BOOK REVIEW

The Measurement of Colour. By W. D. WRIGHT. Adam Hilger, Ltd. (London), 1944, 232 + vii pp.; 65 diagrams and illust., 6 figs. in color.

This is a remarkably well-written book, and one which will fill a long-felt need. The title of the book gives no true indication of the breadth and depth of its coverage. The chapter headings give a somewhat better indication. They are:

I. Radiation in the Visible Spectrum: Its Emission, Absorption and Reflection.
II. Radiation in the Visible Spectrum: Its Reception by the Eye.
III. The Trichromatic System of Colour Measurement.
IV. Colorimeters: Their Design and Use.
V. Spectrophotometry Applied to the Measurement of Colour.
VI. The Colour Atlas as a Sub-standard of Colour Measurement.
VII. Practical Applications of Colorimetry.

Supplementing these there are 3 appendices with 7 condensed tables.

The last chapter is of particular value. Among its section headings are: The Colouring Power of Chemicals and Their Mixture, Lighting, The Paint Industry, Signal Glasses, and Colour Reproduction. The last mentioned section, which has particular application to color photography, is all too short; but it contains references to other more extensive articles. In particular an article by the same author in the *Photographic Journal* in 1940 gives a much more extensive treatment of color photography.

As the use of color in motion pictures increases, and more particularly as some of the newer processes are offered to and used by the industry, a great many engineers, especially sound recording engineers, are going to be interested in the harnessing and control of color reproduction processes. These engineers are not going to be measuring colors (except perhaps occasionally) but they will be, so to speak, dwelling in color space and some of them will want to "know their way around." Dr. Wright's book can be recommended as a most thorough guide book.

The physics of color presents peculiar difficulties, especially to the engineering mind. This is largely because color does not properly belong in the domain of physics, but rather that of psychophysics. Engineers deal so exclusively with the external world that the very word psychophysics is scarcely in the engineering vocabulary. The motion picture sound engineer deals with psychophysical relations when musical sensations are treated in terms of vibrations, amplitudes, *etc.* But in the science of music the relationship of pitch, harmony, loudness, *etc.*, to frequencies, ratios, and amplitudes of aerial vibrations is so simple and so closely alike for all individuals that the science of music moves effortlessly over into the domain of physics. In fact, the distinction between the two aspects seems rather labored.

Not so in the case of color. There are no colors in the external world, but only electromagnetic vibrations, variations in reflection factors, *etc.* The sensation of color is manufactured by the human eye and its attendant nervous mechanism. The sense of color can be most closely compared with the sense of absolute pitch. Very few people possess the latter, and very few people fail to possess the former. The way in which, by the device of a standard observer, this phenomenon can be treated as if it were a branch of physics is not without its pitfalls.

There has been for some time a great need for a book on the science of color which would have the following qualities:

(*1*) Never to ignore the experimental background against which the standard observer was erected, or to ignore the standardizing limitations to which he must submit;

(*2*) Present the necessary mathematics in the simplest possible terms, recognizing but not pursuing mathematical complexities;

(*3*) Describe and evaluate the various types of color measuring devices, their capabilities and limitations;

(*4*) Describe the applications of the methods to various industries with due regard to tolerances and the incidence of unusual psychological conditions.

"The Measurement of Colour" is just such a book. A man better qualified than Dr. Wright to write it could scarcely be found. His determination of the color mixture curves for a group of observers, published in 1929, was one of the chief courses of data for the specification of the standard observer. He is one of the outstanding workers in the science of color. His presentation of the entire subject is sound, thorough, and clear, without either skipping over the difficulties or delving into them abstrusely.

Criticism of such a book can only be of a minor nature. One could wish it had more brilliantly conceived and executed colored illustrations similar to some of those which appeared in *Life* some months ago. Probably wartime limitations on color printing in England have prevented that.

A minor criticism of the text can be made in saying that Dr. Wright in sketching the evolution of the trichromatic system has not properly accredited the report, published in 1922, of the Colorimetry Committee of the Optical Society of America headed by Dr. L. T. Troland, which first surveyed the field broadly and foreshadowed the specification of a standard observer. However, he has properly accredited Dr. H. E. Ives, now of the Bell Telephone Laboratories, for his part in setting in motion the modern phase of development in the Science of Color with his 1915 paper in the *Journal* of the Franklin Institute, an item which is frequently overlooked in this country.

The book is obtainable in this country from the Jarrell-Ash Company, 165 Newbury Street, Boston, Massachusetts.

J. A. BALL
May 16, 1945