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