

# Inter-Society Color Council *Newsletter*

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NUMBER 197

November - December 1968

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## HARRY HELSON TO RECEIVE GODLOVE AWARD

Dr. Harry Helson, Professor of Psychology, University of Massachusetts at Amherst, has been nominated to receive the Godlove Award for his work on the principle of adaptation-level and its application to the appearance of colors. Among his important studies was the influence of the characteristics of the surround on the color perception of the object.

The award is given in memory of I. H. Godlove by the Inter-Society Color Council for outstanding contributions to the subject of color. Presentation will be made on April 15, 1969 in New York City by Council president Fred W. Billmeyer, Jr., at the annual banquet. The citation will be given by Deane B. Judd, the first recipient of the award.

## ISCC SYMPOSIUM ON VISUAL PERCEPTION

Announcement of a symposium on Visual Perception, to be held in Colonial Williamsburg on Feb. 9-12, 1969, was made to the membership by the secretary's office in November.

Ralph Evans, who will act as program chairman, has secured the services of five experts on the subject. The speakers and their principal topics are as follows:

Mr. Ralph M. Evans, Eastman Kodak Co.  
Gray Content of Colors

Professor Glenn A. Fry, Ohio State Univ.  
Border Phenomena

Dr. Jo Ann Kinney, U. S. Naval Submarine Medical Center  
Color Blindness

Dr. Edwin H. Land, Polaroid Corp.  
The Retinex Theory

Professor W. D. Wright, Imperial College of Science & Technology  
Adaptation

While these are the principal topics, the speakers are not restricted to these alone, but are free to talk on other related subjects in which they are expert: for example, contrast, appearance, arrangement, aesthetics. Attendees will be free to ask questions in the speaker's general field.

There will be no papers on colorimetry, spectrophotometry, or the physiology of vision.

The meeting will start with a reception on Sunday afternoon, Feb. 9, at 5:00 p.m., and end at noon on Wednesday, Feb. 12, following a format similar to that of the Williamsburg Symposium in 1966. Technical sessions will be held in the mornings and evenings, while afternoons will be devoted to informal discussions and recreation. There will be a luncheon on Tuesday for registrants and their families.

Accommodations at Williamsburg restrict attendance to 140 people. At press time, this limit had not yet been reached. Interested members may, therefore, still be able to register at the time of receipt of this N.L., but they should do so without delay by writing to the secretary's office, indicating the kind of accommodations desired (single or double room) and enclosing a check for \$35, payable to ISCC, for the registration fee. The registration fee does not cover meal and room charges but does include the Sunday reception and the Tuesday luncheon and, in addition, covers the immediate members of a registrant's family. The secretary's mailing address is:

Mr. Ralph M. Evans, Secretary  
Inter-Society Color Council  
Photographic Technology Division  
Building 69  
Eastman Kodak Co.  
Rochester, N. Y. 14650

## ANNUAL MEETING SYMPOSIUM ON COLOR MEASURING INSTRUMENTS

At the 1969 Annual Meeting of the ISCC, to be held in New York on April 14 and 15, the symposium on Tuesday afternoon will be designed to up-date the general knowledge of what is available in color measuring equipment, including spectrophotometers, colorimeters, and shade sorters. The official report of the Subcommittee for Problem 24, "Catalog of Color Measuring Instruments", will be presented by Ruth Johnston, chairman of both the Subcommittee and the

Symposium. Other speakers will provide information on instrument types and concepts, performance, and new developments.

Karl Fink, General Chairman for the meeting, expects to have a Forum similar to the highly successful one of last year. Problem subcommittees will meet as usual on Monday morning and possibly also during part of the afternoon. A short business meeting on Tuesday morning is to be followed by one or two special reports.

Tentative plans for Monday evening call for presentation of some good examples of color movies. Milo D. Folley, chairman of the Subcommittee for Problem 30, is seeking significant new films that could be used for this presentation. Anyone who has relevant information is asked to contact Mr. Folley. His address is: 2112 Erie Blvd. East, Syracuse, N. Y. 13224.

Final details of the meeting will appear in later issues of the N. L.

#### H. CRESTON DONER RETIRES FROM L-O-F

H. Creston Doner, an individual member of ISCC, retired as Director of Design for Libby-Owens-Ford Glass Co. in January 1968, but he continues to remain active in the field of design and color as a consultant, operating from his office in Toledo, Ohio.

A Fellow of the Industrial Designers Society of America and of Design Directors in Industry, a former President of the Industrial Designers Institute, and an active participant in numerous other national, international, and civic organizations, Mr. Doner achieved international recognition as an authority on design and color. He was a consultant to the architects and designers of Expo '67, the new Tomorrow and at Disneyland, and HemisFair '68. His ideas on the use of transparent and dichroic mirror resulted in the development of new concepts of display design at Expo '67 in the Pavilion of Canada, Man the Producer Pavilion, the Czechoslovakian Pavilion, and the Canadian National Film Board's "Labyrinth". He has also served as a consultant to the designers and engineers creating the Bay Area Rapid Transit System in San Francisco, the Northeast Corridor Trains, and other systems throughout the U. S.

Mr. Doner's interest in office efficiency led to a new concept for executive communication centers, and he originated the colorful, trend-setting Kitchen of Tomorrow, created in 1942 and shown in magazines, newspapers, and movies throughout the world. To keep pace with design trends, Mr. Doner photographs the most modern buildings, homes, and interiors in the U. S., Canada, and Mexico. His color presentation on "The Modern Architecture of Mexico" is currently being shown to national associations and to architectural, design, and engineering societies.

Mr. Doner's creative imagination extends even to his home and his clothing. The Doner home, rebuilt from an insignificant prefab, is described as an "exotic oriental pavilion", and has served as the subject of feature stories in two newspapers and in the June 1961 issue of House Beautiful. In 1954, he was selected as one of twenty-five men in the U. S. to become a charter member of the American Society of Beau Brummels. His trend-setting ideas in male fashions were featured in the May 1960 issue of Gentlemen's Quarterly.

#### WARREN REESE NAMED GROUP EXECUTIVE

Warren B. Reese, Board chairman and president of Macbeth Corporation, has been appointed Group Executive for Kollmorgen Corporation's Color Systems and Photometry Group. Reese will establish a single planning, research development, and marketing organization serving the five Kollmorgen companies engaged in color and photometry -- Macbeth Corp., Instrument Development Laboratories, Davidson and Hemmendinger, Photo Research, and LERES.

Mr. Reese is a delegate from SMPTE and a former Director of ISCC.

#### PROPOSED CHARTER FLIGHT FOR COLOR 69

A questionnaire concerning interest in a charter flight to Stockholm for Color 69, the First Congress of the International Color Association, was mailed to the membership in November.

L. A. Graham reports that the response was good but that there were some conflicts with respect to the departure date. Mr. Graham hopes to have a summary of the situation to report in the near future.

#### FSPT MEETING SCHEDULED FOR CHICAGO

The 47th Annual Meeting and 34th Paint Industries' Show of the Federation of Societies for Paint Technology will be held at the Conrad Hilton Hotel, Chicago, Ill., Nov. 5-8, 1969.

The Program Committee will be headed by Barry Adler, and Robert W. Matlack, Executive Secretary of the Federation, is the Show Manager.

#### PDC PROGRAMS IN PACKAGING

The Package Designers Council is sponsoring a series of six carefully documented, illustrated explorations of some of the most important areas of packaging and the package design profession. The programs are planned for management, designers, educators, and



students, and feature leading authorities on each of the subjects covered.

The first two meetings were in November and December 1968. The remaining four programs, to be held at the United Nations Assoc., 345 East 46th St., New York City, are scheduled as follows:

Health and Beauty Packaging, Jan. 29, 1969.

Hardware and Household Packaging, Feb. 26, 1969.

Leisure Time Packaging, Mar. 26, 1969.

What Are The Consumer's Needs in Packaging, Apr. 30, 1969.

#### VEHICLE COLOR DESIGN AWARD

The 1967 Fleet Owner Award for Outstanding Vehicle Color Design was presented jointly to George A. Hormel and Company and Lipincott & Margulies at the National Fleet Owner Conference in Chicago. (From: Package Designers Council Newsletter, Fall, 1968.)

#### THE COLOUR COUNCIL OF CANADA

"Colour-Personally Yours" was the subject of the November meeting of the Colour Council of Canada. Mrs. Eleanor Brown, Personnel Training Department, Robert Simpson Co., Ltd., gave an illustrated lecture on interior decorating.

On December 3, 1968, the group met at the C. F. T. O. -TV station and were instructed in "Lighting and Make-Up for Colour Television".

#### THE COLOUR GROUP (GREAT BRITAIN)

The fifty-fifth Science meeting of the Colour Group was held on Dec. 4, 1968 at Imperial College. The lives and works of four notables in the field of color were discussed. Interesting notes on these famous personalities, provided in the meeting notice, are reproduced below.

Isaac Newton 1642-1727. By Dr. Stuart Hodson.

This attempts to relate Newton's work, especially in optics, to the development of the scientific method; little of this was understood by contemporaries, except Robert Hooke, but even this relationship degenerated into personal bickering.

Because of Newton's caution, discovery of his personality is difficult. The little we know shows him to have been a complex man.

Johann Wolfgang von Goethe 1749-1832. By Mr. M. H. Wilson.

Goethe regarded his scientific work, particularly in colour\*, as his greatest achievement, but most physicists have been unable to share his views. For him, the reality behind every phenomenon was the creative process that has brought it about. It is at this level that he sees the unity of man and nature. Only if this is appreciated do many of his pronouncements make sense.

\*Beiträge zur Optik (Contributions to Optics) I (1791) II (1792) Zur Farbenlehre (Towards a theory of colours) (1810)

J. E. Purkyne (known as Purkinje) 1787-1869. By Dr. R. A. Weale.

Purkyne was born near Prague and became Professor of Physiology in Breslau and in Prague. He was an anatomist, a visual physiologist and a fighter for Czech freedom. The Royal Society elected him as a Foreign Member.

E. Hering 1834-1918. By Professor H. Kalmus.

Hering, who was born in Saxony, was a physiologist who became Professor of Physiology at Vienna, Prague and finally at Leipzig where he died. He is known in colour science for his theory of colour contrasts, but he also made other contributions to physiological optics.

The returns from a questionnaire on "Current practice in colour measurement" are being analyzed for presentation at the Colour Group meeting on 2 April 1969. The questionnaire was designed to collect information, not about the way in which instruments are supposed to be used, but about the way in which they are actually used. A general report on the results will be issued.

The Northern Section of the Group will hold a half-day symposium on illumination on 9 April 1969 in Manchester. Speakers and topics are as follows:

Mr. K. McLaren, "Illumination for colour matching"

Miss M. B. Halstead, "The New Daylight Lamp"

Dr. B. H. Crawford, "Assessment of the Colour Rendering Properties of Lamps"

Mr. E. H. Nelson, "New light sources"

The Midland Section's meeting on 13 Feb. 1969 in Birmingham will feature Mr. H. C. Yorke speaking on "Clinical methods of colour vision testing".

#### COLOR APTITUDE TEST DATA SOUGHT

The Subcommittee for Problem 10, Color Aptitude Testing, is seeking test results from users of the 1964

edition of the Color Aptitude Test. The co-chairmen, L.A. Graham and Angela C. Little, would like to have the actual test sheets, if possible, dispatched to them. Users east of the Mississippi are asked to send the data to Mr. Graham, Research Center, Burlington Industries, Inc., P.O. Box 21327, Greensboro, N.C. 27420; those west of the Mississippi, to Mrs. Little, Dept. of Nutritional Sciences, 313 Hilgard Hall, Univ. of California, Berkeley, Calif. 94720.

Mr. Graham reports that review of recent results has already led to some intriguing new interpretations and some questions, concerning the present test, which may lead eventually to an improved version. Meanwhile, the committee has encouraged the Federation of Societies for Paint Technology to proceed with reproduction of additional copies of the present test as representing the best that is now available for practical use.

#### BOOK REVIEW:

Chevreul, M. E. The Principles of Harmony and Contrast of Colors and Their Applications to the Arts. Introduction and notes by Faber Birren; 256 pp, 11x12 in size, illus., 28 in color, index; Reinhold Publishing Company, N. Y., printed and bound in Japan; 1967; \$27.50; LC66-24553.

In this, his latest book, Faber Birren has done a real service to all of us in the color field by calling the attention of present-century workers to a very important work produced in the last century. It is Chevreul's book on simultaneous contrast of colors, first published in 1839 as *De La Loi Du Contraste Simultane Des Couleurs*. Much of the color work in the original volume was done by hand. The special and extensive introduction and explanatory notes by Birren in this Reinhold edition make this quite as much a Birren as a Chevreul book. The Chevreul text translation is that of Martel as used in the first English edition of 1854.

The organization of the Chevreul text is rather complicated; it is in three parts, each with several divisions, sections, and chapters, with paragraphs on related subjects being numbered straight through the book from (1), for the first paragraph of the Introduction, to (1010), which refers to the last discussion in the Summary and Conclusion of the book. Birren presents this complicated organization in very good order by providing explanatory text and commentaries that run in book-width columns that parallel those of Chevreul from the introduction through the Third Division of the Chevreul book at (#520). The Fourth and Fifth Divisions of Part II (#521 through #828) are omitted by Birren because they concern subjects that seem of less practical value today, but Part III on Experimental Esthetics of Coloured Objects is reproduced completely, accompanied by a brief introductory comment by Birren.

In a general three-part introduction of about 40 pages (actually double pages since each page carries two book-width columns), Birren provides the reader with a fascinating review of the life, the works, and then the influence of M. E. Chevreul upon his contemporaries, particularly his influence upon the artists of his time. To make this last point clear, full-color, mounted reproductions, most of them as large as 8x11 inches, are provided of paintings by Turner, Delacroix, Pissarro, Monet, Renoir, Van Gogh, and Cezanne. These color plates are in addition to a number of other historical illustrations in black and white and full-color, including 15 numbered plates that are reproductions of color plates in the original Chevreul book.

Michel Eugene Chevreul was born in Angers, France in 1786. By 20 he had started writing the scientific papers that made him famous. As a chemist he became an outstanding authority on animal fats, but since his chemical investigations included research into coloring materials, in 1824 he was named Director of Dyes for the Royal Manufactures at Gobelins. His already considerable fame continued to increase at the Gobelins through his lectures, courses, and publications on color. He became a member not only of the Academy of Sciences of his own country, to which he belonged for 63 years, but of those of several other countries. He had the unusual distinction of being elected twice during his lifetime, 28 years apart, as president of the French Academy of Sciences.

For the occasion of his 100th birthday a bronze medal was cast in his honor by the French government, and we are told that at the museum of the Gobelins over 2000 delegates from learned societies, schools, museums, and workshops in whose behalf he had labored for so many useful years, came marching with banners into the great hall, and that 53 delegates spoke on his achievements. In the evening "a torchlight procession strode through the streets of Paris, and special performances were given in the theaters." As a part of the celebration a magnificent edition of *The Law of Simultaneous Contrast of Colors*, with an introduction by Chevreul's son Henri, was authorized at government expense. When he died, April 9, 1889, at 103, a few months following the death of his son, his funeral service, held at Notre Dame, was attended by thousands.

In the section of the Introduction in which Birren discusses Chevreul's works (as well as in Chevreul's introduction to his own book) we find that it was on studying complaints at the Gobelins tapestry works that Chevreul found some of them to be "well founded as regards lack of stability of the blues and light violets, of gray and brown shades" but not those regarding the blacks. On investigation, Chevreul found that this "purported lack of strength in the blacks had to do with the phenomena of color contrast and depended on the color with which it was juxtaposed." But to summarize these effects in terms of a law that

governed them was not immediately possible. His son tells us (p. 23) that his father's mind was constantly on the problem, but that the solution came to him spontaneously while he was attending a public lecture on July 27, 1827, on Hannibal's crossing of the Alps!! On leaving the meeting he immediately explained the terms of the law to his friends Ampère and Cuvier. His friend Ampère exclaimed: "I am now convinced; it is too simple not to be true." And from that moment on, his son reports, all of his father's experiments with color were revised, described, and compiled in book form. Yet it was not until 1839, twelve years after the Hannibal lecture, that the first edition was published. Many other editions and translations have followed. In 1864, when Chevreul already was 78, he wrote another outstanding color book, Colors and Their Application to the Industrial Arts with the Aid of Chromatic Circles, which was widely distributed. It contained 27 full-color lithographed plates, including Chevreul's color circles and color scales.

In an April review in the *Library Journal* this book is "recommended for extensive purchase by art collections" and this reviewer seconds this for all color scientists and technologists who make any real try at maintaining a representative and useful shelf of books relating to the science of color. It is an extra dividend that this is an art as well as a science book!!

It is seldom that one comes across a color book so unusual and outstanding in both conception and execution as this one by Faber Birren and M. E. Chevreul.

D. Nickerson

#### BOOK REVIEW:

Seeing and Perceiving, by C. W. Wilman. Pergamon Press, New York, 1966, 200 pp., \$3.75.

The author, who has respected credentials, stated in the preface that the subject "touches science - and art - at so many points that it is a formidable task to attempt even a general survey of the way in which we see". The task is indeed formidable and the author and publisher are to be commended on their effort in creating a generally readable and informative primer.

Although the writing is distinctly more than casual, the book is readable and the list of chapter headings is worthy of inclusion in this review to show the scope of the book.

1. The act of seeing
2. The eyes
3. Physical aids and hindrances
4. Seeing clearly, and failing to see
5. Building up the mental image
6. False impressions
7. Things, and the spaces between them
8. Seeing in three dimensions

9. Vision from multiple viewpoints
10. Binocular by-ways
11. Seeing things move
12. Interpretations
13. Colour and the physicists
14. Seeing colours
15. Analysis and synthesis of colour
16. Side effects of color
17. Looking at pictures

The book is a revised collection of lectures, a firm basis in itself, and this book has few faults. However, it does have some specific ones that seem to stem from the use of the lectures as material. The resulting book should tie together somewhat more effectively than does "Seeing and Perceiving" in certain sections. On the basis of the assumption that the reader will progress through the book from start to finish, it would be helpful if all subjects discussed in more detail later were referenced when mentioned early in the book. Often they are, but in Chapter 2 "Scotopic vision" is discussed without noting that some of the basic data relating to this subject are discussed in detail on page 116 in Chapter 14. However, the earlier discussion in Chapter 2 is back referenced on page 117 of Chapter 14.

A remark in the preface, which is also quoted on the back cover of the paperback edition, is worthy of note. This book "is addressed to any individual reader however slight his previous knowledge, but no attempt is made to gloss over difficulties or to enter the field of popular science". This reader is rewarded on pages 110 and 111 in the discussion of the electromagnetic spectrum with some very informative, well chosen remarks, but at the same time is asked to suffer through an examination of Figure 75, the single letter abbreviations of which must be carefully decoded by a thorough examination of the accompanying paragraphs. Since many of the illustrations in other chapters are simple, straightforward and informative, this reviewer is disappointed in Figures 75 and 76, relating to the electromagnetic spectrum.

Certainly it must be agreed that a complete list of references for all the subjects of various chapters would be longer than the book. It seems unfortunate that well over half (seventeen, in fact) the references given were published prior to World War II and will probably prove fairly difficult for the average non-expert reader (to whom the book is directed) to obtain. At the same time, Ralph Evans' book, An Introduction to Color, and the Optical Society book, The Science of Color, are not listed.

The book does not suffer unduly from the lack of extensive color illustrations (it has only one as the frontispiece), for it has been equally as successful as Billmeyer and Saltzman's The Principles of Color Technology in the use of black and white illustrations for subjects concerning color. Nevertheless, since the visual process is the subject of the book, there are

many places where the reader might well yearn for more illustrations printed in color. It does seem a shame that, while the publishers had a doublefold frontispiece in the press, at least one or two other examples were not printed in color. For the "intelligent reader" to whom the book is directed, an interesting reading companion might be the beautifully printed Interchemical Corporation booklet, The Color Tree.

Mr. Wilman's book, however, gives us more than a glimmering of the variety and nature of the pleasures to be found in the discovery and comprehension of the visual process. The expert in the field is well advised to add this book to his library lest he lose touch with non-expert friends who will not go beyond Seeing and Perceiving into the 28 references given, much less more difficult material on these subjects.

L. A. Graham

#### THE SPECTROPHOTOMETRIC PROPERTIES OF A SELECTION OF CERAMIC TILES

A report of the above title has been received by the President's Office with the request that its contents be described in the News Letter to supplement the brief report in an earlier issue (N. L. #195, p. 5) of the availability of a new set of standard tiles. The abstract of the document (Report No. MC 2 of the Metrology Center of the National Physical Laboratory, Teddington, England, by F. J. J. Clarke and P. R. Samways) appears below:

"The report describes a comprehensive series of measurements on the spectral reflection properties of a selection of nineteen coloured ceramic tiles, as a preliminary investigation into their suitability as reference surfaces for checking the performance of colorimeters and spectrophotometers in industrial use. The nineteen tiles were selected as the most likely varieties available from British sources which might aid in diagnosing specific types of error in photoelectric colorimeters. The spectrophotometric properties are published for the ultra-violet, visible and infrared regions from 200nm and with different modes of illumination in order to give complete information representative of these types. As a result of this investigation a set of twelve tiles has been chosen that should prove a great diagnostic value in checking colorimeter performance. A large number of sets of these ceramic colour standards will be made available to industry in 1968."

The report itself consists of 11 pages of writing, 25 tables and 30 figures. The need for well-defined material standards for colorimetry and reflectance spectrophotometry is recapitulated, and the selection and measurement of a set of ceramic-tile candidates for this purpose is described. A Cary 14 spectrophotometer with integrating-sphere reflectance attachment

was used in both normal/diffuse and diffuse/normal geometries. The tables and figures give the results, in terms of spectral reflectance tabulations and curves, plus some ancillary information.

Use of the two modes of illumination and viewing allowed the NPL group to explore in detail two serious defects which may occur in candidate materials for color standards use, namely fluorescence (including possible phosphorescence) and thermo-chromism (including possible photochromism). The selection of tiles for the final set to be made available was made to minimize or eliminate these effects wherever possible.

Curiously, no mention is made in the report of any study of the equally important problem of the surface characteristics of the samples and their interaction with instrument characteristics in the form of incomplete exclusion of the specular component in the integrating sphere, of the difference between integrating-sphere and collimated geometries such as normal/45° and 45° / normal, or of the goniometric properties of the candidate materials in a more extensive sense. In fact, the report does not even state that the specular component was excluded, or how this is done, although the data indicate that this was the measurement condition used. Nor is the reflectance attachment specifically identified by model number. These omissions are greatly to be regretted, our own work at The Rensselaer Color Measurement Laboratory with the Cary 14 and samples with a variety of surface textures having pointed out the seriousness of the aforementioned interactions with this instrument.

The tiles reported on in this document were not the master set for those later made available for purchase, and it is stated that a subsequent report will provide the spectrophotometric properties of the master set, together with information on the distribution of color variation among the other sets. It is also stated that, for those sets standardized by the NPL, the geometries available will be 45°/normal, normal/diffuse (specular component excluded) and near-normal/diffuse (specular component included). It is hoped that in this report, with the surface characteristics of the final samples accurately definable, further information on their goniometric as well as their spectrophotometric properties will be made available.

In any case, all concerned with accurate reflectance spectrophotometry and colorimetry will welcome the availability of these carefully-selected standards.

Fred W. Billmeyer, Jr.

#### AMA REPORTS ON COLOR

A news release from the American Medical Association in September 1968 reports "facts about color" and its effects. The release is reprinted here in its entirety so that readers can ruminate thereon.

## FOR YOUR HEALTH'S SAKE . . . BY THE AMERICAN MEDICAL ASSOCIATION - - - HOW COLOR AFFECTS US

Some fifteen years ago, the athletic director of one of the large universities wasn't trying to be funny when he redecorated his football teams dressing room in bright red and their opponent's quarters in pale blue pastels. He had a reason for doing so. Alonzo Stagg, while head coach at Chicago, employed similar strategy when he had two dressing rooms for his players - one painted blue for rest periods - and the other painted red for fight talks. Both men were simply using smart color psychology.

SCIENTISTS HAVE UNEARTHED SOME AMAZING, as well as amusing, new facts about color as they have been busy unlocking hitherto-hidden secrets of the rainbow. Their extensive tests have convinced them that the colors on the red side of the spectrum are warm and stimulating while their blue-green opposites are cool and relaxing.

BLUE CAN BE A REAL EMOTIONAL SEDATIVE. Some hospitals report that they have found that patients recover more quickly if they are placed in blue rooms following major surgery. Blue rooms are sometimes used to quiet violent inmates of mental hospitals.

CERTAIN SHADES OF YELLOW are believed capable of producing a sensation of sunlight and warmth. Yet, just a slight change in shading can cause a feeling of nausea. Many years ago, commercial airlines abandoned interior decorations in yellow because tests showed that certain shades seemed to encourage air sickness. For the same reason some yellow foods are not served during long ocean voyages. Yellow is an excellent color, however, where "food for thought" is concerned. Research has shown that the grades of school children rose noticeably when their study rooms were redecorated in attractive yellow.

HOWARD KETCHUM, AN AUTHORITY ON COLOR and its effects said: "Whether we realize it or not, color can lower our sales resistance, make us feel hot or cold, gloomy or gay. It can affect a man's personality and mental outlook quite as definitely as a sleepless night, a cold in the head or a good square meal."

Ketchum gave as one example the story of a New York manufacturer who redecorated the cafeteria of his factory in light blue. The women employees immediately began to complain that the cafeteria was chilly. Some of them even started wearing their sweaters and light wraps to lunch. The plant engineer was called in. He ordered the baseboards repainted orange, had orange slip covers placed on all the chairs - and the complaints ceased!

WORKERS IN ANOTHER FACTORY complained they were straining their backs lifting black metal boxes. The ingenious foreman studied the problem and then

consulted a color expert who advised him to repaint all the boxes a pale green. This took about a month to complete. After this was finished, several of the workmen were heard to remark about the ease of lifting "these new lightweight boxes".

Studies had shown that dark-colored objects will almost invariably be adjudged heavier than light-colored objects. Also most of us are inclined to underestimate the temperature of a blue room and overestimate the temperature of a red room.

GREEN AND RED SEEM TO HAVE CERTAIN PHYSIOLOGICAL EFFECTS. Dr. Gilbert Brighthouse tried several experiments at Occidental College in Los Angeles. He recorded the muscular responses of several hundred students under the influence of red and green lights. He found that their reactions were faster than usual under a red light, while green light actually retarded their reactions.

ANOTHER INTERESTING TEST showed that many people tend to overestimate the passage of time under the influence of strong colors of red and underestimate it under equally strong influences of green or blue. This was shown in experiments with two groups of salesmen who were attending sales conferences. The first group, divested of their watches, was ushered into a bright red room for their conference which lasted three hours and fifteen minutes. At its close, they were asked to put on a piece of paper their estimate as to how long it had lasted. The average estimate was around five hours. A similar poll was conducted among another group of salesmen conferring in a light blue room. The average estimate was two and one half hours. All thought they had spent less time than they actually had.

COLOR IS BELIEVED TO BE AN INTEGRAL PART OF OUR DAILY LIFE - from the green of the grass to the blue of the sky. Even our language is liberally sprinkled with colorful phrases we use to express our emotions - such as "seeing red", or "green with envy", "blue with cold". Certain qualities have been associated with specific colors. Black, for instance is the traditional color of tragedy and death. In the Middle Ages, suicides from Blackfriar's Bridge, a gloomy black structure in the heart of London, declined appreciably when it was repainted bright green.

THE EFFECT OF COLOR ON DIGESTION AS THE RESULT OF SUCH thought-association was dramatically demonstrated by Samuel G. Hibbon, an illumination engineer. He invited several guests to a table set with tempting foods. Each guest had a good appetite-until the group was seated and Hibbon pushed a button. The dining room was instantly flooded with specially designed lights. As a result, the juicy brown steaks looked gray; the crisp celery turned pink; the coffee was transformed into a sickly yellow fluid. Most of the guests couldn't eat a thing. Some of those who did

manage to force down some food actually became nauseated.

**THE IMPORTANCE OF COLOR IN BUSINESS AND INDUSTRY** was shown when a Chicago meat market doubled its sales after redecorating and repainting the yellow walls of its large sales rooms. Aware that each color has its specific after-image, color engineers discovered that the yellow created a gray after-image which robbed the meat of its natural redness. Sales began to grow immediately after they painted the walls green because the contrasting after-image made the meat look redder than ever.

**EXHAUSTIVE TESTS HAVE DEMONSTRATED THAT COLOR** is one of the prime factors in the sale of virtually every commodity on the market today. When frozen foods first appeared they were packaged in ice-green or snow-blue containers with pictures of Eskimos or igloos or other Arctic designs. They didn't attract the eye of the average housewife, however, until they were repackaged in warmer colors that suggested the appetizing appearance of the re-heated food.

**IN HOME DECORATION, FABER BIRREN**, a pioneer color engineer, contends that living room walls should be in soft dark hues to show off beautiful furniture to the best advantage. The human eye is always first attracted by brightness, he explains, and too-bright walls will prevent anyone from appreciating the other objects that are in the room.

Birren believes that dining rooms decorated in soft peach colors produce the best appetites - particularly if they are accented with other edible colors such as lettuce green or apple red. Cool colors are his choice for bedrooms because experiments have shown that such colors actually reduce the blood pressure and induce relaxation. Rose, salmon or similar flesh tones make the best background for singing in the bathtub, according to Birren, because these hues reflect a rosy light and give the bather a glow of healthy well-being.

**SELECTING THE PROPER COLORS TO SUIT YOUR CHANGING** personal moods is a more difficult matter, according to Today's Health, a publication of the American Medical Association. Suppose you feel depressed and in need of a bright environment for an emotional lift? Then suppose by tomorrow you're brimming over with exciting plans that require the sedative effect of pale blue? Well, the Color Research Institute of America has a partial solution to this problem - keep changing your colors with your moods!

That's easy enough in clothing, and it can be done also in your surroundings. Keep the walls gray or some other neutral shade and use spots of color - in pictures, slip covers or hangings - that can easily be changed.

As for the right colors to go with the outfit that suits your mood, the institute suggests:

Take a sheet of black paper or cardboard, cut out a two to four inch square, look at the color of your outfit through this "window" for about 30 seconds, and then look at a blank sheet of white paper. The color that appears on the paper will be the after-image-a complement of the original color.

This after-image effect can cause complication, too, as in the case of a young mother who was caring for her sick baby. After sewing for some time on a blanket, she glanced over at the crib to find that the baby's face had turned green. Her hysterical phone call summoned a doctor who soon reassured her that the baby's color was simply caused by the after-image from the blanket-which was bright red!

#### WERE THE GREEKS COLOUR-BLIND?

The above question is asked in the New Scientist for July 25, 1968 with respect to an article by Harold Osborne in the British Journal of Aesthetics. Mr. Osborne is said to characterize the Greeks' colour vocabulary as having "imprecise complexity" and being "jejeune or lacking in substance". All the available terms are said to have been "bunched together into a small number of groups, the components of which were used indifferently as synonyms or possibly to differentiate only between brightness and intensity. Thus black is Kelainos, melas and kakakores; white is argos, leukos and leiroeis; . . . . "

Homer is said to have used the single color word "melas" to describe fresh blood, newly-ploughed earth, water, ships, and wine. On the other hand, snow, tin, water, ivory, grapes, honeycombs, and even leafy wreaths, were reportedly all called "white".

This disinclination "to make anything but conventional discriminations between colour hues . . . . raises again the often-discussed but never satisfactorily settled proposition that (the Hellenes) suffered from racial colour-blindness.

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