

books reviewed



The Rays Are Not Coloured

By W. D. Wright. Published (1968) by American Elsevier Publishing Co., 52 Vanderbilt Ave., New York, N.Y. 10017. 154 pp. Illus. 5 by 7 in. Price \$5.95.

Professor Wright's latest book, *The Rays Are Not Coloured*, is an anthology of nine lectures given by the author over the past seventeen years. They make for very enjoyable reading. It is the kind of book that one can pick up, prop up his feet, sit back, and simply read with enjoyment. The essays cover a wide range of problems that all have in common visual perception; especially color perception. Physics, physiology, perception, night-driving, television, "color blindness" (a term which Dr. Wright quite properly avoids using), and colorimetry are all discussed.

But although Dr. Wright is one of the world's leading technical experts in color,

he does not let his science obscure the message he wishes to convey. Rather, he approaches his subjects in much the manner of Michael Faraday explaining the chemical history of a candle to students or of Isaac Asimov or George Gamow leading the layman through the labyrinth of theoretical physics. In short, the essays are interesting and highly readable; one might even say, in spite of their technical substance. In his preface, Dr. Wright has said that "many people are concerned with color professionally, but many more, who earn their living in quite other ways and would make no claim to be scientists, also have a most lively interest in it. I hope that both groups will find a spark here and there which will set off a new train of thought." I would say that the author has achieved admirable and uncommon success in attaining this goal.

He has achieved it for a number of reasons. Certainly, his abilities as a writer count for much of the book's success. Also, these essays are based on lectures that were designed to inform and, at the same time, be entertaining (a quality all too lacking in much scientific and technical exposition). But not the least of the reasons for Dr. Wright's success in this endeavor is the fact that he is a scientist who has never lost touch with the world of everyday problems. He has consistently concerned himself not only with his science, but also with the application of the results of that science to many problems that confront real people in a real world.

Dr. Wright, while highly cognizant of

them, is not overawed by "scientific breakthroughs" or the fads of modern technology. He properly points out the wondrous complexities of the commonplace. For example, on page 110: "May I, as an aside, emphasize that the light from the [tungsten] lamp [illuminating a rose] is a multidirectional beam of ordinary incoherent white light — not one of these highly directional, extremely coherent, strictly monochromatic laser beams? I have the greatest admiration for the discovery of the laser principle and the many novel uses to which laser light is being put, but I must confess to becoming a little tired of the awe in which a laser beam has come to be regarded. The light which brings out the colour and texture of our rose is really much more exciting and interesting and there is no occasion for us to have an inferiority complex about it." Technology is placed in proper perspective; as a means to an end, not as an end in itself (page 115): "I understand that Zurbaran, who died just over 300 years ago, was noted for his skill in the painting of fine texture. Like Constable, he must have acquired this skill through experiment and experience and certainly in complete ignorance of modern theories of light. It is interesting to speculate on whether a knowledge of the quantum theory could have made the slightest difference to Zurbaran in his art. Probably not, although it might have increased his sense of wonder. This could be our reaction too."

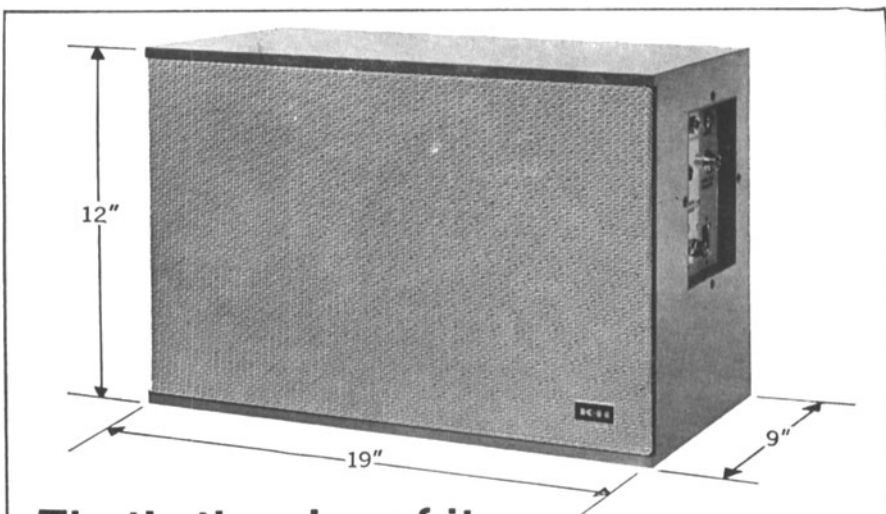
Indeed, this could be the reaction to this entire book. I should think that almost anyone could get something from it; if only a sense of wonder at the many things involving color perception that we take for granted. But, of course, there is much more that may be taken away from a reading of this book. Whether one is interested in an updating of Dr. Wright's lecture of over thirty years ago entitled "The Eye: A Link in The Television Chain," or in courses on color for schools, or in the color of peacocks' feathers, or any of a number of fascinating aspects of seeing color, there is much to be gleaned from the pages of *The Rays Are Not Coloured*. It is the kind of book that stimulates one to such usually imprudent statements as: everyone should read it.—C. J. Bartleson, Macbeth Corp., Box 950, Newburgh, N.Y. 12553.

Colour Measurement

By Hans Arens. Translated from the German by K. H. Ruddock. Published (1968) by Focal Press, Inc., 20 E. 46 St., New York, N.Y. 10017. 88pp. diagrams. 7 by 9½ in. Price \$14.50.

The book is a translation of a German work that had already appeared in two editions, as far back as 1956. The author's objective, according to a prefatory note, is not necessarily to be comprehensive nor to offer detailed experimental methods, but essentially to give a fundamental insight into color measurement, particularly with an eye to uses in color photography.

Accordingly, much of the discussion centers around psychological effects. It includes among other topics the laws of additive color mixture, the white and black constituents of a color, the additivity of luminance, Grassmann's laws, and the Luther color moment.



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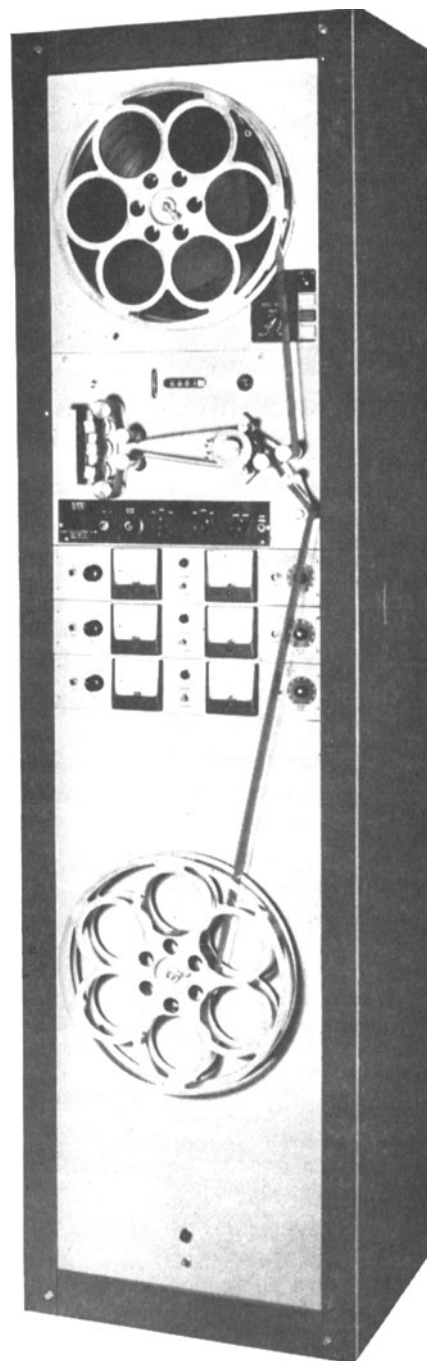
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The author notes: "An important question which must be answered is whether colorimetric or psychological measurement is to be preferred for photography. It is our opinion that psychological measurement is basically more important for all aspects of color. In particular, when in color photography we consider the question of color differences between original and reproduction, only psychological methods of measurement should be used. Unfortunately, this kind of measurement has not been developed as clearly and as precisely as has colorimetry. . . . In spite of the superiority of psychological measurement, we can see . . . why colorimetry is so well established."

The author discusses the principles of psychological color measurement. He considers among other topics Richter's work, the Munsell system, the Ostwald atlas, and the DIN color chart. Unfortunately, much of this is rather sketchily presented, with recommendations to the reader to consult the original sources, which are rather extensive. Items such as visual adaptation are mentioned, but not really developed in depth. The author concludes that none of the systems of psychological measurement or color description are completely successful in the present state of knowledge. Some of the difficulties foreshadow problems which have arisen in the development of the 1964 large-field standard observer.

The book is especially aimed at the reader who is interested in the general philosophy and psychology of color measurements, but he must not expect recommended detailed recipes or specifications on procedures. *Pierre Mertz*, Consultant; 66 Leamington St., Lido, Long Beach, L.I., N.Y. 11561.

Applied Optics

A Guide to Modern Optical System Design

By Leo Levi. Published (1968) by John Wiley & Sons, Inc., 605 Third Ave., New York, N.Y. 10016. 620 + xviii pp. Illus. Diagrams. 6 by 9 in. Price \$18.95.

One notes from the author's preface to this work that "In recent years there has been a great increase in the use of optical systems and optical components in larger systems which may straddle several technological disciplines. *Applied Optics* was written to serve as a reference work, as well as a text suitable for self-study, for engineers and scientists who require up-to-date techniques in the design and analysis of such optical components and systems."

The author has divided the work into three large divisions (plus an extensive appendix of tables) and nine chapters. The first division is a broad introduction of physical concepts in radiometry, electromagnetic waves, and communications and quantum theories. The second division covers sources of light, including incandescent and discharge lamps, the sun, luminescence and lasers. The third division covers modifiers of light, namely mirrors, prisms and lenses. There is a group of 70 tables as an appendix (together with some shorter appendices to the earlier divisions).

It is obvious that such an ambitious project, in one volume, must lead to an abbreviated treatment of the topics. For

example photometry is given two pages. The term "signal velocity" is used without definition on page 47 and the reasoning may be puzzling to the self-study reader. It also becomes clear to the reader that the "optical system design" indicated by the title covers only a description of the tools needed for this design, and that there is practically no guide to the processes of designing. On page 488 the author says "Before venturing into an actual lens design, the reader should study the subject from texts far more thorough than this chapter."

Other points will occur to puzzle the reader. Figure 5.45 appears rather different from Kingslake's Figure 2 (on page 45 of his *Optical Engineering*, Vol. 1) because it does not include the important water vapor absorption bands, a point omitted in the text. Table 47 mysteriously shows, for wavelengths between 1.7 and 2 microns, both the solar radiance and irradiance to be greater at sea level than above the atmosphere.

Nevertheless the volume is a generally useful reference that offers brief discussions of the points consulted, with extensive citations of original literature. Also the very profuse tables are quite handy for reference.—*Pierre Mertz*, Consultant, 66 Leamington St., Lido Beach, L.I., N.Y. 11561.

Motion Picture and Television Film: Image Control and Processing Techniques

By D. J. Corbett. Published (1968) by Focal Press, 31 Fitzroy Square, London, W. 1, England. 231 pp. Illus. Diagrams. 7 by 9½ in. Price £ 4 10s.

This manual is intended to provide an elementary technical background for those engaged in motion-picture or television film processing and related activities. The material was assembled originally for a series of lectures to members of the BBC Engineering Dept. responsible for the processing of black-and-white films. Mr. Corbett is Film Technical and Training Manager, Film Operations and Services, British Broadcasting Corp.

As the author states in the Preface, much of the material has been assembled from published literature, or obtained from manufacturers. The manuscript was prepared largely from teaching notes made over some time, and of such varied origin that it was impossible to give the source in every case. Some of the information is new, however, obtained from internal BBC sources, but this information is not identified in such a way that a reader could verify the results of the reported tests or measurements for his own — probably different — operating conditions.

The reader will find a great deal of useful information in this book, arranged for easy reference. The text is liberally illustrated, with nearly 200 diagrams and photographs.

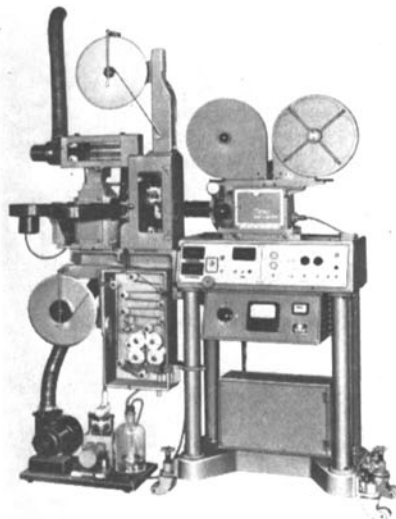
Chapter 1 gives some of the characteristics of light and light sources, and describes how these characteristics may be measured. Chapter 8, on the measurement of light, provides details on different types of photocells, and the use of these cells in photographic exposure meters. The SEI meter has been selected as a typical example of a comparison photometer.

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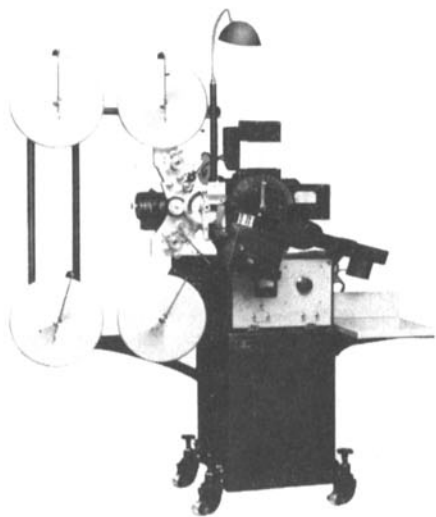
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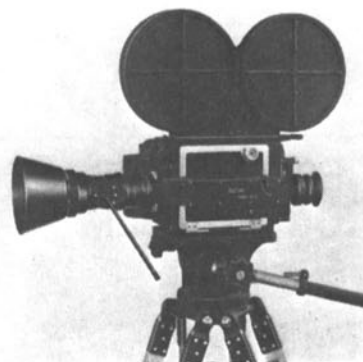


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In Chapter 2 the meaning of chemical terms and ideas is explained. This is followed, in Chapter 6, by an outline of photographic chemistry, including some of the effects of variations in developer composition.

The physical characteristics of film stocks are touched on in Chapter 3, followed by a somewhat more detailed description of light-sensitive materials in Chapter 4. Sensitometry is the subject of Chapters 5 and 7. Chapter 5 shows how the characteristic curve is constructed, and some information is given on the design and construction of sensitometers and densitometers. Several applications of sensitometry are outlined in Chapter 7, including the control of development, and the measurement of film speed. Various methods of film speed rating are described.

Chapter 9 deals with the assessment of the photographic image, mainly noise and resolving power. An outline is given of the modulation transfer function and its measurement. In Chapter 11, the construction of the quadrant diagram is described, and the effects of flare are shown. A brief outline of reversal processing is included also in this chapter.

Chapters 10 and 12 describe the design of motion-picture printers and processing machines. Some information is included in Chapter 12 on the control of film processing and the recovery of silver.—*Rodger J. Ross*, Canadian Broadcasting Corp., Toronto, Ont., Canada.

New Relationships in ITV

Published (1968) by Educational Media Council, 1346 Connecticut Ave., N.W., Washington, D.C. 20036. 157 + xvi pp. Paperbound. Illus. 6 by 9 in. Price \$3.00.

A three-day conference on instructional television was held in April 1967. It was sponsored jointly by the Education Section of the Electronic Industries Association and the Instructional Division of the National Association of Educational Broadcasters in cooperation with the Educational Media Council. This book is a report on that conference.

Purpose of the conference, as stated in the Foreword, was to "examine in detail some of the central issues of education today along with major trends in educational processes which must be fully understood before instructional television in any form can even be considered."

The book is divided into nine chapters, corresponding to session topics at the conference: Unstructuring Education, Curriculum and Organization Patterns, Metropolitan Area Council for Instructional Television Resources, Are You Ten Feet Tall?, Cooperative Approaches to Instructional TV Programming, Validating ITV Learning Materials, The Coming of Education in American Samoa, New Roles and Relationships in ITV and Televistas: Looking Ahead Through Side Windows.—*Edit.*

Solid-State Electronics

By Robert G. Hibberd. Published (1968) by McGraw-Hill Book Co., 330 W. 42 St., New York, N.Y. 10036. 170 + xiii pp. Illus. diagrams. 7 by 10 in. Price \$8.95.

This book is part of the *Texas Instruments Micro-library*. The material presented was originally offered as a self-taught course in semiconductor theory to readers of *Machine Design*. Each chapter (labeled "lesson") is terminated with a multiple-choice quiz (answers at the end of the book) to enable the reader to check his understanding of the material just covered. How successful a pedagogical device this is, is beyond the ken of this reviewer. The style is clear; extraneous information is avoided, every sentence counts. The dependence upon diagrams as part of an explanation is sometimes reminiscent of the technique employed by the editors of *Scientific American*. Mathematics is assiduously avoided.

While it is easy to understand why the author wishes to avoid the use of statistical mathematics in discussing transistor physics, the use of a modicum of high-school algebra would have made clear some points regarding transistor circuitry. In general, when explaining physics, the author is very careful to build on previously developed notions. When explaining circuitry, he may appear impatient; no means of rationalization appears available to the reader. As an example, take the development of the most important single set of concepts presented in the book, that of "transistor action." Because of earlier descriptions, the beginner will easily follow the flow of injected minority carriers into the base, the survival of most to the depletion layer at the collector junction, and their being swept by the field to the collector; those that don't survive become a (partial) basis for the ratio of collector to emitter currents (α). The ratio of collector to base currents now is handled differently. β is presented as a logical consequence of the definition of α (the author's only lapse into algebra). How now does a collector load resistor affect the "circuit current gain"? By now the author expects the student to use "characteristic" curves as a basis for his reasoning. This is, of course, in the manner of a circuit designer; but, the latter's attitude towards "why?" is surely not that of the tyro.

All of this is carping on a very successful volume which explains "how a transistor works" to someone without any electronic background! In addition it explains how transistors are made, how crystals are grown, and even two final chapters on integrated circuitry. The lesson on manufacture is especially good. Much of the success is due, again, to the use of diagrams. One too-crowded chapter on "other semiconductor devices" (i.e. other than bipolar transistors) should have been saved for FET's alone. One negative note—no bibliography is offered to help the reader extend his understanding.

This reviewer feels that this book would make an excellent secondary school text. Its persuasive manner may easily bring youngsters into a world of microcircuitry early.—*W. A. Schreiner*, Astro-Electronics Div., Radio Corp. of America, P.O. Box 800, Princeton, N.J. 08540.



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