that we have interrupted that series with examples taken from the two exhibits.

We may say at the outset that we felt a bit cheated on the Italian floor, but repaid on the Modern floor. We say this in spite of the fact that we are not prone to enthuse over modern art merely because it is modern; and in spite of the fact that we are an ardent admirer of the Renaissance Venetians and some of the Florentines. Not that the Italians were not worth the quarter paid for admission, or many quarters; rather that we expected so much. It was Botticelli who let us down most. There must be at least two dozen Botticellis in America, and most of them we had seen. We had learned to find there much beauty, but not much painting. The beauty lies in Botticelli's draughtsmanship, his graceful and expressive line. We knew that, in our terms, Botticelli did not paint with paint. We had been accustomed to seeing reproduction of his "Birth of Venus" from early childhood. It had taken rank as one of the great classics of painting. We had read many rhapsodic eulogies of this work. "The supreme achievement of Botticelli's genius", we had read, continuing, "No reproduction can do justice to the exquisite delicacy of expression in the original." To be sure, the reproductions revealed an uninspired composition; in that we were not disappointed. The sea, in whose foam Venus was born, is usually reproduced as a bilious yellow-green; and this was confirmed. Not that we object to a sea of bile if it contributes to an esthetically moving ensemble. This sea and the flat unbroken sky show a lack of imagination. They are mere space fillers between the figures which could be rendered by Botticelli's exquisite drawing. The "dancing accents of the waves" exhibit a monotonous sameness which is the cheapest kind of rhythm. The Venus is a beautifully drawn one of the de Medici type; her flesh might be mistaken for putty if it were not so yellow. Botticelli's flesh color is nearly always a yellowish gray with barely a tinge of pink, and umber-brown in the shadows. You could give us his Venus, and she would leave us cold.

The shell which was her ferry to Cyprus barely contrasts in color with her flesh. Giotto, Giorgione or Titian would have managed a contrast of warm and cool tans and would have built the shell of more solid but transparent color. The whole painting is encompassed within a narrow brightness (value) and saturation range; a Munsell value range not more than from three to seven, saturations not over five or six.

The illusion of nature, when that is an aim, must be achieved at best with the considerably condensed brightness range forced by the limitations of pigments; Botticelli sacrificed still more. This, it must be admitted, enhances the general feeling tone of lightness and delicacy, no doubt a deliberate goal. But we have seen it in Botticelli where delicate grace was most inappropriate to the subject.

Of the "Birth of Venus" the exhibition's illustrated catalog (which on the whole is understandingly written) says: "the pale colors touched with gold high-lights..... make a supreme masterpiece of decoration as well as of poetry." We admit the poetry, which was borrowed from Politian, and more reluctantly the decorativeness; but we demur at the supremacy. The marvelously fluid, graceful line, almost flamboyantly expressive, produces a pattern of rare rhythmic charm. It achieves first-class decoration which, however, has no compliment in the color. Leonardo and Raphael also depended largely on line, which was sharper in their hands, but also usually not well integrated with color. Giorgione and Titian, by way of contrast, drew with color. Neither of the latter would have been guilty of the ostentatious linear patterns in the standing figure at the right (spring?) in a composition so designedly simple, the

conventional symmetrical one with counterbalancing masses. The semicircular arrangement of the main masses repeats the rear edge of the shell, a trick more obvious than subtle. To us, the Zephyrs formed the point of greatest interest, but even here not because of the color.

Our strongest impression was obtained when we left the Florentines, turned a corner, and suddenly felt the agreeable shock of the glorious color of the Venetians. But before discussing them, we would like to say a bit more about the Florentines. The two followers of the great Donatello, namely Pollaiuolo and Verrocchio, who were both sculptors and painters, were represented only by bronzes, the very interesting "Hercules and Antaeus" and the "David", respectively. One of the most important figures of the early Renaissance is Tomaso of Florence, nicknamed Masaccio, short for Tomasaccio (clumsy Tom), who was represented by a "crucifixion". His work constitutes a general advance over that of Giotto, though Giotto is the greater figure when viewed in historical perspective. His innovations included the use of the cast shadow, more exact perspective; blurring of outlines, general haze and other elements of an "atmosphere"; deep space, and increased naturalism. No doubt Masaccio's advance can be gauged only by a study of his frescoes in the Church of the Carmine, Florence, which we have not seen; we have only the careful notes of a friend taken there at our request. We know of no Masaccios in America; and there was none at the World's Fair. The "Crucifixion" betrays Masaccio's traditional heritage: the symmetrical composition, the gold background, the Gothic arched frame. But one also sees there his dramatic power, his knowledge of anatomy and difficult foreshortening, his powerful modeling of the figures by means of chiaroscuro. Most interesting to us was a special use of color, a variation of hue and especially saturation, as is hinted in the catalog, to suggest gradations of grief; the meditative sorrow of St. John, the bewailing despair of Mary Magdalene, and the deep grief of the Virgin.

Fra Angelico was represented by his "Naming of John the Baptist", originally from his own convent. The "gay flower-garden colors" of this, graceful composition gave us a great thrill at first sight; but alas, the pleasure did not last. On returning for a second view and analysis the color appeared to be mostly on the surface. It is undeniably pleasing and harmonious; it is well modeled with light and shadow in both the figure at the right and in Zacharias's robe. His costume and that of the middle figure exhibit effective color contrasts. A blue appears on two costumes and in the sky, but they are all isolated areas, and do not serve to unify or organize the work. Angelico's color is rarely thus organic. Two works of his shown at the World's Fair, one of them all red and gold, are less pleasing than the "Naming of John". The three confirm Angelico's rank as a painter, but a rank which must remain much below that of the greatest.

Of Raphael, like Botticelli, we had already seen enough not to expect too much in the use of color, in spite of his formerly great name. The portrait at the World's Fair was interesting, but not from the color standpoint. The same is true of the "Madonna of the Chair", in some respects a great work. As the catalog points out, Raphael has solved skillfully the difficult technical problem of composing a group of figures within the circle of a tondo. There is a rhythm of parallel masses sloping upward to the right which is very effective, if academic, device; it is formed by the Virgin's lap, the Infant's leg, the Virgin's arm, the Infant's arm, and finally the Virgin's tilted head. There are several patterns of line and light which weave in and out of each other very gracefully. The Madonna's kerchief and the embroidery of her shawl contribute importantly to these patterns. The straight vertical of the chair and John's uplifted arm furnish just enough lines in opposition to add strength. But as nearly always with Raphael, the color is not up to the superb drawing and good

composition. It is in no sense organic; other colors might be substituted without impairing the general effect very much. Raphael does not impress us as thinking in terms of color; color was an afterthought. Consequently, it appears laid on or superficial. The present example seems to us a little better than the general run of Raphaels; better than the portrait at the World's Fair, where the color is dull almost to muddiness. Here the chubby limbs of the Infant are well modelled with light, a trick Raphael learned from Leonardo.

Our available space does not permit discussion of Michelangelo, who was represented only by a relief, or of Bronzino and Sabastiano del Piombo, who were represented by portraits. Of the latter's "La Fornarina" it may be said only that we see here influences, not too well integrated and assimilated, from Raphael, Michangelo and Georgione and the other Venetians. To the latter may be attributed some use of color in a structural sense in the arm, neck and throat of the lady. These portraits may be compared with the interesting "Portrait of a Lady" by Parmigiano. This painter, though influenced by Raphael and other contemporaries, may be ranked as a follower of Correggio. Parmigiano and his contemporary, Lorenzo Lotto, may be included among the Mannerists, whose individuality of style marked a reaction from the grand manner of the High Renaissance; the movement in turn, as has been so often illustrated in other cycles of painting, degenerated into affectation, distortion and academism. These momements, as indicated, followed the Renaissance, to the culmination of which, in Venice, we shall now turn.

We have already mentioned the agreeable shock of the Venetian color, which we came upon full blast. Up to this point, the works most interesting to us were those of Masaccio, Mantegna and Correggio. The first of these we have considered. Mantegna was represented by his important "St. George". This work and perhaps Mantegna's generally, are less interesting for the color than for other elements of design. Here the colors are all rather dull and in the middle value range, except for a few spots in a decorative flower garland and some accents of deep red. The accents remain staccato; they fail to form a rhythmic color pattern. Not only is the color not organic; it is not harmonious and it has little structural value. The Correggio, a "Madonna and Child", illustrates the qualities which elicit our slightly furtive admiration - furtive because he violates to some degree the theories we have outlined. There is no doubt that, as exhibited here, he tends toward exaggerated sweetness of sentiment, which frequently is well combined with sublety of color harmony. Here there are accents of yellow and green against pale blue and violet. Correggio's color is moderately rich though not comparable in richness and variety nor in structural and organic value to Giorgione's and Titian's. His composition is usually good; here it is excellent. The Holy Family forms the pyramidal grouping which is so frequently found; but here it is elongated so as to function as a vertical mass which is reinforced by the child's arms. The child's body and the mother's arm and tilted head form a rhythmic progression of transverse parallels.

We come upon the Venetian color in works by Giovanni Bellini, Jacopo Palma, Titian and Tintoretto. In none of these however, do we see it in its full splendor. In the Bellinis it had not yet reached the full richness, variety, organic value or structural value of the works of the four great Venetians who followed. The "Holy Family" of Palma, called il Vecchio (the Elder), exhibited fully the rich glowing color of the great quadrumvirate of his contemporaries; but Palma is clearly the imitator, rather than the original genius. Titian was represented only by his superb portrait of Pope Paul III and here the rich reddish violet of the robe and the red of the velvet chair arm, were insufficient, though subtly varied, to reveal Titian's genius for painting with color. In Tintoretto's great work, "St. Augustine Healing the Plague-Stricken",

the saturations of the colors are all very low, and that cannot be considered typical of this master. To be sure, this chroma-restraint is most appropriate to the subject. The necessary contrast is secured by interplay of light and dark masses, which splendidly adapts itself to the dramatic and powerful portrayal of tragedy, pathos and joy. Further, the picture illustrates Tintoretto's ability to use organic color; it is tied together by the many accents of blue, which form a definite pattern. The exhibition catalog brings out nicely the excellence of the design which hinges about a strong diagonal line crossed by a weaker transverse diagonal. It mentions also the powerful three dimensional character of this painting, and the master's dynamic force, so well illustrated here, which caused him to be called "Il Furioso". But all in all, here too we miss the richness and depth of color of which the master was capable, as we missed it, we may add, in the four Tintoretto's at the World's Fair. We may add also that the exhibition had no representative of Veronese, while the fair had four, at least two of them exhibiting this master's ability with color. In the Bellini "Holy Family", the structural use of color in the figure of John the Baptist and in the Madonna's robe is particularly good. Titian's "Pope Paul III" is one of the outstanding portraits of all time. There are many works by these masters in America; and there were three by Bellini (and one by his father) and eight by Titian at the Worlds. Of the Titians at the fair, the "Venus and Adonis" is perhaps the most interesting. The Bellini may be compared with two paintings of the Madonna and Child at the fair. Of the latter that from the Booth Collection is the more interesting, particularly the lighting on the face of the Madonna and in the yellow and green sky. The color of the robe is dark blue with some red, the common colors for the Virgin.

Tintoretto's picture serves as the transition from Mannerism to the Baroque of the seventeenth century. This revolution was introduced by the painting of Caravaggio and was carried on in sculpturing by Bernini, who was represented by a portrait bust. Caravaggio's "Boy Bitten by a Lizard" well illustrates his vivid realism and theatrical lighting, as well as his interest in commonplace and "low-life" subject matter, which was novel for his time. The interest in lighting effects is shown also in "The Card Players" at the World's Fair, especially in the face of the boy at the left. There the colors, which were largely reds and yellows, are of only moderate saturation, but are effectively used. Unfortunately, space is not available for discussion of the work or life of this hard-boiled radical, whose fiery temper made him kill a companion at a tennis match.

Contrasting with Caravaggio's work is Guercino's "Bath of Diana" whose static figures are only an excuse to paint a quiet landscape. Here the interesting feature is the gradual recession from the rich warm colors of the foreground to the "cold blue green in the misty distance", against which a bright orange tree stands out. Gentileschi in his "Virgin and Child", and Cavallino in his "St. Cecilia", made use of harmonies of contrasting yellow and blue. These artists of the Baroque period were not represented at the World's Fair. The large canvas, "A Council of the Knights of Malta", by Tiepolo, the last important Venetian, was well planned in composition as well as in color. The rose red walls contrast in value with the black robes of the knights and the blue-green windows. The red is "echoed" throughout the picture, serving to tie it together. At the World's Fair, there were five works by this Baroque master whose style changed as he studied Veronese. Of these five, the most interesting is "The Procession to Calvary", in which many figures are gathered without giving an impression of crowding, in part because of a well varied use of lighting and color.

From the last of the Italian Masters, we must skip more than a century to reach the Modern Masters whom we saw represented simultaneously at the Museum of Modern Art. This gap we bridged by descending a flight of stairs to the lower floor. Since our

subject is the Italian Masters, we shall devote little space to the Moderns. Among some of the Moderns, we find many of the qualities for which we looked more or less in vain among the Italians. Particularly in Cezanne and Renoir we find structural as well as organic use of color. These qualities in those masters we have already discussed at length. Cezanne was represented by his "Mount St. Victoire" from the Phillips Gallery and the "Card Players" from the Clark Collection; Renoir by "Le Moulin de la Galette" and the charming portrait of the child "Little Margot Berard". From the brush of Van Gogh was "Night Cafe, Arles", in his most characteristic style, and the portrait "L'Arlesienne". There were also represented Degas, Gauguin, Seurat, Henri Rousseau, Vuillard, Rouault, Derain, Matisse, La Fresnaye, Gris, Picasso and Miro. The latter's "Composition, 1933" is far more interesting from a color standpoint than his famous "Dog Barking at the Moon", and depends for its value on no such spurious element as humorous subject matter. The American Moderns were represented by Whistler, Eakins, Homer and Ryder. Regretfully, we must confine ourselves to our chosen subject and to our available space, avoiding the temptation to illustrate by these examples many of the principles which we have discussed in past articles.

THE COLORQUERY AND VISIONNAIRE

Question No. 14. Why is a piece of cloth darker when wet than when dry?

Ans. It's all a matter of relative refractive indices. We assume that our readers all have a speaking acquaintance with elementary optics, so we shall not define this index. Probably also their erudition extends beyond the stage of the simple answer given here, so they are wondering wherein is the catch. The lightness or darkness depends on the relative amount of light reflected from the object. The light reflected from a surface in turn depends on a function of the relative refractive index. In the case of metals and some other materials the relation is given by Fresnel's law, which for normal incidence reduces to a simple relation. The refractive index of air is approximately unity, the unit being that of a vacuum. The index for water is about one and a third, for textile fibers about one and a half. When water wets a fiber, a fiber-air interface is largely replaced by a water-air interface, so the relative refractive index, and consequently the reflection of light, is reduced somewhat. For this reason the woven fibers appear darker. The situation is somewhat complicated, however, by the fact that water also fills the "pores" of some fibers, replacing air by water; and by the fact that different textile fibers differ in their degree of "hollowness" and transparency. If, for example, we considered a hollow semi-transparent tube having a cross-section about like the familiar Bunsen burner tubing, we would find four surfaces reflecting considerable light. If the hollow tube were filled with water, the light reflected at the two inner surfaces would be considerably reduced. If the whole tube were further covered by an adhering water film, there would be an additional reduction at the first and last or outer surfaces. Perhaps we may now see why those people who habitually see the darker side of life are frequently referred to as "wet blankets".

Bibliography

Temperature and the Critical Intensity for Response to Visual Flicker. W. J. Crozier & E. Wolf; Proc. Natl. Acad. Sci. 25, 171-5 (1939).

Specific Constants for Visual Excitation. Part IV. W. J. Crozier & E. Wolf; Proc. Natl. Acad. Sci.; 25, 176-9 (1939).

Visual Photometry of Sodium Lamps Using Color Filters. H. König; Helv. Phys. Acta 12, 229-48 (1939). In German.

Color: Analysis. J. Pinte; Bull. Trimest. Lab. Anal. Recherches Ind. Roubaix, 1939, No. 42, 8 - 18.

Illumination Standards for Effective and Comfortable Vision. M. A. Tinker; J. Consult. Psychol. 3, 11-19 (1939).

The Color Grading of Fatty Oils. E. R. Bolton & K. A. Williams; Oil & Soap 16, 106 (1939).

Establishment of Soil Color Standards (Univ. Cal.) C. F. Shaw; Trans. First Commission Intern. Soc. Soil Science, Bangor, Wales; Intern. Soc. Soil Sci. A, 51-3 (1938). Through Expt. Station Record USDA 80, 734 (1939).

Perception of Light (Analysis of Visual Phenomena in Relation to Technical Problems of Vision and Illumination). 100 pages; Chemical Publishing Co., New York.

The Linkage between the Genes for Color Blindness and Haemophilia in Man. J. Bell & J. B. S. Haldane; Proc. Roy. Soc. B 123, No. 831 (1937).

(1) Color Vision and (2) Experimental Psychology of Vision (16-mm films). G. M. Gilbert; Columbia Univ., New York. 150 ft. at $22. and 450 ft. at $30, respectively, latter in color. See J. Psychol. Abstr. 13, No. 3 (March 1939).

The Colors of the Positive After-images following Momentary Chromatic Stimulation. S. M. Newhall; Psychol. Bull. 35, 674 (1938).

Color: What it is and how we see it. L. F. Avera; Amer. J. Optom. 16, 10-3 (1939).

Methods of Testing for Color Vision and Theoretical Deductions from Observations of Color Vision. H. E. Roaf; Brit. Med. J. 1938, part 2, 440-2.

Correlation of Some Sensory and Physiological Phenomena of Vision. W. D. Wright & R. Granit; Brit. Ophthal. Monogr. Suppl. 1938, No. 9, p. 80.

Measurements of Fluorescence and Absorption with Benzene Derivatives. H. Ley & H. Specker; Z. wiss. Phot. 38, 13-27 (1939).

Color Analysis. J. Pinte; Bull. Trimest. Lab. Anal. Recherches Ind. Roubaix 1939, No. 42, 8-18.

Series of Colors of Equal Subjective Saturation. J. Rosemann; Z. techn. Physik 20, 198-203 (1939).

Color Tests for Testing the Color Sense (20th revised ed. of the Stilling tables). E. Hertel; Leipzig (Thieme) 14 pp. (1939).

Wavelengths to which the Eye is most Sensitive and those of the Strongest Sunlight. F. Loewe; Bioklin. Beibl. Meteorol. Z. 5, 100 (1938).

A Color-blind Family ("Daltonians"). A. May Vianna; Ann. Oculist. (Paris) 175, 901-10 (1938).

Critical Selection of the Colorimetric, Spectrophotometric and Spectrographic Methods for Absorption Measurements. G. Kortüm & M. Seiler; Angew. Chem. 52, 687-93 (1939).

Elements and Molecules; Analysis by Absorption Spectra. W. R. Brode; J. Appl. Physics 10, 751-9 (1939).

Absorption of Light in the Atmosphere. Mme. A. Vassy and E. Vassy; J. Physique et Radium (7) 10, 459-64 (1939).

Electric Lamps: Spectral Distribution of Radiation. B. T. Barnes, W. E. Forsythe & W. J. Karash; Gen. Elec. Rev. 42, 540-3 (1939).

Color Vision: Theory. F. Margival, TIBA 17, 432-40, 493-7 (1939).

Physical Photometer: Development. J. Voogd; Philips Tech. Rev. 4, 260-6 (1939).

Spectral Photometer Analyzer. E. Strohbusch; Z. Instrumentkunde 59, 417-21 (1939).

Spectral Variation of the Photosensitivity of Visual Purple. E. E. Schneider, C. F. Goodeve & R. J. Lythgoe; Proc. Roy. Soc. 170 A, 102-12 (1939). Abstr. in Eastman Abstr. Bull. Sept., 1939, p. 473.

Paper: Opacity Measurement. Staff of the Institute of Paper Chemistry; Paper Trade J., TAPPI Sect. 109, 31-6 (1939).

Color and Constitution of Organic Compounds. T. Förster; Z. Elektrochemie 45, 548-73 (1939).

Linear Light Sources: Application. N. A. Halbertsma & G. P. Ittmann; Philips Tech. Rev. 4, 181-8 (1939).

Lucite: Dispersion and Transmission. A. H. Pfund; J. Opt. Soc. Amer. 29, 291-3 (1939).

Photoelectric Color Photometer. I. G. Farbenind. A. G.; British Patent 508,802 of 5-1-1938; 5-7-1939.

Bleached Pulp: Evaluation of Color Stability. J. W. McIntyre; Paper Trade J. 109, TAPPI Sect. 317-25 (1939).

Color Measurement. J. Pinte; L'Ingenieur Textile 1939, No. 358, 244-58.

Influence of Position Isomerism in Azo Dyes upon their Fastness to Light and Washing. M. E. Griffith & W. R. Brode; Ohio Stat. Bull. 1939, No. 601, 21 pp. (through Exp. Stat. Rec. 81, 460 (1939).

Solar Radiation: Measurement. G. H. Walker; Analyst 64, 392-4 (1939).

Specification of Uniform Color Tolerances for Textiles. D. B. Judd; Text. Research 9, 253-63, 268, 292-308 (1939).

Pulfrich Photometer: Application in Matching to Sample. Zeiss & Co.; Text. Recorder 57, No. 674, 45-6; No. 675, 36-7 (1939).

Photronic Combined Brightness, Opacity and Glass Meter: Development. S. W. Blanchard; Paper Trade J. 109, TAPPI Sect. 95-6 (1939).