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INTER-SOCIETY COLOR COUNCIL

NEWS LETTER No. 51

JANUARY, 1944

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ANNUAL MEETING — The annual meeting of the Inter-Society Color Council to be held at the Hotel Pennsylvania, New York City, on March 1, 1944, will consist of a Discussion Session on the subject of "Small Color Differences," co-sponsored by the American Association of Textile Chemists and Colorists and the Federation of Paint and Varnish Production Clubs; a Business Session, and committee meetings. Programs, hotel reservation cards, and a copy of the 1944 membership list will be mailed to members in the near future. Annual reports on the color work during the past year in each member body from the chairman of each delegation, reports from officers, and from each committee chairman are expected at the Business Session.

There will be two parts to the Discussion Session. The morning session will be devoted to a discussion of small color differences, with prepared discussion regarding the importance of small differences in the textile and paint industries, and presentation of information available on tolerance formulas, with discussion from member-body delegations to cover methods now in use in the various industries. A brief afternoon portion of the Discussion Session will supply time for discussion of topics placed on the program by request, particularly topics that present problems it is thought the Council should study. The Optical Society of America will hold its meetings on March 2 - 4 at the Pennsylvania Hotel, following those of the ISCC. On March 2 there will be a symposium of invited papers on the Ostwald system, and undoubtedly there will be contributed papers on the OSA program that will also interest ISCC members. All interested are invited to attend.

COLOR NOTE — "The learned compute that seven hundred and seven millions of millions of vibrations have penetrated the eye before the eye can distinguish the tints of a violet." From Bulwer-Lytton: What Will He Do With It? Bk. VIII, Ch. II.

NEW INDIVIDUAL MEMBERS — We welcome John J. Hanlon and Harry J. Keegan to individual membership in the Council. Before the war Mr. Hanlon was in charge of spectrophotometric work at the Mohawk Carpet Company, and more recently has been stationed as a civilian employee of the Navy Department in charge of spectrophotometric test work at Philadelphia where he has been cooperating with a number of council members on test problems concerned with textiles. On December 28 Mr. Hanlon reported for duty as Ensign in the Naval Reserve. Mr. Keegan, well known to many ISCC members, has been a member of the Photometry and Colorimetry Section of the National Bureau of Standards since 1921, where his interests in color relate to spectrophotometric measurements, colorimetric specification, mechanics, optics and electronics of instrumentation.

COLOR STORY

Mother: "How much do you love me, Mary, darling?" Three-year-old daughter: "Sixteen blue stamps worth, mother."

CHANGE IN STATUS

We extend our good wishes to Frederick T. Simon, individual member of the ISCC, who left the color work at the Philadelphia Quartermaster Depot on January 1 to become connected with Sidney Blumenthal and Company at Shelton, Conn., one of the first organizations to make use of the General Electric Recording Spectrophotometer. Mr. Simon has become known to many Council members by his cooperation on a number of color problems in which Council members are interested. He is a member of the Sub-committee on Color of the American Association of Textile Chemists and Colorists and of the committee planning the Small Color Differences discussion for our annual meeting.

FUNDS FOR COLOR APTITUDE TEST DEVELOPMENT

We are pleased to announce the receipt of a very considerable financial contribution from Cheney Brothers to be applied toward defraying the cost of developing the ISCC Color Aptitude Test. In his letter of transmittal, Mr. Frank Cheney recalled that his company has been much interested in the development of a Color Aptitude Test for several years, and had encouraged the formation of this committee. He remarked very appropriately that the cost of development ought to be borne by those who expect to use the test rather than by the members of the committee charged with its development, and he suggested that there may be other organizations willing to contribute their fair share. Maybe he has something there. At any rate, this contribution is a fine vote of confidence in the work already done by our committee under the Co-chairmanship of Professor Dimmick and Mr. Foss.

WASHINGTON AND BALTIMORE COLORISTS

The second meeting of the current (11th) season of this group was held on January 24 at the Ugly Duckling Tea House, opposite the Congressional Library, Washington, D. C. The guest speaker at this dinner meeting was Mr. S. W. Boggs, Chief Geographer, State Department, who spoke on problems of color printing on maps and globes. New maps and globes were exhibited together with atlases used in the Army Specialists Training Program. Assisting Mr. Boggs was Mr. Carl E. Foss, our Editor for Industry, who is color consultant on this problem, and Mr. A. B. Hoen, President, A. Hoen & Company, Inc., Baltimore, Md., lithographers and printers of these maps. Our readers will recall that this company printed Ridgway's Color Standards and Color Nomenclature," 1912 Edition.

MAP-COLOR NOTES

You will recall that Huckleberry Finn, Mark Twain's inimitable American Boy, thought that the vegetation and soil of the various states were of the several colors indicated on maps. And Professor Hooton in his "Up from the Ape," says that visitors to the osteological collections of Harvard Museum are of the impression that the bones of a negro are black; of an Indian, copper-red, etc.

MRS. RORKE'S SOLDIER SON ALIVE AND WELL

At the last Christmas time we received from Miss Estelle Tennis, Assistant to Mrs. Margaret Hayden Rorke, Managing Director of the Textile Color Card Association of the United States, Inc., news about Mrs. Rorke's son, Sgt. Edward F. Rorke, which made our Christmas more joyous. Miss Tennis said that she thought it might bring hope and encouragement to the many families still anxiously awaiting news of their relatives in service reported missing in action. Direct word was received by his mother that Sgt. Rorke, U. S. Engineers Corps, is a prisoner in a Japanese Military Camp in the Philippines. Previous to this, the last word that reached her from her

son, who sailed for the Phillipines two months before Pearl Harbor, was through a cable dated December 13, 1941, telling her he was safe and well. Shortly after the fall of Bataan and Corregidor, he was listed by the War Department as missing in action. Three undated postcards have now been received by Mrs. Rorke on the same day, each bearing a personal message to his family and friends. In one he said, "I am well and uninjured. Don't worry. Merry Christmas." Miss Tennis' letter gave biographical data concerning Sgt. Rorke and mentioned two brothers in the Army, one a director of Irving Berlin's all-soldier show, "This is the Army," now playing at American Army camps in Great Britain. We are sure Mrs. Rorke's host of friends will be greatly, heartened, as we were, by the news of her son.

A NOTE ON RED

Here's to the red of it,
There's not a thread of it,
No, not a shred of it
In all the spread of it,
From foot to head,
But heroes bled for it,
Faced steel and lead for it,
Precious blood shed for it,
Bathing in red.

From John Daly's "A Toast to the Flag."

COMPARATIVE STUDIES ON ILLUMINATION

Last June a group interested in illumination as related to textile-color-matching problems met informally to pool interests and see if they could not get at some important facts. Certain of the interested individuals thought that differences between results of measured color data and visual matching data might be due in large part to the fact that measured data in use generally assume the illuminant to be I.C.I. Illuminant C, while in actual practice (they thought) the illuminant was considerably higher than C in color temperature. Some believed it might average as high as 25,000°K. This meeting brought out clearly the fact that we lack accurate information regarding color temperatures of the natural lighting under which textile-color matching is usually practiced, and that we also lack information regarding the color temperature of natural light that is preferred for textile-color matching.

Representatives present from three large textile mills agreed, if instruments and instructions were provided, to obtain information on color temperatures of natural lighting used and preferred for color matching in their mills; and we are glad to report that this cooperative work is now well under way. As results become available, we shall keep our readers informed. It is of interest to note that most of the cooperating group are delegates or individual members of the ISCC, though the project is not officially a Council undertaking.

NOTES ON COLOR AND ILLUMINATION

"When the candles are out, all women are fair;" Plutarch in Conjugal Precepts. "By candle light nobody would have taken you for above five-and-twenty." Bickerstaff in Maid of the Mill, Act I, 2. "She may very well pass for forty-three, in the dusk with a light behind her." W. S. Gilbert in Trial by Jury.

COLOR COURSE

From the American Dyestuff Reporter for December 20 we learn that a course in color matching, terminology, judging color effects; Munsell, Ostwald and other color standards; and color measurements will be given at the Evening Textile High School, 351 West 18th Street, Manhattan, this winter, by William H. Peacock, a member of the Technical Service staff of

Calco Chemical Division, American Cyanamid Company. Mr. Peacock has been identified for many years with application problems in all branches of the dyestuff field. His treatise on the coloring of plastics has been a standard part of the text of plastic catalogs for many years and his knowledge of stains and of the application problems involved in food, drug and cosmetic dyes is well known. He is the author of the comprehensive set of articles on "The Practical Art of Color Matching," which appeared in Rayon Textile Monthly (Oct. 1940 to Feb. 1941), which evidence a very wide acquaintance with dyeing and color problems. The course will be free to those desiring to receive the instruction.

DYEING NOTE — A long time ago, there was a lady of the chorus who underwent a surgical operation. When the stitches were removed, alas, the dye in the surgical thread had "run," and the lady was tattooed with a pattern resembling a herringbone! The operation was successful, the the patient dyed! From a Corticelli Threads advertisement (Belding Hemingway).

COLOR IN "THIS IS FASHION" — The impression inadvertently given in the July (1943) News Letter that "This is Fashion," Elizabeth Burris-Meyer's new book, contains little color information, should be corrected. Actually it does give an extensive treatment on color. It contains a historic survey of colors as they appear in clothes from ancient times through 1942 by means of thirty pages of color swatches and notes on the thirty periods most important to the development of fashion. The research material presented in this book is given in brief form without comment so that the reader may draw his own conclusions and interpretations. When the notes on the color of the clothes of the historic periods are isolated, as they are in an entire section in this book, it is surprising to see how clearly the whole history and development of a country are revealed by the colors it wore. The dyes used show the progressive use of natural resources; the descriptive names given the colors and their changing range of value and chroma reflect unmistakably the changing social, economic and political life of the people.

Mrs. Burris-Meyer's many friends will be interested to know that in addition to running a plantation in South Carolina, her husband now being in the Navy, she is continuing her series of lectures at the Tobe-Coburn School for Fashion Careers, and also working with the Simplicity Pattern Company as Associate Art Director and Color Consultant on their catalog.

FASHION NOTES — "He will come to her in yellow stockings, and 'tis a color she abhors; and cross-gartered, a fashion she detests." From Twelfth Night, Act II, Sc. 5, L. 216. "Apes are apes though clothed in scarlet." Ben Johnson in Poetaster, Act V, Sc. 3

"Both he and his people were black as sloes
For the region they lived in was torrid;
And their principal clothes were a ring through the nose
And a patch of red paint on the forhead.
Thomas Hood, the Younger.

DR. BARNES' THE ART IN PAINTING — We have received a letter, dated January 6, from Albert C. Barnes, noted art collector, critic and founder of the Barnes Foundation at Merion, Pa., in answer to the Editor's inquiry. We have had occasion, in discussion with Color Council friends and in meetings, to praise Dr. Barnes' "The Art in Painting" (1925) for specific reasons given in part in the following paragraph from our letter of December 30:

I say this (about the constructive value of the book) not only because its critical analyses deal with the plastic values from the point of view which stresses those consequent upon and unique to the medium of painting (that is, paint) and the ways in which color contributes to the general design; but also because you have outlined a working mechanism for such evaluation and criticism and have illustrated it with many examples. Citation of many specific cases of "organic," "structural" and other uses of color have led me to read some parts of your book again and again and to compare with my own observations in our galleries. No other work has given me a small fraction of the nutrition of the chromatic pabulum you offered.

Dr. Barnes, explaining that he is not writing a resume of his present ideas because "The war has reduced our teaching staff by more than 50% and everybody here has his hands full..," continues: What I wrote in the book, "The Art of Painting" by no means covers all we have had to say about color -- and I think you will find that topic treated better in the third edition of "The Art in Painting" than in the earlier edition which you mention. Also, since that book was written we have published the following monographs: "The Art of Matisse," "The Art of Cézanne," "The Art of Renoir," and "The French Primitives and their Forms." In each of these books, the treatment of color takes on a particular character so that by taking appropriate excerpts from each of these volumes you would be able to augment, reinforce and make more complete our treatment of color in even the latest edition of "The Art in Painting."

The editor's ignorance of the fact that there were later editions, of the cited work, than the one in his possession, only serves to emphasize his impression that the critical methods utilized by Dr. Barnes are not as well known to Council members as they deserve to be. As time permits, we shall attempt to carry out Dr. Barnes' suggestions and offer the resulting excerpts to our readers for what they may be worth.

NOTE ON PAINTING

Painters have not been generally known for their charitableness in their estimates of one another; but when Vollard, art dealer and biographer of Cézanne, spoke to that painter about a painting of Delacroix's with flowers "at random against a gray background," Cézanne shook his fists in Vollard's face and shouted: "You idiot, don't you dare say that Delacroix painted anything at random."

COLORIMETRY COMMITTEE

The Colorimetry Committee of the Optical Society of America of whose extensive report an introductory chapter and Chapter II were published in the October Issue of the Journal of the Society, has been reappointed in toto by President A. H. Pfund. This committee as at present constituted includes Messrs. Adams, Crittenden, Draves, Foss, Gage, Gibson, Godlove, Hardy, Judd, Lowry, Luckiesh, MacAdam, Newhall, O'Brien and Paul; Cmdr. Bittinger; and Blanche R. Bellamy, Dorothy Nickerson and Louise L. Sloan-Rowland.

OPTICAL NOTE

Cézanne said of the Impressionist painter Monet: "'Tis but an eye; but what an eye!"

THE RATION CARD

We have received a card announcing a "sensational Stroblite number" entitled "The Ration Card," to be given at Radio City Music Hall, New York City, presumably soon (date not given on the announcement). This is described as a brilliant spectacle with fun and mystery in the dark; produced by Leon Leonidoff, directed by Florence Rogge, and designed by Marco Montedoro; on the screen, "Madame Curie."

RATION COLORS AND SUCH

"Conductor, when you receive a fare
Punch in the presence of the passenjare
A blue-trip slip for an eight-cent fare,
A buff-trip slip for a six-cent fare,
A pink-trip slip for a three-cent fare
Punch in the presence of the passenjare!

Mark Twain in Punch, Brother, Punch; used in Literary Nightmare.

TCCA MEETING

At the 28th anniversary meeting of the Textile Color Card Association, held on December 9, 1943, directors were elected for the ensuing year; and at a meeting of the directors held immediately after, the following officers were re-elected: Charles Pinnell, Merrimack Mfg. Co., President; Roy E. Tilles, Gotham Hosiery Co., Inc., 1st vice president; Armand Schwab, Armand Schwab & Co., 2nd vice president; Carl E. Kempf, Brewster Hat Co., Inc., treasurer; Margaret Hayden Rorke, secretary and managing director. In addition to these, the other directors elected were: Waldo Grose, Botany Worsted Mills; E. Irving Hanson, Hafer Associates, Inc.; Allan C. Jacobson, J. P. Stevens & Co.; W. R. MacIntyre, Joseph Bancroft & Sons Co.; William B. Olmsted, Jr., American Viscose Co.; Brainerd Pidgeon, Stunzi Sons Silk Co.; Alfred L. Simon, Osmite Co.; and John F. Warner, Calco Chemical Division, American Cyanamid Co.

We have received copy of the summary of the report by Margaret Hayden Rorke, managing director, covering the activities of the TCCA. Many of these activities have been reviewed in past News Letters; and our space permits little more than calling attention to the reviews. Mrs. Rorke stressed particularly the vital war services of the Association in addition to its normal functions of catering to the color needs of industry. The War Department, the Navy Department and other government bureaus frequently have called upon the TCCA to assist in establishing standards for essential color requirements. The U. S. Army Color Card issued at the request of the Quartermaster General has been discussed in News Letter No. 44. Compilation of official flag colors at the request of the War Department, was treated in News Letter No. 50. The official card portraying the new Navy Grey for officers' summer uniforms was described in News Letter No. 49. The placing of Mrs. Reimann as Research Associate in the National Bureau of Standards for the purpose of calibrating the 216 standard colors of the Ninth Edition Standard Color Card of America and translating these standards into the language of science, has also been announced. As the War Department has adopted the spectrophotometer for measurement of its colors these accurate color specifications will be most valuable for wartime as well as peacetime requirements.

The Association has given its active support to the War Production Board in conserving dyestuffs and other critical materials; and in this connection we have described the formation and functioning of the association's Dyestuff Advisory Group. In cooperation with the WPB, the association issued the Colors for Shoe Leathers, as specified in Conservation Order M-217. From the Association's cards, many color standards have been adopted by the Government for various divisions of the Armed Forces, including the WAC, WAVES, SPARS and the Transportation Corps, Armored Force and Tank Destroyer Forces of the U. S. Army, as well as for various service ribbons and decorations. The Association's Information Bureau on War Colors answers numerous inquiries working on Government orders.

Despite the vicissitude of war, which necessitated the suspension of all members in enemy countries and the resignation of many members in other foreign countries, due to war conditions and monetary restrictions, Mrs. Rorke reported that the Association had gained 140 new members. In closing, she predicted that the Association would have

many opportunitites for broadening its activities in the post-war period and that countries heretofore unknown in its geographical roster would open their individual doors, asking its help and cooperation.

FASHION NOTE — One day Marie Antoinette appeared in a gown of chestnut which so pleased the king that he commented on its beauty, calling it "flea color." Thereafter, flea color became the fashion. "Old flea," "young flea" and "flea back" were so much in demand that the dyers were unable to meet the needs of the trade.

A BOUQUET AND A STORY — In a recent complimentary letter from Walter C. Granville of the research Laboratories of Interchemical Corporation, New York City, he stated that he had had the complete set of 50 News Letters bound into two volumes "and would rather lose almost anything else in my laboratory than these two volumes." The editor replied in part as follows:

Your high valuation placed on your bound first 50 issues reminds me of a classical story; but I shall not test out your valuation in the way of the story. The beautiful Phryne, who had considerable influence over Praxiteles, was anxious to possess a work from the master's chisel; and when desired to choose for herself, not knowing which of his exquisite works to select, she devised the following expedient. She commanded a servant to hasten to Praxiteles and tell him that his work-shop was in flames. The great sculptor rushed out in a great anxiety and alarm, shouting: "All is lost if my Satyr and Cupid are not saved!" The object of Phryne being accomplished, she confessed her stratagem, and chose the Cupid.

Being wartime, your laboratory is safe from arson committed by me; nor do I expect to set the world afire with issues of the News Letters in the near future.

MASTERS OF COLOR — What appears to promise an interesting series of advertisements entitled Masters of Color (painters, British so far) is a set published in the Journal of the Society of Dyers and Colourists by Imperial Chemical Industries, Ltd. The painters in the issues so far received are: Gainsborough (June), Raeburn (July) and Hogarth (Aug.), Romney (Sept.), and Reynolds (Oct. 1943).

FIRST FUNDS CONTRIBUTED TO MUNSELL COLOR FOUNDATION — Miss Nickerson, as ISCC representative to the Board of Directors of the Munsell Color Foundation, sends us the following item, one more evidence of the cooperative spirit that exists among color workers: The research test used by Lt. Dean Farnsworth in developing his color blindness studies employed the 100-hue research papers developed some years ago by the Munsell company in studying hue intervals. Lt. Farnsworth's use of this material at the New York University aroused so much interest among those working on color blindness on the ISCC Color Aptitude Test Committee that several tests were made and distributed for test use within the committee. This brought on a request for such a number of other tests that Lt. Farnsworth told Mrs. Bellamy, of the Munsell Color Company, to go ahead and make up the tests for commercial sale and that he would willingly contribute his part. Recently, Mrs. Bellamy, having sent Lt. Farnsworth a check representing a royalty, received the following note: "Dear Mrs. Bellamy,: Having now had the thrill of receiving a royalty check, let me give it a second turn of duty by presenting it to the Munsell Foundation. As I recollect, it is permitted to receive and disburse funds and since I don't suppose it started with any, the statement of some small grant in its endowment might serve as a reminder to others that it can receive. If I'm wrong in this we'll find some other use for it."

Though the amount involved was small, to Lt. Farnsworth should go congratulations on being the first, other than the original donors, to make financial contribution to the Munsell Color Foundation. Since the purpose of the Foundation is to "further the scientific advancement of color knowledge, and in particular, knowledge relating to the 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," we are glad to see the start of a fund that may some day grow to be a real factor in color research.

ANOTHER LETTER

The following brief letter is also self-explanatory; it was dated on January 11, and went from the Council treasurer to the Council secretary:

In answer to your letter of January 7th regarding funds forwarded for the Building Fund of the Institute of Physics, please be advised that we have received no money for this purpose.

NOTE ON PAINTING

When eight, Johnny loved soldiers and Mary was crazy about painted dolls. Now, at eighteen, Mary loves soldiers and Johnny is crazy about painted dolls.

From "Nuggets" (The Barnes-Ross Co.)

INTERESTING ADVERTISEMENT

In the Saturday Evening Post of November 20, 1943, appeared a most striking illustration accompanying an advertisement entitled "The Lady with the Prewar Eyes" by the Better Vision Institute, Inc. A lady holds her hands over her eyes, with closed eyelids and an expression of mild distress from strain. This whole atmosphere is heightened by the design. The two arms, with the two elbows at the lower corners, frame the conventional pyramid. The highlighted face and throat yield central symmetry only slightly informal in balance. The blouse lapels, emphasized by deep shadows, produce lines "in opposition" to the lines of the arms, and so add strength. The contrasts of light and dark are startlingly Correggiesque, but are so combined with more subtle value contrasts as to produce a pleasing though attention-getting pattern. "Correggiosity is the human body glorified in the manner of Ziegfield"; so says a recent work on painting. But while we cannot rank Correggio with the greatest, we believe he came closer to expressing the true spirit of the Renaissance than this epigrammatic statement implies. And though the advertisement properly makes use of the attention-value of a beautiful woman; we do not imply any Ziegfield quality in the picture. The advertisement's message is that previous neglect of the lady's eyes sabotaged the vital war work she was doing. We congratulate the Institute and the artist on a job well done.

COLOR AND CHEMICAL STRUCTURE

An interesting paper, entitled "A simplified discussion of color and constitution of azo dyes," by W. R. Reynolds, appeared in American Dyestuff Reporter 32, 455-6, 465-7 (Oct. 25, 1943). Dr. Reynolds, a chemist with wide experience in the dyestuff field, points out that the important concept of "resonance" which, mathematically treated, involves the application of difficult quantum mechanics to complex molecules, gives predictions in harmony with concepts "developing among organic chemists (by simpler means) for many years." He then gives a simple qualitative treatment centering around two tables of dye intermediates so arranged that "light shades" are obtained by azo-coupling intermediates near the top of the lists while "deep shades" are obtained from intermediates near the bottom of the list. Here he uses the old definition (Schütze, 1892) of "depth of shade," namely, position in the series: yellow, orange, red, violet, blue and green, green being "deeper" than blue, blue deeper than violet, and so on. Though there are defects in such a concept, Reynolds has made a very necessary and useful step and has done it well.

We have pointed out, in the article "Calculation of 'color' in organic compounds," in News Letter No. 47 (May, 1943) that the above definition of depth is inadequate in several ways; and we also suggested certain steps which are necessary to improve Reynolds' treatment. There and in a recent paper before the Optical Society of America, we pointed out that the chemist's idea of depth arises from seeing the colors of increasing thicknesses of layer of colored solutions. Reynolds and others are primarily interested in the colors produced when auxochromes and chromophores (often present in the intermediates) are added to certain molecules, an important but not sole result being that the long-wave absorption band moves from the ultra-violet through the visible spectrum. When this occurs, the colors first get steadily darker and more saturated (i.e., become "deeper" in the sense they do in the beaker), but at a point where the absorption is near the middle of the visible spectrum, reverse, then becoming steadily lighter and less saturated. And the Schütze hue-series needs some correction: the colors (from a single band) start with green-yellow and end with blue-green; and true greens are never obtained at all. Greens require a second band, produced in ways suggested by G. N. Lewis and others.

Reynolds also tacitly assumed or implied that the bathochromic or deepening effect involves hue (absorption wave-length) change only. The Editor has pointed out that many substitutions also increase the molecular extinction coefficient, "deepening" the color by increase of saturation and decrease of brightness. Moreover, that while there is frequently a general parallelism between these two effects, this is not always the case, for they depend on different factors. Both effects are ultimately connected with factors which tend to free the valence electrons from the constraints under which they move; but extinction coefficients can be connected most readily with the polarizability of the molecules. The polarizabilities are proportional to the bond refractivities, obtainable from analysis of data on molecular refractions; and fortunately, the latter are additive functions which can be calculated from constants characteristic of atoms and bonds. For an example to illustrate the two independent effects, we may consider substitutions in the camphor molecule. It is possible to make one substitution into the molecule which increases the intensity of absorption, leaving the wave-length of maximum absorption virtually unchanged; to make another which does not increase the extinction coefficient but moves the absorption toward longer waves, and a third which causes both effects. The next step in the development which Reynolds has so ably furthered will consist in so analyzing the organic chemist's and spectrophotometrist's data as to separate and distinguish the two factors and their interaction as typical intermediates are combined and auxochromic and other substitutions made.

DYESTUFF NOTE

"I'm what I seem; not any dyer gave,
But nature dyed this color that I have."
Martial: Epigrams, Bk. XIV, Ep. 133 (Transl. by Wright).

METROPOLITAN LECTURES

February lectures at the Metropolitan Museum of Art include: American Painting Today and its Tradition: Landscape (Feb. 3); wall painting (Feb. 10); modernism (Feb. 17); the American scene (Feb. 24); Gallery conversations: XX century painting (Feb. 11); sources of modern French painting (Feb. 18); Italian Art of the Early Renaissance (Feb. 13); The Spanish Paintings in the National Gallery in Washington (Feb. 13); and XIX Century Polish Paintings (Feb. 29).

COLOR IN PAINTING THROUGH THE AGES XVII.

In our previous issues, our story has reached about the middle of the third millenium, though we have carried part of it down to 2400 and 2300 B.C. This was the end of the Atlantic (warm, damp) climatic period in Western Europe, and was followed by the warm but drier one called "Sub-boreal." In this period in the Near East had occurred the collapse of the empire of Sargon, while at Jericho and Lachish began the Early Bronze Age. The Second City at Troy, larger than Troy I, was founded; its ruler built himself a palace of the megaron plan (hall with central hearth and porch). The city thrived through monopoly of trade in the Hellespont. Bronze of standard proportion of ten percent tin was now in general use. Gold, silver, lead, obsidian, lapis lazuli (ultramarine) from Iran, and amber from the Baltic area were imported. Jewelers introduced solder, filagree work and beads after an earlier Sumerian plan. Late in the period the pottery wheel was introduced. The Mother Goddess was represented, horned and owl-like, on "face-urns" as on early Sumerian funerary jars. The vases were paler than before; but to preserve the effect of the old self-colored vases, their surfaces were covered with a ferruginous wash which turned red on firing, forming the "red-wash ware" found at Alishar and as far west as the Middle Danube basin. About 2300 B.C., Troy II was besieged and set on fire; but hoards of valuables missed by the plunderers have been unearthed. Shortly before this date, Alishar in Central Anatolia was also destroyed. Peake and Fleure believed that the destruction of these towns was due to men from the Russian steppes; and the geographer Ellsworth Huntington believed that drought was the primary cause of their movement, though the taming of the horse must have been an important factor.

The Sixth Dynasty of Egypt was brought to an end about 2400 B.C. by invasions by hill tribes from Judea, perhaps themselves pressed by the steppe men, and by Nubians and negroes from the South. There followed a period of chaos called the First Intermediate period or Dark Age, graphically described by a poet known as the "gloomy sage." The Egyptian chronology of the Seventh to Tenth Dynasties is confused; this period ended with Dynasty XI about 2160 B.C. During the Dark Age, men of moderate means provided for their future life by leaving in the tombs, replacing the earlier "Ka" statues, figures of servants, made of wood. Later there were groups and scenes taken from domestic life, models of boats and workshops. These were usually crudely painted with "lively" colors. Inside coffins, pictures were painted of food, jewelery, clothes, flowers and magical texts for the use of the departed.

Turning toward Greece, we see that there occurred an extension of the Morava-Vardar culture from the Balkans south into Macedonia. Shortly afterwards, about 2500 B.C., invaders from the region of Troy took possession of the Macedonian coast-lands, forcing the people with painted-pottery into the hinterland. Moving westward, their culture became the Bronze Age one knows as "Early Macdonian." It formed a wedge between the Dimini culture to the south and the extension from the north called Neolithic B. Its grooved-surface pottery was gray in color. This pottery mingled with corded ware and other objects indicating contacts with Battle-axe folk from the northern plains. In central Greece, Early Helladic II dark-red-on-buff pottery was replaced by that of the period III (2400-2100 B.C.), which was also painted with geometric designs in a dark red or black glaze on a light ground; or with white rectilinear patterns on the dark glaze ground.

In central Moldavia, excavations in 1936 at Izvoare revealed a culture named from that site. Below a painted-pottery settlement of farmers here was found one characterized by incised monochrome pottery. The decoration consisted of bands of rilling, sometimes separated by punctuations, broken lines stamped with a tooth-comb, cross-hatched

ribbon lines with white inlay, and simpler linear patterns. This culture is practically continous with that known as the "A" phase of the Tripolje culture, best known from grain-growers' huts in the country around Kiev. The culture included the domestication of animals, including horses, and several styles of pottery: rectilinear, spiral and punctuate incision on monochrome pots; reddish pots painted with pale spiral bands with black edging, or with black and red ones on a pale ground, also a third painted style with black and white on red, or red on white; finally a coarse ware due to more primitive people descended from the Mesolithic stock. At Cucuteni in Moldavia, the designs were executed in red or warm yellow-brown, outlined in black, on a white slip ground, or in red or brown, black, and white directly on reddish clay. The leading motive, a long S-spiral, stands out in white against the polychrome ground. The vases were technically excellent and varied in shape. Their striking resemblance to those of the Yang-shao culture of western China is not believed to indicate derivation from China. The Tripolje farmers were probably a branch of the Danubian family.

In the Oltenian culture of the Alt river basin west of the Carpathian mountains the pottery clay was reddish, sometimes blotched with black or parti-colored; the designs were executed in white on red or on a pale slip, often outlined in black. Farther to the southwest, in the Balkans, the old Boian A culture was succeeded by one which the Rumanian prehistorians named from a type-site at Gumelnitza, whose "A" phase lasted until 2200 B.C. Other excavated sites are Vidra and Tangaru. Here pots were painted with graphite, sometimes supplemented with white pigment applied before firing.

The painted-ware in Hungary was replaced by the red, yellowish, or white "crusted ware" with black ground which we have described. At some central Hungarian sites, typified by Lengyel, a great cemetary site west of the Danube, the black-polished ware was uncrusted. There was also incised ware, described in connection with the Tisza culture in News Letter No. 46; at Butmir in Bosnia this became incised, hatched and pointillé ornament in angular ribbons, checkers and running spirals. Lengyel and Butmir carry us in time down to 2100 B.C.

OUTLINE HISTORY OF COLOR: SUPPLEMENT

Suggestions from one or two readers of the News Letter indicate that we skipped too lightly over the early part of our historical outline (News Letter No. 48; July 1943). We now supply part of the missing material.

100,000 B. C. (?) Burial in red ocher practiced in Mousterian times; body painting probably practiced.

75,000 B. C. (?) Black and red imprints of hands and outline drawings in Chatelperronian culture (early Aurignacian) caves.

50,000 B. C. (?) Gravettian (late Aurignacian) cave paintings were in black, red and yellow with some modelling by shading and attempts at perspective.

25,000 B. C. (?) Balls and pencils of yellow ocher, red and brown hematites and ochers and paintings were left in the Bambata cave (Rhodesia), and other African sites; red, yellow, brown and black animal paintings in late Aurignacian and early Magdalenian caves of Europe.

12,000 B. C. Polychrome cave paintings (upper Magdalenian) from mixed yellow, red and black pigments.

9,000 B. C. Painted pebbles in Azilian sites.

6,000 B. C. Tasian (Egypt) gray ware with black patches formed.

5,800 B.C. Black or brown monochrome pottery made at Mersin, Cilicia.

5,500 B.C. Polished black ware with incised white-filled decoration made at early upper Mesopotamian sites.

5,000 B.C. Orange pottery with wavy red decoration made in the upper neolithic culture of Tepe Gawra (Iraq); rock drawings in red and white in the Libyan desert.

4700 B.C. In the Tel Halaf culture period (N. Syria and Assyria), black, white and red to orange polychrome painted pots, often on a creamy ground were made; these had broad horizontal bands of red separating registers and often a red and black chevron pattern. Badarian (Egypt) culture made ripple-finish pots, red on the lower outside and black on the rim and inside; also polished black bowls.

4300 B.C. Ghassulian (Palestine) culture included fresco paintings in houses; Susa I (Persia) prepared violet-black on pale buff geometrical and stylized naturalistic ware; The Amratian (Egypt) ware was red with a black top.

4200 B.C. The Highland ware of Tel El Obeid near Ur, the home of Abraham (Babylonia) was painted with dull black on a light reddish yellow (buff) or greenish clay.

4100 B.C. At Tepe Gawra (Iraq) was found the oldest known landscape painting on a shattered vase; traces of purplish red paint found in temple rooms; lapis lazuli (Ultramarine) beads used.

3700 B.C. The "Red-ware" culture (actually pots were black, brown, gray or red) thrived in Western Asia Minor.

3600 B.C. Gerzean (Egypt) ware was brownish red on light buff, with spiral designs.

3500 B.C. Polychrome "Lowland" ware, due to pigtailed Hurrians (?), geometrically and realistically decorated, in black and dull purplish red was prepared at Jemdet Nasr near Kish (northern Babylonia); building walls were painted with red, white and black paint. Pottery was painted with black, brown or violet pigment at Anau (Russian Turkestan). The Amri culture of southern Sind (India) prepared polychrome black-on-red-on-pale-slip ware.

3400 B.C. In the Middle Neolithic culture of Crete, burnished black ware, with incised geometric designs, often filled in with white or red paint, was prepared; in Nal, western Baluchistan, was made a polychrome conventionalized animal ware, dark red with or without white, yellow, green or blue and outlined with brownish black.

3300 B.C. Tomb walls at Hierakonpolis (Semainian culture of Egypt) were painted in red, black and white with scenes of the chase, combats and dances on yellow ground; the first Thessalian culture (Sesklo, Greece, earliest European neolithic) made white on red or mottled burnished ware; also red on a white slip (likewise in Copper Age Cyprus).

3200 B.C. In the second city of Susa, realistically decorated polychrome pots were made (purplish red on black or gray).

3000 B.C. Egyptian (Thinite) paintings and animal-figured relief used "solid" color outlined with saturated red or other color; at Tel Brak (northern Syria) was found

a blue, white, green, gold and copper frieze in the "Temple of a Thousand Eyes"; Sumerian walls were in horizontal bands of red and white, and often black (and the gryphon, centaur and chimera appeared in art); at Lachish (Palestine) was a red ware; with the Early Minoan culture (Crete) were multi-compartment paint pots and gray to black, white on buff, and dark on light wares; with the Harappa culture of India were brightly painted toys, black on burnished red pottery, and red ocher face paint; with the Vardar-Morava culture of the Balkans, "rusticated" or "barbotine" roughened brownish ware, spiral-meander-decorated gray and black to red ware, red-slipped ware, and spiral-design black or white on red ware were prepared.

2900 B.C. The Egyptian Third Dynasty tomb of Hasi-Re at Sakkara was decorated with flat geometrical patterns in black, red, yellow, green and white (also at Hierakonapolis).

2800 B.C. Eygptian Fourth Dynasty realistic painting of geese from a mastaba of Nefermet at Medun, in brown, green, and blue on a gray ground; the famous portrait of Nefert was painted; Maltese neolithic and Sicilian geometric pottery were made.

2700 B.C. Early Minoan II (Crete) blotched black on red ware; buff ware; glazed red to black; dark-on-light and light-on-dark designs; Early Helladic II (Greece) glazed dark red to black on buff ware; Second Thessalian-Macedonian (Dimini, Greece), spiral and basketry designs in white or warm black on buff, red or brown, sometimes outlined with black or white; and with Vardar-Morava culture and West Rumanian sites, various painted potteries; with the Early Almerian (Spain) red "bag ware" and cave-culture paintings (conventionalized animal, chase and pastoral scenes).

2600 B.C. Egyptian Fifth Dynasty temple and tomb ceiling decoration, gold stars on "midnight blue"; scenes of daily life, red, black, white, green, blue and yellow washes within outlines in registers; the famous painted reliefs of the Tomb of Ti; in Central Europe, "mixed cultures" (Danubian II with others) had monochrome pots variously decorated; Tisza (Hungary) culture pots were dark gray "crusted" with red or yellow.

2500 B.C. In the Second City of Troy, at Alishar (Anatolia) and as far west as the Danube were pots of "red-wash" ware; the Western Neolithic in Apulia (Italy) had black on buff pottery.

2400 B.C. During the Egyptian "Dark Age," wooden statues and scenes of domestic life were painted with "lively" colors; at Uruk (Mesopotamia) was a mosaic of terra-cotta cones, heads colored red, white and black, on a building wall; with the Tripolje and related cultures of the Ukraine, Rumania and the Balkans were several styles of painted and plain pottery, one form strikingly resembling Yang-shao ware of China; in Rumania, painting with graphite; in Hungary, red, yellowish or white "crusted ware" with black ground; at Lengyel, great cemetary on the Danube, was black polished ware; around the Swiss lakes, Belgium and Baden, black and gray tulip and bell-shaped beakers and "sauce-boats"; in France, with megaliths, richly decorated vases and palettes for grinding paints.

2200 B.C. In the Sindh (India) was Jhukar polychrome pottery, deep purple or black designs (commonly chevron motive) in broad bands on a cream or pink slip, recalling Tel Halaf ware; with the Second Tripolje culture in the Black Earth lands, pots were painted in black on a light orange ground; brick red to black "beakers" were carried all over Europe by the "Beaker race," later the John Bull constituent of the British, who were bands of dagger-armed merchants and smiths.

2100 B.C. In the Fifth City of Troy, red-ware was ousted by a fine gray "Minyan ware" imitating silver; in the Middle Minoan (Crete), "eggshell ware" was polychrome; yellowish white, orange and vermilion on dark or black ground; or these on pale buff or deep red; also fresco paintings, painted stucco relief, naturalistic style with outlines in dark red, yellow or black; pigments included Egyptian blue and a bluish green; an early figure was the "Blue Boy," a fresco in yellow and white on red, with blue flesh; often reproduced is the Flying Fish fresco (1700 B.C.)

2000 B.C. Art flowered in Egypt's Dynasty XII; wall paintings of the tomb of Beni Hassan are famous; at Kahum, walls were often red and yellow; the silver-gray Minyan ware was brought to Macedonia and Greece by the destroyers of its cities (the first Aryan Nordics), but the natives were left with their black and brown and glazed red wares.

1800 B.C. In the Central European Early Bronze Age, where (as at Perjamos, Rumania) Beaker and Battle-axe folk and smiths from the southwest merged, "hour-glass" mugs and jugs were red, black or mottled, slipped and polished.

1700 B.C. Painted pottery occured at Tell Atchana (inland Syria); Minoan (Crete) "lily vases," in a naturalistic style, were in chalky white on dark violet.

1600 B.C. In the palaces of the Hellene (Aryan Nordic) princes of Tiryns and Mycenae (Mycenaean age of Greece), battle scenes were done by fresco painters, probably Cretan in colors "muddier and less pure" than they were in Crete; strongly contrasting vivid colors were used. Colors were yellow, bright blue, red, white and black or dark brown, the backgrounds being brownish yellow and grayish blue, later a uniform blue. In the "Boar Hunt" at Tiryns, the "incredibly pink hounds are disfigured with stylized spots of scarlet, black or blue." Pottery colors were brown, buff, black, maroon, white and red. In the Minoan palace fresco at Knossos, the "Cup-bearer" is seen against a contrasting background of wavy alternating stripes of yellow and bright blue. The same kind of ground, but red and yellow, was used for the painting called "The Chieftain," as also in Greece. In Cretan painting, the feeling is of vital animation and of a people in love with life. There was no perspective, chiaroscure nor modelling of figures.

(The interesting and important cultures in Central and Western Europe and in Egypt from 1800 to 1400 B.C. have very little color interest.)

1580 B.C. Turquoise-blue-glaze faience beads were found in Egypt, Danubian and Western European sites.

1500 B.C. In the Egyptian Dynasty XVIII tomb of Huy, a painting of negro women with children is bright and crude, in red, blue and yellow. Minoan (Crete) vases often used marine designs. The famous Octopus vase from Gournia is in dark brown on light buff; in Greece, floors and ceilings were decorated in color.

1450 B.C. In the period of the mythical king Minos, the Late Minoan II period of the supremacy of Knossos in Crete, the "Palace style" of decoration, florid and elaborate; vases were in a brownish glaze on a buff ground.

1370 B.C. The palace of Akhnaton, first monotheist of history and father-in-law of "King Tut," had floors and walls decorated with glazed tiles; marsh animals were shown against a deep blue ground; other colors were brownish red, green,black, and white. A fresco of the king's family has an orange-red ground with yellow and blue diamonds. A painted limestone statue of his queen is frequently reproduced in color.