IV-3 Note

# INTER-SOCIETY COLOR COUNCIL

## NEWS LETTER NO. 32

### NOVEMBER 1940

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

**NEW DELEGATES AND INDIVIDUAL MEMBERS**

The following appointments as delegates to the ISCC for the coming year have been made by the Illuminating Engineering Society: H. P. Gage, W. F. Little, Norman Macbeth, Parry H. Moon, H. L. Logan, and A. H. Taylor. We take pleasure in welcoming Professor Moon (Massachusetts Institute of Technology) and Mr. Logan (Holophane Co.) as new delegates. We are also pleased to announce the election of the following new individual members: E. H. Greppin, Wilmot Castle Company, Rochester, N. Y., and James A. Meacham, Sherwin-Williams Company, Cleveland, Ohio.

**WASHINGTON COLORISTS**

The Washington Colorists announce a meeting for November 27. Following dinner at the Admiral Club, the group will adjourn to the new headquarters of the National Paint, Varnish and Lacquer Association. Miss Lonore Kent, Director of the Association's Save the Surface Campaign, has made the arrangements for this visit, and Mr. Sward will conduct the group through the scientific laboratories. Mr. Joseph Goss Cowell, art director of the National Art School, will speak to the group on the service of color as an aid in treating mental diseases. Mr. Cowell, a portrait painter and muralist whose avocation is creative therapy, has had six years experience in the Boston State Hospital along this line and is the author of several articles on this subject in psychiatric journals.

**PRELIMINARY PLANS OF 1941 ANNUAL MEETING**

The Tenth Annual Meeting of the Inter-Society Color Council will be held in Washington some time during the week of March 3, 1941. The meeting will consist of a Discussion Session under the chairmanship of Dr. Dimmick, chairman of the Problems Committee, a Business Session, and a Popular Session to be held in the evening. On March 5 there will be a joint Technical Session with the American Society for Testing Materials, on color and in the testing of materials. The March 5 program is in charge of M. Rea Paul, chairman; C. E. Foss, W. R. Fuller, D. B. Judd, H. A. Gardner, R. S. Hunter, A. W. Kenney and W. M. Scott. The local committee in charge of general arrangements is: Wm. D. Appel, chairman; Charles Bittinger, Kenneth L. Kelly, Lonore Kent and Dorothy Nickerson.

**REPRINTS OF THE GAGE PAPER**

Each of you should have received in the past few weeks a copy of the paper given last June by Dr. H. P. Gage before the Society of Motion Picture Engineers at Atlantic City. We greatly appreciate the courtesy of the Optical Laboratory of the Corning Glass Works, through whom this paper was supplied to you. It was in this paper that Dr. Gage defined the Inter-Society Color Council as a "joint committee on color of the member societies favored with the advice of the individual

members", a definition which has received much favorable quotation. This paper's survey of the present status of color knowledge is very good and surprisingly complete for the space available. If any of you wish an additional copy, we are sure that Dr. Gage will be glad to have you write to him directly at Corning.

NORRIS GREGG MEMORIAL DEDICATED

When the National Paint, Varnish and Lacquer Association recently vacated their old-yet-new headquarters in Washington for government use, they purchased the old Morton mansion at 1500 Rhode Island Avenue. In redecorating the interior of the building, they were careful to leave intact the old panelling, fireplaces and stairways. It is of color interest to know that the Council for Paint Styling, in planning the color schemes for each room, kept in mind both the tradition represented by the mansion and the necessity for efficiently lighting the individual offices. In this manner, "with careful 'reason why', their headquarters has been painted from stem to stern." Anyone interested in a description of the color and lighting schemes used should write to the Association for a copy of "Styling with Paint", which appeared in the National Painter's Magazine, October, 1940. On October 30, 1940, during the annual meeting of the Association, this beautiful structure, with its wealth of historical background, was formally dedicated as the Norris B. Gregg Memorial.

COLOR PERCEPTION TESTS PUBLISHED

The American Optical Company has published in the last few weeks a series of 46 charts of the type formerly available in the Ishihara and Stilling tests. We understand that these tests were compiled for the United States military authorities. The charts were engraved by the Beck Engraving Company with International Printing Ink Corporation Inks. They are published under the title "Pseudo-Isochromatic Plates for Testing Color Perception."

PHYSICISTS FOR NATIONAL DEFENSE

The United States Civil Service Commission announces (November 14) an assembled examination for the positions of Assistant Physicist ($2,600 a year) and Associate Physicist ($3,200); ask for announcement No. 152. There is also an announcement (No. 153) of unassembled examinations for Physicist ($3,800), Senior Physicist ($4,600) and Principal Physicist ($5,600). We understand that a fairly large number of positions of all grades are soon to become available in the War and Navy Departments in connection with national defense. All qualified persons are urged to apply immediately; the time limit for filing applications with the Commission at Washington, D. C. is December 12 (December 16 for certain western states). Mr. G. D. Meade, Recruiting Section, informs us that physicists with special training in color may qualify for these positions.

MUNSELL PAPERS

The December issue of the JOSA is to be almost entirely devoted to a series of five papers on the Munsell color system; and so it will be of unusual interest to us. The first paper is the History of the Munsell Color System and its Scientific Application, by Dorothy Nickerson. It is followed by An Analysis of the Original Munsell Color System, by John E. Tyler and Arthur C. Hardy; An Analysis of the Munsell Color System Based on Measurements Made in 1919 and 1926, by Kasson S. Gibson and Dorothy Nickerson; Trichromatic Analysis of the Munsell Book of Color, by James J. Glenn and James T. Killian, and a Preliminary Report of the O. S. A. Subcommittee on the Spacing of the Munsell Colors, by Sidney M. Newhall. The five papers are preceded by a Foreword by Deane B. Judd, which serves to point out the

relations of the papers to the original ideas of Albert H. Munsell, the founder of the system. Dr. Judd points out that the series, in addition to its historical value, serves a second purpose. Mr. Munsell's idea was not only to furnish a notation for color as perceived by the observer, but also to base these notations on an accurately reproducible system of measurement. Dr. Judd points out two opinions of the possibility of good correlation between such a psychological and such a psychophysical system of color, and states that a second purpose of the series of papers is to bring out the much misunderstood relations and distinctions between the two types of systems. After mentioning the two common psychophysical systems of color specification in use, he says: "Mr. Munsell knew well that the search for a psychophysical color system whose notation should correspond with what an observer sees is far from hopeless because he discovered a psychophysical system which fulfills this condition to a surprising degree, better than any yet found of comparable simplicity." According to Judd, the second paper of the series analyzes the psychophysical color system discovered by Munsell; the third paper shows the degree to which the color standards of the 1915 Atlas of the Munsell Color System accord with this psychophysical color system; the fourth paper defines psychophysically the color system previously defined only by the material color standards of the 1929 Munsell Book of Color; and the final paper presents extensive data on which is to be based a psychophysical color system intended to fulfill as closely as possible the psychological ideal of A. H. Munsell.

BRYN MAWR WORK IN COLOR

Upon request from the editors, Dr. Harry Helson, Professor of Psychology at Bryn Mawr College, Bryn Mawr, Pa., has given a brief account of the work in color at present being prosecuted in the psychological laboratory there. Experimental work is in progress on colored shadows in an attempt to measure the several variables involved. It is desired to see if the phenomena can be fitted into the theories and formulas already developed for "normal" and strongly chromatic illuminants and backgrounds of various brightnesses and hues. A number of interesting phenomena have been uncovered, yet all seem capable of prediction on the basis of principles enunciated by Judd, Jeffers and Helson in work that has been published. Helson is working on the application of the Judd "transformation" formulas to the data obtained at Bryn Mawr. Some simplifications have been found possible, resulting in improved fit. He is working also on formulas for contrast-constancy effects obtained when there are differently illuminated regions within a given field, e.g., shadowed and brightly illuminated portions. Dr. Helson reports that the theories developed for uniformly illuminated spaces carry over to the more complex viewing situations and render unnecessary many of the special assumptions regarding the relations of these two fundamental color phenomena.

OPTICS OF NYLON

A brief notice of work by A. Frey-Wyssling on the "Optics of the Artificial Nylon Fiber" may be found in Nature 145, 821 (May 25, 1940). The section of the fibers is slightly elliptical. Although the average diameter of the fibrils is only about 19 microns, they show interference colors of the third order. They exhibit remarkably high double refraction, the double refraction amounting to about 0.060. The refractive indices for the sodium D line are: alpha = 1.520, gamma = 1.580. These are surprisingly close to the indices for silk fibroin (K. Ohara, 1933), which are 1.529 and 1.584, respectively; and to those for natural (ramie) cellulose (Frey-Wyssling & Wuhrmann, 1939), which are 1.532 and 1.599, respectively. When the fibrils are stretched, they prove to be strikingly photo-elastic; the retardation may increase by 30% before the fibril breaks. Other physical data on nylon fiber may be found in an article by Clayton, Amer. Dyestuff Reporter 28, 198 (1939). The Editor may add that

the coincidence of the refractive indices of nylon and silk is of considerable economic interest; for the use of titanium dioxide as a delusterant for silk depends on the relative refractive index of the pigment in silk, and there was not a priori reason for expecting this excellent delusterant to be useful for nylon. On the other hand, the coincidence of the indices of nylon and silk may not turn out to be an unmixed blessing. For titanium dioxide is known to be photochemically active, much more so than most white pigments, consequently the action of absorbed light on any fiber delustered with it, and any dye used to color the fiber, is facilitated.

COMMERCIAL STANDARD FOR ARTISTS' OIL PAINTS

Mr. M. Rea Paul, Chairman of the Committee on Public Relations, reports that his committee will have a recommendation to make in a few days for Council action on the Recommended Commercial Standard for Artists' Oil Paints. Copies of this standard are to be sent to members and delegates of the Council some time in December. In his discussion of this possible Council action, Mr. F. H. Rahr states: "One of the hurdles we shall ultimately have to take with paint manufacturers, and artists as well, is to develop some form of visual standards. Beside the chemistry of the problem, we must place the "visual color" problem. Until paint producers and consumers understand the latter, we can expect continued confusion, -- standards or no standards ..... It is my thought that much of the time of the average painter is used in trying to mix manufacturer's Oil Paints so that he may lay upon his canvas the subtle variations of hue, chroma and value which may appear in the subject he is rendering. Very often, mixtures which appear to be right on the palette, are 'out' in one of the three dimensions when applied to the canvas. This necessitates cleaning the canvas and remixing and repainting. Much of the supposedly necessary cut-and-try technique of the average painter is eliminated by the use of properly pre-organized palettes such as Pope offers." The work to which Mr. Rahr refers is, "An Introduction to the Language of Drawing and Painting", Vol. I, The Painter's Terms, by Arthur Pope (Harvard University Press, Cambridge, 1929). Color terms of the painter are related to the Munsell and other color systems, and the idea of the color solid in relation to painting is thoroughly discussed.

ART CENTER CHICAGO

This Chicago group had its first monthly meeting of the season on November 14 at its quarters at 820 N. Michigan Avenue. Mr. Walter Paepcke, President, Container Corporation of America, spoke on "Design Today", his lecture being illustrated with Kodachrome slides of "before and after" examples. An additional feature was "The Wooden Indian Looks at Modern Design", a symposium on packaging. Taylor Poore opened this feature with a discussion of the beginnings of American design, illustrated with slides from the collections of Mrs. Inez Cunningham Stark and others. Five of Chicago's foremost package designers redesigned cigar boxes for the occasion. The boxes were exhibited, projected on the screen, and then subjected to an open-forum discussion led by their creators.

COLOR BLINDNESS TESTS

We have received copy of a brief paper, "The Ishihara Test for Color-Blindness: A Point in Ethics," Amer. J. Psychol. 47, 511-3 (1935). This discusses the well-known reproduction of these test charts by American Weekly, which the author of this paper, Miss Elsie Murray, believes to have done much harm by furnishing an easily available key to hundreds who have sought it and may thereby be given access to occupations, such as railroad engineer, which may jeopardize the lives of thousands. Miss Murray makes suggestions for improvement of the edition which was copied. In a note typed by her on the margin of the copy of her paper received by us, she states that the

8th edition of the charts has utilized these suggestions. Another paper by the same author which we have received is "The use of Munsell Papers in Tests Diagnostic of Color Weakness, Color Blindness and Vocational Color Capacity", Amer. J. Psychol. 53, 445-9 (July, 1940). After mentioning two directions in which test-patterns should be extended to meet the shortcomings in current clinical tests, the author describes in detail three types of sample designs used in attacking the indicated problems.

EASTERN PSYCHOLOGICAL ASSOC. MEETING

We are informed by Professor Harry Helson, Secretary-Treasurer of this association, which is affiliated with the American Psychological Association, that at the meeting of the association at Atlantic City on April 5 - 6, one whole session was devoted to "Visual Processes", and papers relating to color vision appeared on other programs. The titles and names of the following list indicate that psychologists in many different institutions, large and small, are actively engaged in research on divers problems of color. Here is the list:

A new experimental test of Hecht's theory of visual acuity, by C. E. Berger of Cornell University;
The Purkinje afterimage on the rod-free area of the retina, by Theodore Karwoski of Dartmouth College;
Colorimetric purity curves for chimpanzee and man, by W. F. Grether of Yale University;
Light sensitivity in relation to age, by Ross McFarland of Harvard University;
Visual intensity discrimination in the cat following removal of the visual cortex, by F. C. Mead of Tufts College;
Flicker discrimination in the cat following removal of the visual cortex, by W. E. Kappauf of the University of Rochester;
Interrelations of nervous structures in binocular vision, by Jacob Levine of Harvard University.

COLOR IN THE AUTOMOTIVE INDUSTRY

At the request of the editors, we have received the following notes from Mr. William H. Beck, who is well and favorably known for his application of modern color principles to philately. Mr. Beck is to address the Society of Automotive Engineers in Detroit some time during the week of January 6, 1941, on the subject: "Color Research and its Relation to One Phase of the Automotive Industry." The paper will deal chiefly with control and tolerances for upholstery materials furnished to a large car manufacturing company. Samples were measured spectrophotometrically and by means of rotating disks. Tolerances were established, and the Nickerson and Judd formulas for color difference were applied for comparing and ranking the matches. Correlation coefficients between the methods were computed. Measurements of differences were also made with the Judd differential colorimeter. The paper will show that the methods indicated can be used satisfactorily in the purchase of and the writing of specifications for automobile upholstery materials. Mr. Beck writes that the dialogue between Mr. Meter and Mr. Dyer of the 1939 Winter meeting of the ISCC was "almost a description of this paper."

ISCC-NBS DESIGNATIONS FOR STAMP COLORS

Mr. Beck also states that he is building a Color Atlas for stamps using the ISCC-NBS color designations for stamps to be published in the future. There will be a sheet corresponding to each of 100 Munsell hue numbers, with space for ninety stamps per sheet. However, when about half that number is reached, the job will be considered practically complete, and Mr. Beck will publish the data for stamp collectors and others interested in making up a color album.

MONUMENT TO COLOR

We have received copy of a letter, dated November 8, 1940, from Deane B. Judd to Faber Birren which includes the following paragraph: "I have studied with special interest your Monument to Color, because I found there for the first time, a correct application of the newer discoveries in the psychology of color to the principles of pictorial representation."

ISCC COLOR-APTITUDE TEST

The following statement of the present status of the ISCC Color Aptitude Test was received with a letter of November 13 from Dr. Forrest L. Dimmick, who says he has "tried to indicate what a good job Foss has done" and suggests adding "more adjectives" to make this clear. Preliminary sets of materials for the Color Aptitude test, he writes, have been made available during the last two weeks. They consist of two saturation series of 40 color chips ranging from 6 R 5.4/4 to neutral gray 5/ and from RP 5/4 to 5/. It will be recognized that the task of dividing the Munsell saturation step into ten equal parts calls for the highest degree of technical skill. Mr. Foss is to be congratulated on the excellent results he has attained. Upon visual inspection, the gradations are almost perfectly uniform, and the spectrophotometric measurements bear this out. Given this excellent material, our next task is to standardize a procedure that will accurately evaluate the performance of individual matchers in terms of an adequate sampling of the total population. Two procedures have been devised, but my own preliminary work indicates that they will require further revision. Several members of the committee have undertaken to turn in results within the next two months. We have hopes that the test will be in definite form for presentation at the next Annual Meeting. A simplification of the test is being tried out for detection of color blindness and the preliminary trials show promising results.

ABSTRACTS OF PATENTS INVOLVING LIGHT AND COLOR

The following abstracts of patents involving color, light, and optical methods and apparatus, comprise a companion to the bibliographical and literature abstract and review references. The arrangement and amount of detail included are tentative. It is difficult to estimate the number of patents to be expected in the next year or two; undoubtedly, war conditions will limit substantially the number of patents to be reviewed, though there is necessarily a considerable time lag between application, issue and abstraction. It is difficult also to know where to draw the line in the decision as to what to include. For example, dyeing and textile-printing processes are certainly coloring processes; but it is not intended to include these generally, for it is thought that the emphasis or main interest in these is chemical. Another important group of patents which will not be fully abstracted is the class of photographic patents. Here, too, the interest is largely chemical; and abstraction of all patents of the class would require so much space as to be prohibitive. We shall be glad to have suggestions and criticisms, with the hope that this section may eventually be made as useful as the bibliography.

Apparatus.

Brit. 508,802. I. G. Farbenind. A.-G. (1939). Photoelectric colorimeters.

U. S. 2,101,741. Ketcham (Dec. 1937). Color-analyzing apparatus suitable for viewing samples of cloth, etc., having a lamp chamber, sighting tube and a motor-driven graduated disk, etc.

U. S. 2,107,060. Assmus assignor to F. Hellige & Co. (1939). Colorimeter suitable for use with solids or liquids.

U. S. 2,101,933-4. Fassin (& Miles) assignors to Bausch and Lomb Optical Company (Dec. 1937). Colorimeters.

Ger. 655,127. C. Reichert Optische Werke. (1938). Colorimeter.

Russ. 44,703. Tomson (1935). Wedge-shaped colorimeter.

Russ. 44,704. Tomson & Vishnevskii (1935). Colorimetric apparatus.

Brit. 506,282. Schofield & Russell (1939). In color-matching apparatus, wherein the color exhibited by a test sample is equated to that of a control sample while both samples are illuminated by light of fixed spectral distribution, the control sample is so selected that its color quality is visually equivalent to that of the test sample and the visual brightness of the two colors is adjusted to equality without modifying substantially, by reason of this adjustment, their spectral distributions.

Belg. 430,458. Errera (1938). Turbidimeter.

U. S. 2,127,477. Carpenter & Schreiner assignors to Oxford Paper Co. Photoelectric gloss meter.

U. S. 2,120,499. Mackey (1938). Device for measuring color and light densities.

U. S. 2,123,743. Pratt assignor to General Electric Co. (1938). Color-change-indicating apparatus.

U. S. 2,107,836. Pineo assignor to Calco Chemical Co. (1938). Photoelectric spectrophotometer.

U. S. 2,126,410. Pineo to Calco Chemical Co. (1938). Photoelectric spectrophotometer.

U. S. 2,100,755. Shepard to Radio Corp. of America (Nov. 1937). Photometer suitable for various light intensities.

U. S. 2,160,603. Sagebeer (1939). Photometric comparator for comparison of scientific or other statistical data, etc.

U. S. 2,151,187. Christopher (1939). "Electric photometer".

U. S. 2,153,165. Turney (1939). Complete, unitary, (electric) portable photometer.

Brit. 463,994 (1937); 469,636 (1937); 476,359 (1937) and 476,407 (1937); and U. S. 2,150,050-2 (1939). Chilowsky. The British patents disclose an apparatus and procedure for measuring or utilizing variations in illumination by electrolyzing HCl and subjecting the mixture of hydrogen and chlorine formed to the light, which causes them to recombine at a rate depending on the intensity of illumination. The U. S. patents disclose an apparatus utilizing the same reaction and measuring the light intensity through the resulting volume reduction (2,150,050 and 2,150,052) or through the variations in pressure (2,150,051). See Russ. 45,989 below.

U. S. 2,113,450. Lasky & Wood to Polymet Mfg. Corp. (1938). Pyrometer and pyroscope.

Fr. 828,011. Felten & Guilleaume Carlswerk A.-G. (1938). Apparatus for quantitative spectroscopic analysis.

Austrian 152,774. Habermann (1938). Optical apparatus for estimating temperatures by comparison of glow colors.

Brit. 477,037. Kunz (Dec. 1937). Apparatus and method for viewing objects by infrared light in which an image of the object is produced by an optical system on an excited phosphorescent screen, the stored-up energy of which is driven out as visible radiation in proportion to the intensity of the infrared light or positive image that is observed directly being formed. Phosphors such as Lenard phosphor, CaS-Pb or ZnS-Mn, or NaBr or CsBr or crystals of RbCl or KCl withdrawn from a fused melt may be used for the screen.

U. S. 2,120,765. Orvin (1938). Apparatus for viewing objects by infrared rays.

Russ. 45,939. Agapov (1936). Photochemical relay in which the piston of the relay is operated by utilizing a photochemical reaction with a high yield of energy, e.g. by means of the reaction between hydrogen and chlorine (see Brit. 463,994 etc. above), which is set in operation by the admission of a beam of light.

Fr. 820,108. N. V. Chemische Fabrik L. van der Grinten (Nov. 1937). Method of determining radiant energy which depends on the variation caused by the reduction in the absorptive power of a light-sensitive substance such as a diazo-compound.

Brit. 501,606. Adam Hilger Ltd. & Twyman (1939). Diffraction gratings molded by hot-pressing plastic material of a basis of a polymerized acrylic acid ester, e.g. "Perspex", in or upon a mold or under a die upon which the pattern of the grating is ruled.

U. S. 2,153,363. Brücke to General Electric Co. (1939). Depositing alternate layers of materials such as gold and silver on a condensing surface such as an optical diffraction grating.

Light filters (absorbers).

Brit. 513,743. Rooney, Daly & Lowe (1939). Production of foils, useful as photographic filters, filters for arc-welder goggles, etc., having a basis of cellulose acetate and containing 4,4'-di(dimethylamino) benzophenone, its 2,2'-dinitro derivative and benzene-azo-1-naphthalene-4-azo-p-hydroxy-benzene. U. S. 2,209,419 of these inventors assigned to Celanese Corp. of America (1940) discloses films rendered opaque to ultraviolet light by similar substances (methyl groups generalized to alkyl groups) and optionally an azo dye.

U. S. 2,104,492. Winthrop Chemical Co. (1938). Use of certain benzimidazoles and benzoxazoles as ultraviolet light absorbers in cosmetics. Ideal light-absorption characteristics are stated.

U. S. 2,172,262. Schinzel to Eastman Kodak Co. (1939). Multilayer filter for use in color photography comprising three color layers and ultraviolet absorbing layers.

Brit. 508,011. I. G. Farbenind. A.-G. (1939). Manufacture of light-filter layers, by illuminating a photographic material comprising one or more silver halide emulsion layers containing dye components which are fast to diffusion, with chromatic or white light, if required through a filter serving as a pattern, and producing a dye image by color development or by azo-coupling.

Brit. 503,337. I. G. Farbenind. A.-G. (1939). Nonacarbocyanine dyes, useful as filter dyes, are prepared by a method which is stated.

Improving the fastness to light of colored materials.

Brit. 478,953. I. G. Farbenind. A.-G. (1938). Manufacture of transformation products of dyes having improved fastness to water and light by means of the Cu, Cr and Fe complexes of certain nitrogen bases. Fr. 834,420 to the same company (1938) discloses cellulose esters or ethers with water-soluble dyes characterized by the use of basic organic substances, e.g. amines, quaternary ammonium, phosphonium, or tertiary sulfonium compounds in the dye bath or in a subsequent bath. The fastness to light, etc. is improved.

Belg. 433,362. I. G. Farbenind. A.-G. (recent date). The fastness to light is improved by treating the dyed fibers with an organic non-basic derivative containing 3 to 10 carbon atoms together with a sulfuric acid radical.

U. S. 2,125,902. Celanese Corp. of America (1938). Use of an acid compound from the reaction of a carbon-containing polybasic acid with a basic substance as a pretreatment to enhance light-fastness of dyeings on cellulose acetate.

Germ. 666,643. Münz, Keller & Trosken (1938). Improving the light-fastness of substantive dyes on vegetable fibers with di-phosphonium derivatives.

Germ. 665,365. Imperial Chemical Industries (1938). A regenerated-cellulose fiber is impregnated with a titanium delusterant and a chromium compound and dyed with a direct-cotton dye. The dyeing is fast to light (the chromium compound preventing the deleterious effect of the delusterant).

Fr. 846,681. Soc. of Chemical Industry, Basle (1939). The improvement to light and water of dyeings and printings made with water-soluble dyes by treatment with water-soluble salts of high-molecular-weight organic bases and salts of copper.

Stabilization of color.

U. S. 2,147,572. Clarke & Callaway to Texas Co. (1939). A cracked hydrocarbon distillate of the class of gasoline and kerosene, alpha methyl hydroxylamine, which bleaches the distillate to a light color, and diphenyl thiourea to stabilize the color.

U. S. 2,165,261. Hewlett to Standard Oil Development Co. (1939). The color of a petroleum distillate of the kerosene boiling range is stabilized by the addition of 0.025 to 0.25 percent of a lower aliphatic ketone, e.g. acetone.

U. S. 2,165,651. Rees & Oosterhout to Texas Co. (1939). Anti-knock gasoline containing tetraethyl lead is prevented from clouding in the sunlight by adding small amounts of lecithin and an aromatic compound containing amino and hydroxy groups, e.g. benzoylamino phenol.

Dye inhibiting rancidity and indicating uniformity.

U. S. 2,157,755. Pillsbury Flour Mills Co. (1939). An oil-soluble dye is added to the oil concentrate of oil-soluble vitamins to be mixed with poultry feed. The dye indicates the uniformity of distribution of the vitamin in the feed and also inhibits rancidity of the oil.

Diazotype printing (with a diazo-compound and a coupling component) and other diazo-coupling processes in light:

Brit. 496,090. Kalle & Co. (1938).
Brit. 510,874. S. C. & P. Harding Ltd. (1939).
Fr. 834,896. La Cellophane (1938).
U. S. 2,150,565. Kalle & Co. (1939).

Reflex copying processes.

Brit. 513,560. Kalle & Co. (1939). Reflex copying process in which the change in color due to light is caused by the latter's action on a mixture containing a stabilized diazo salt and a phenol containing an alkyl group which carries a group imparting solubility.

Brit. 503,996. Kalle & Co. (1939). Production of reflex copies which are suitable for reproduction on material sensitized with diazo compounds wherein the reflex copies are prepared according to the diazotype process.

Colors produced by light exposure (photo-tinting, photo-printing, color photography, color reproduction, etc.)

Fr. 835,138. Vanderroche (1938). Preparation of wall paper by printing with light-sensitive compositions followed by exposure to light and development.

Brit. 497,481. Philippson, Farmer & Fillery (1938). Method of tinting a positive print by bleaching an image-portion of the print of deep concentration to lighten its depth, fixing the modified depth with a chemical fixing agent, e.g. sodium thiosulfate, and thereafter applying the desired color to the selected portion of the print.

Brit. 496,618. Sease (1938). In combination in a tri-pack for use in color photography, a front element comprising a film base containing a "non-halation tint" and bearing on its rear side a blue-sensitive emulsion layer containing a removable yellow filter dye, the emulsion having a sensitivity range of about 3900 to 5200 A.; an intermediate element comprising a clear film base bearing on its front side a green-sensitive emulsion having a sensitivity range of about 3900 to 5800 A.; and a rear element comprising a film base containing a "non-halation tint" bearing on its front side a red-sensitive emulsion having sensitivity ranges of about 3900 to 5100 A. and of about 5800 to 6900 A.

Brit. 497,771. Heidenhain (1938). Preparation of wash-out reliefs.

U. S. 2,172,262. See above, under light filters.

U. S. 2,177,195. Wilkinson, assigned 50% to Miehle Print. Press & Mfg. Co. (1939). Color correction of negatives and printing plates. U. S. 2,174,812 to the same

discloses a modification system for correcting a set of yellow, red, and blue separation photographic negatives.

Brit. 504,790. Pollak (1939). Production of receptive gelatin surfaces for imbibition with basic dyes and acid dyes containing amino or sulfo groups, by employing free complex acids, e.g. silico-tungstic acid, as mordants or precipitators.

Brit. 498,234. I. G. Farbenind. A.-G. (1939). Deals with desensitization; and Brit. 498,388 to the same deals with increasing the general sensitivity of a photographic emulsion.

U. S. 2,203,767-8. DuPont Film Mfg. Corp. (1939-40). Daylight loading cartridges of photographic film with light-sensitive and light-absorbant treated surfaces.

Brit. 514,159. Kodak Ltd. (1939). Discloses a supersensitized emulsion.

U. S. 2,176,518. Yule to Eastman Kodak Co. Discloses a photo-mechanical color-reproduction process.

U. S. 2,179,786. Hardy to Interchemical Corp. (1939). Discloses photographic corrected color-separation images.

U. S. 2,165,167. Hardy to Interchemical Corp. (1939). Discloses a method of ascertaining the spectral quality of a primary of a standard color-reproduction system, which consists in making a combination in accordance with the system of the colored materials to be used in the reproduction in which each of the colored materials has a selected density, making another combination of the colored materials in which all but one of the colored materials have the same density as in the first combination and that one colored material has a density sufficiently different from that which it had in the first combination to give the second combination a color measurably different from that of the first combination, measuring the spectral energy distribution of each of the colors, and subtracting the smaller of the two spectral energy distributions from the larger to obtain the spectral energy distribution of a primary of the reproduction system.

U. S. 2,165,168. Hardy to Interchemical Corp. (1939). Discloses a method of and apparatus for making a color-separation image by combining three master images in accordance with predetermined negative and positive combining factors, which comprises simultaneously modulating three electric currents in accordance with the corresponding point-to-point variations in the transparency of the three master images, making the strength of the current modulated by each image correspond to the magnitude of the combining factor for that image, combining the three currents to produce a resultant current proportional to the algebraic sum of the currents modulated by the three images, while making the direction of the current modulated by each master image correspond to the sign of the combining for that image, and utilizing the resultant current to control a recording device.

U. S. 2,165,169. Wurzburg to Interchemical Corp. (1939). Discloses a differential print for determining the primaries of a color-reproduction system, consisting of superposed impressions of three differently colored inks having the form of a hexagon containing 24 equal differently colored areas, each in the form of an equilateral triangle, including six triangular areas showing the colors produced by each of the three inks separately and each of the pairs of the three inks in equal proportion, and six sets of three triangular areas surrounding each of the six areas

and showing the colors produced by changing the color of the area which they surround by increments of each one of the three inks.

Other photographic processes include:
Brit. 497,463. DuPont Film Mfg. Corp. (1938).
Brit. 497,698. DuPont Film Mfg. Corp. (1938).
Brit. 500,716. Schinzel (1939).
Brit. 512,542. DuPont Film Mfg. Corp. (1939).
Brit. 512,752. Schinzel (1939).
Brit. 513,244. I. G. Farbenind. A.-G. (1939).
Brit. 513,596. Kendall & Collins (1939).
Brit. 514,639. Gaspar (1939).
Brit. 514,955. Gaspar (1939).
U. S. 2,180,409. Agfa Ansco Corp. (1939).

Multi-colored surfaces; safety-paper, etc.

U. S. 2,129,363. Simons & Weiss to G. Lamonte & Son (1938). A safety paper consisting of a sheet of material presenting a surface of a color other than white and indicia overlying a plurality of portions of the surface, leaving other portions exposed, which indicia are of a substantially lighter color than the surface and are composed of a material adapted to have the permeability to light increased to a substantial extent upon application of a liquid.

U. S. 2,129,364. Simons & Weiss to G. Lamonte & Son. (1938). In combination with a colored sub-surface, a surfacing web of a contrasting color including a first portion adapted to become substantially more permeable to light on application of a liquid so that the color of the sub-surface is visible therethrough, and a second portion which is contiguous with the first portion, which is of substantially the same color as the first portion when the surfacing web is dry, and which is adapted when wetted to have its permeability to light substantially less affected than the first portion. U. S. 2,129,362, to the same parties, is very similar.

Brit. 500,151. Himmell (1939). Discloses a light-permeable paper comprising a white or gray paper base having a coating of the clay type and having imprinted thereon a marking, e.g. with $TiO_2$-pigmented transparent lithographic varnish, similar in color to the base whereby the marking is substantially invisible in reflected light but is visible in transmitted light, the marking being covered by the clay coating.

Variegated transparency, as by "parchmenting" and "water-marking".

Brit. 490,345 (1938); Brit. 494,195 (1938); Fr. 832,619 (1938); Fr. 833,691 (1938); Ger. 677,251 (1939); Ger. 677,259 (1939); Ger. 683,795 (1939); all the foregoing to Heberlein & Co.; and Brit. 504,666 to Soc. Chemical Industry, Basle (1939); disclose variegated or patterned effects obtained by localized parchmenting, as by the action of sulfuric acid.

Brit. 493,580 (1938); U. S. 2,150,825 and 2,157,600 (1939), all three to J. Bancroft & Sons Co.; Fr. 849,208 (1939), equivalent to Brit. 510,083, to Tootal Broadhurst Lee Co.; and Brit. 489,651, to Raduner & Co., 1938; all disclose parchmenting (increasing transparency). U. S. 2,218,235 of Fletcher & Kirton to Eastman Kodak Co., 1940, discloses imparting of translucency.

Iridescence, luster and miscellaneous.

Fr. 836,917. American Hard Rubber Co. (1939). Manufacture of a molded, colored, hard-rubber compound containing arsenic sulfide, the surface of which presents distinguishable areas which reflect light with different degrees of intensity depending on the angle from which the article is viewed. Brit. 497,908 is the equivalent.

U. S. 2,177,240. Brumbaugh to Universal Chemical Corp. (1939). A wax composition comprising an emulsion of wax in water containing as an emulsifying agent a morpholine compound and a fatty acid of high molecular weight, holding the wax dispersed in such small particle size that it will dry bright or with substantial luster when merely applied to a surface and exposed to the atmosphere without rubbing.

U. S. 2,099,010. Firestein & Ferentzy to Max Factor & Co. (Nov. 1937). A cosmetic makeup preparation adapted for use on humans to be photographed on panchromatic type emulsions which contains white pigments such as ZnO or $TiO_2$ and chromatic pigments in quantity and proportion sufficient to impart to the cosmetic a high reflection coefficient to wavelengths of about 6200 to 6500 A. and lower coefficients to shorter wavelengths of light, the reflection coefficient to wavelengths within the range 4000 to 4500 A. being 45-75% of the coefficient within the range 6200 to 6500 A. Brit. 502,410 is the equivalent.

Fr. 833,309. Herbline (1938). Process and apparatus for the formation of colored smokes for signalling, etc. Iodine vapors, auramine and indigo are mentioned as coloring matters.

Luminescence (fluorescence and phosphorescence).

Belg. 424,419. Carlier (recent date). Textiles are given phosphorescent properties by treating with mixtures of solutions of vinyl compounds, such as vinyl acetate, in e.g. trichlorethylene, containing a luminescent compound based on CdS or ZnS and other alkaline-earth sulfides.

Brit. 501,742. I. G. Farbenind. A.-G. (1939). Fluorescent dyes for use in coloring oils, fats and waxes are prepared by heating benzanthrone or chloro-derivatives with catalysts of the Friedel-Crafts' type in the presence of aromatic or hydroaromatic hydrocarbons.

Brit. 502,599. British Celanese Ltd. (1939). Production of an identifiable or decorative article of paper, felt or the like by incorporating in a felted mass of cellulosic fibers, artificial fibers having a basis of an organic ester of cellulose and containing a tertiary amine having at least two aryl substitution groups, e.g. ethyl benzyl aniline, which becomes fluorescent under ultraviolet light.

Brit. 486,902. Standard Oil Development Co. (1938). Method for improving the color and fluorescence of viscous oils, without unduly increasing the viscosity or susceptibility to oxidation, by subjecting the oils to the action of a silent electric discharge.

Brit. 503,760. British Thomson-Houston Co. (1939). Preparation of a fluorescing composition for a light-transforming surface consisting of an alkali-metal salt of Rhodamine B and a binder, such as a product obtained by reacting hydrolyzed polymerized vinyl ester with an aldehyde. Other binders and solvents are stated.

The light-fastness of the potassium salt of Rhodamine B is said to be much improved over that of the regular Rhodamine B (the free acid)in the same compositions.

Brit. 503,915. See above under plant stimulation.

Brit. 511,888. Williams & Sell (1939). A printing ink for textile identification marking consisting of "colorless dyes", which are visible under ultra-violet light, e.g. stilbene, coumarone, phenyl ethylene and thiazole derivatives, in a viscous liquid vehicle. (Addition to Brit. 453,514).

Fr. 733,879. Manufacture Francaise de Tapis et Couvertures (1938). A floor covering which is completely or partially, e.g. in a systematic design, fluorescent, and an arrangement comprising the covering and a source of ultraviolet light. Fluorescent materials include: 2-amino-8-naphthol-3,6-disulfonic acid ("2R-acid"); 1-amino-8-naphthol-3,5-disulfonic acid ("B-acid"); 1-amino-8-naphthol-4-sulfonic acid ("S-acid"); sulfamide of Chicago acid; amino-H-acid; alpha-naphthylamine-3,8-disulfonic acid; 1,7-Cleve's acid; 2RL-acid; benzidine sulfone disulfonic acid.

Fr. 834,739. Telefunken Gesellschaft f. Drahtlose Telegraphie m. b. H. (1938). Luminescent zinc salts.

Fr. 848,706. Soc. Anonyme d. Etablissements E. Arden (1939). Cosmetics for theatrical or spectacular effects containing fluorescent substances.

Ger. 673,390. Addink to Philips Patentverwaltung g. m. b. H. (1939). Preparation of a coating composition consisting of a red-fluorescent organic dye, e.g. rhodamine, lead chromate, and a solution of an organic binder, e.g. glyptal or polyvinyl acetate resins, in an organic solvent. This composition is used for the painting of signs, road markers, etc. which show red-fluorescent color in a monochromatic light.

Ger. 674,818. National Marking Machine Co. (1939). Laundry marking inks which are invisible in visible light but which fluoresce in ultraviolet light.

Ger. 683,317. Koeberle & Schlichting (1939). Preparation of compounds of the general formula R-A-X, in which R is the radical of a cyclic compound having at least four condensed rings, A is a nitrogen bridge, and X is an alkyl or alkenyl group having at least four carbon atoms. The products may be used for coloring rubber, cosmetics, etc., and as fluorescent agents for oils. Equivalent to Brit. 495,460 and Fr. 817,559.

U. S. 2,113,973. Addink to Philips Gloeilampenfabriken (1938). A body having red fluorescent properties comprising a fluorescent layer containing a red fluorescing rhodamine dye and a filtering layer containing an orange-colored substance having the properties of transmitting red light and of absorbing a portion of the light whose wavelengths are within the range of the rhodamine absorption band lying within the visible portion of the spectrum.

U. S. 2,135,259. Neresheimer, Vilsmeier & Heymann to General Aniline Works (1938). Oil-soluble and fluorescent products, which can also be used to color resins and lacquers, are obtained by acylation of hydroxy compounds of the perylene series, e.g. by stearic acid chloride. A similar patent to the same parties is U. S. 2,158,296.

U. S. 2,136,044. Engelmann to DuPont Co. (1938). A blue dye, oxidation product of 2,3,6-triamino-pyridine, is converted into a greenish-yellow dye having a brilliant blue fluorescence by boiling in water.