comprehensively covered fields, but may wish additional information on thermodynamics and sound.

T. ENNS

Johns Hopkins University

Some Recent Researches in Solar Physics. F. Hoyle. London-New York: Cambridge Univ. Press, 1949. 134 pp. $3.00.

This book in the new series of Cambridge Monographs on Physics deals mainly with Hoyle's own recent work on the corona and chromosphere, carried out in collaboration with Bondi and Lyttleton. It is therefore mainly of interest to workers in this branch of astrophysics.

The monograph starts out with two chapters dealing with sunspots and with the observational data regarding the chromosphere and the corona. The final chapters deal with electromagnetism in solar physics, terrestrial phenomena directly influenced by the sun, and emission of radiowaves by the sun.

The book's main merit probably lies in the fact that it will draw attention to the importance of accretion processes in astrophysics. It seems to me that Hoyle's conclusions are far from final. His considerations fail, for instance, to account for the fact that only a certain select group of spectra are emitted by the corona, whereas other spectra corresponding to ionization potentials and excitation energies of the same order of magnitude as those of the observed spectra are not present.

The theoretical part appears to give a quantitative discussion, although it is noted by Hoyle that the results indicate only orders of magnitude. A more qualitative discussion might therefore have been more to the point. Also Alfvén's influence on ideas about electromagnetic effects in astrophysics might have been stressed more.

D. TER HAAR

Purdue University

Introduction to Theoretical and Experimental Optics. Joseph Valasek. New York: John Wiley; London: Chapman & Hall, 1949. 454 pp. $6.50.

This book is an introduction to the various fields of advanced optics, both theoretical and practical. To read it with real understanding requires more than a passing acquaintance with optics and theoretical physics. The theoretical material is well presented. Each discussion is necessarily very condensed, however, because the author touches upon so many topics. The good student will be stimulated by these brief presentations of material new to him and will complement them by reference texts, many of which are named in the good bibliography included here.

It is pleasing to see many engineering optical applications included and brought into close connection with theoretical optics. This is accomplished in part by the 24 optical experiments described at the end of the book, each requiring reference to a portion of the text. There are also included throughout the text optical applications in engineering and in other fields of service. For example, there is a good treatment of the one subject in optics of most importance to all of us—the eye and spectacle lenses. One searches in vain, however, for those recent applications of physical optics, reflection reducing films, and interference filters.

It is suspected that the author, in common with the reviewer, accepts with hesitation the recently recommended photometric terms *illuminance* and *luminance*. Though *illuminance* is used everywhere in place of the older term *illumination*, the section that discusses *luminance* is entitled, "Brightness of Images." It remains to be seen whether the younger generation will find the new words less confusing than the old.

This book is also useful as a handy reference text for the specialized optical worker who wishes to refresh himself quickly on some matter in another field.

RICHARD TOUSEY

Naval Research Laboratory

Partial Differential Equations in Physics. Arnold Sommerfeld; translated by Ernest G. Straus. New York: Academic Press, 1949. 335 pp. $5.80.

The present book is a translation of the sixth volume of Sommerfeld's *Lectures on Theoretical Physics*. The theory of partial differential equations is, of course, not a branch of theoretical physics. Its inclusion in Sommerfeld's series of lectures is, however, well justified, not only because of the author's many valuable contributions to this field, but because this branch of mathematics, above all others, is an indispensable tool in the theoretical physicist's work.

The motivation for the selection of topics and for the procedures employed is physical throughout this volume, and in this respect the book differs considerably from most modern writings on its subject. It is closer in spirit to the classical literature in this field, whose authors still believed in the "preestablished harmony" between what is physically important and mathematically significant. The book starts with an introduction to Fourier series, Fourier integrals, and other Fourier-like expansions, and then proceeds with a discussion of the various types of partial differential equations and boundary conditions arising from physical problems, and of some basic tools used in solving them. The next chapter deals more specifically with boundary value problems in heat conduction. This is followed by a rather detailed but concise treatment of cylinder and sphere problems in potential theory. Next, the eigenvalue problems of classical and quantum mechanics are discussed. The last chapter deals with the propagation of radio waves and serves as an illustration of many of the general methods developed in earlier chapters.

The chief merit of the book lies in its skillful handling of complex problems, by the use of a minimum of mathematical formalism and a maximum of physical intuition. Mathematicians will miss the rigor in statements and proofs that they are accustomed to (there is hardly any discussion of convergence, although infinite expansions appear in all parts of the book) and will not accept the author's "uniqueness axiom for physical boundary value problems" (p. 248) as a substitute for difficult uniqueness proofs. On the other hand, the physicist will feel completely at home in this book and he will be grateful

for a concise and very readable text that offers him the true physicist's insight in place of the mathematician's epsilons and deltas.

MICHAEL GOLOMB

Purdue University

Acoustic Measurements. Leo. L. Beranek. New York: John Wiley; London: Chapman & Hall, 1949. 914 pp. $7.00.

In *Acoustic Measurements* Dr. Beranek gives us a handbook covering the basic procedures followed, and the instrumentation required, for the measurement of sound. Theory and practice are blended to make a volume that is at once a compendium of detailed information and a summarizing textbook. It should prove useful to anyone concerned with acoustics.

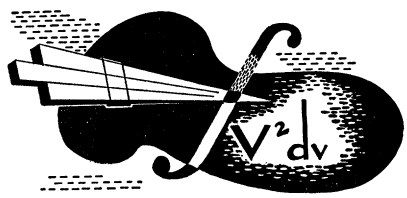
The twenty chapters cover an extraordinary variety of topics, ranging from the anatomy of the ear to a description of the testing rooms of the National Physical Laboratories in England, and from the mathematical basis of a reciprocity calibration to a list of words used in articulation testing. In each case, ample illustrative material complements a clearly written text.

Considered individually, most of the chapters present information of interest to those who require a "how-to-do-it" book. For example, descriptions of common microphones, with diagrams, show the essential details of their construction, the text and figures illustrating their weak and strong points as tools. Sound sources and sound analyzers are similarly handled. Knowledge of the facts presented should enable the reader to make an intelligent choice of the device that will best serve his needs. A further point: the author's care to define the limitations of his instruments and procedures alerts the reader continuously to the pitfalls inherent in such measurements.

Considered together, the chapters make a comprehensive textbook, complete with subject and author index and a glossary of terms. The bibliography is distributed as footnotes, and some 85 percent of the references are to publications in English. Although certain of the topics seem less adequately treated than others, the effort to cover the entire field has, on the whole, been successful.

ROBERT GALAMBOS

Harvard University



Algebraic Curves. Robert J. Walker. Princeton, N. J.: Princeton Univ. Press, 1950. 201 pp. $4.00.

Plane geometry in antiquity concerned itself for the most part with the straight line and the conics, studied by synthetic means. It was only with the introduction of analytic methods in the 17th century that it became possible to consider algebraic curves in general. Since that time a large number of particular curves have been exhaustively studied, and an extensive and beautiful theory of algebraic curves has been developed. It is with this theory that the present book is concerned.

Although the subject matter is classical, the author has made use in his exposition of some of the concepts of modern algebra, such as fields, ideals, and valuations. At the same time, he has set himself the task of keeping the treatment on as elementary a level as possible. In this objective he has admirably succeeded. Very little previous knowledge of algebra on the part of the reader is required, since the first chapter is entirely devoted to algebraic preliminaries, and further algebraic concepts are introduced throughout the book as needed. The second chapter develops the necessary material on projective spaces.

The subject matter of the book proper begins with Chapter III. Here are discussed plane algebraic curves, their singularities, and the reduction to ordinary singularities by quadratic transformations. By means of resultants, Bezout's theorem is proved in a weak form: The number of intersections of two curves is at most the product of their degrees. The full theorem of Bezout is proved in Chapter IV, after the introduction of formal power series and the definition of a place of a curve. These notions are then used to prove Noether's theorem also. Chapter V deals with space curves and with rational and birational transformations of algebraic curves. Finally, Chapter VI contains the theory of linear series and the Riemann-Roch theorem.

There are a large number of excellent exercises, ranging from the very elementary to the quite difficult. It is pleasing to note that the author has not contented himself with merely developing the general theory but has applied it, both in text and exercises, to various special curves. Many drawings are given, and these will be found very helpful.

This book should make available to a wide class of readers the classical theory of algebraic curves.

IRVIN S. COHEN

Massachusetts Institute of Technology

The Theory of Probability: An Inquiry into the Logical and Mathematical Foundations of the Calculus of Probability, 2nd ed. Hans Reichenbach. Translated by Ernest H. Hutten and Maria Reichenbach. Berkeley and Los Angeles: Univ. of California Press, 1949. 492 pp. $12.50.

This book is the English version of the author's "*Wahrscheinlichkeitslehre*" of 1935. Several changes—which, however, do not bear upon the essential contents—are listed in the preface. Reichenbach's theory is an attempt to combine and to reconcile two different concepts of probability: the mathematical notion of numerical probabilities which underlies the so-called calculus of probability, and the entity of phenomena to which the terms *probable* and *improbable* of everyday language usually apply. The main characteristics of his conception are that he accepts the frequency interpretation in the calculus of probability without introducing a randomness