



Astrophysics. The Atmospheres of the Sun and Stars. By Lawrence H. Aller. 412 pp. The Ronald Press Company, New York, 1953. \$12.00.

In the book *Astrophysics*, Lawrence Aller, who is Associate Professor of Astronomy at the University of Michigan, has gathered together a considerable compendium of facts and current interpretations in this rapidly developing field. He begins by reviewing the basic data in physics and astronomy which pertain to this field, and then starts in on a detailed discussion of specific fields. The second chapter is devoted to atomic and molecular spectra, the third to the gas laws and equations of state, and the fourth to excitation, ionization and dissociation. He then devotes a chapter to the detailed processes in the emission and absorption of radiation. The sixth chapter is the radiation of the stars, the seventh on the continuous spectrum. Finally the eighth and ninth chapter deal with the Fraunhofer spectrum and with solar phenomena in general.

The book has a secondary title, *The Atmospheres of the Sun and Stars*, and this title much better describes the contents than does the word *Astrophysics*. The shorter title is much too general, and would lead one to expect that the book would discuss energy-generating mechanisms, supernovae, causes of the periodicity of cepheids, and perhaps even cosmology. The book is, in fact, an excellent and up-to-date treatise on stellar atmospheres. As a text in a course on stellar atmospheres, it would serve well. The author gives many applications and examples, and has problems at the end of each chapter which require the formulae developed in that chapter.

The author gives an excellent picture of the application of atomic physics to the problems of stellar atmospheres. He uses the notation of the classical quantum theory, which makes the substitution of numbers easier. He gives many numerical examples. His treatment of the profiles of spectral lines is especially to be commended. To this reviewer, the last chapter, on solar phenomena, is the most interesting. Here he describes in some detail the most recent observational work and the interpretation of the various observed manifestations on the surface of the sun, the sunspots, faculae, prominences, reversing layer and corona, again stressing what is experimentally observed. It is in this domain that the McMath-Hulbert Observatory of the University of Michigan has made such outstanding contributions.

In summary, the book is an excellent text, suitable for a graduate course in the subject of stellar atmospheres. The printing is good and is easy to read. The photographs are interesting and the numerous figures and diagrams well chosen.

Serge A. Korff
New York University

Sound (Fifth Revised Edition). By E. G. Richardson. 352 pp. E. Constable and Company, London, England, 1953. St. Martin's Press, New York. \$5.00.

In his preface to this fifth edition, the author says, "At the time of the first edition of this book, there was no textbook in English which gave the reader an account of the considerable advances in the subject which had taken place in and following the First World War. Now after a Second World War the position is very different". The reviewer is in complete agreement.

The material covered in this book is well presented and the subjects treated are brought fairly well up to date, but present-day acoustics has progressed well beyond this material and many aspects of recent interest are quite outside its scope. In spite of rearrangement and numerous additions the volume has a dated air about it. Particularly inadequate are the chapters on the measurement of acoustic impedance, on architectural acoustics and on the analysis and reproduction of sound.

Philip M. Morse
Massachusetts Institute of Technology

The Philosophy of Science. By Stephen Toulmin. 176 pp. Hutchinson's University Library, London, England; Longmans, Green and Company, Inc., New York, 1953. \$2.25.

There seems to be a well-established tendency for physicists and philosophers to misunderstand each other. This introduction to the philosophy of science, intended for students of philosophy, should help to reduce further misunderstandings since it gives a good description of scientific ways of thinking. ("Science" and "physics" are treated as synonymous in most of the discussion although it applies to many aspects of the other sciences as well.) For the reader who is a scientist it provides an interesting summary of procedures which he is inclined to take for granted, and may even, by a roundabout course, give him some insight into the ways of the philosopher.

Using geometrical optics as an example, Toulmin shows how the laws and theories of science grow out of everyday experience and further detailed experiments and how the language and models of the scientist are related to them. He repeatedly emphasizes that the "participant's language" (that of the scientist) must be properly understood by the "onlooker" (the philosopher), and that this is possible only if the latter has a clear idea of what the former is talking about, which statements refer to actual observations and which to hypotheses and theories concerning their interrelations, a question that is not trivial, although it is, of

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THE CYCLOTRON, Fourth Edition

By W. B. MANN. A Methuen Monograph. 1954. 118 pages. \$2.00.

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APRIL 1954

course, quite obvious to the "participant" who knows the theoretical jargon and is familiar with the experimental facts.

Toulmin's main thesis is that the philosopher has generally tended to oversimplify science, to view it as a logical process of generalization, induction, or deduction, while it is really a more complicated undertaking, not to be summarized in any simple formula. This point of view will probably be more popular among scientists than philosophers, but the book should be valuable to both.

A. M. Thorndike

Brookhaven National Laboratory

Physik der Festen Körper. Volume 8, Part I, 228 pp.; Volume 9, Part II, 235 pp. Edited by Georg Joos. Dieterich'sche Verlagsbuchhandlung, Wiesbaden, Germany, 1947, 1948. DM 10.00 each.

Following the Second World War the military governments of the British, French, and U. S. Zones of Germany, by means of their respective FIAT's (Field Information Agency, Technical), supervised the preparation in German by German scientists of the *FIAT Review of German Science*. A check at the Brookhaven library indicates that at least eighty-four consecutive volumes were issued. The stated purpose was to "assist in informing international science of research done in Germany through the war years . . . (by presenting) . . . a complete and concise account of the investigations and advances of a fundamental scientific nature made by German scientists in the fields of biology, chemistry, mathematics, medicine, physics and sciences of the earth during the period May 1939 to May 1946." Thus, volumes 1-7 deal with pure and applied mathematics; volumes 8-19 with physics, electronics, geophysics; volume 20, astronomy; etc.

The original limited editions were transmitted by the respective FIAT's to their governments for distribution but the manuscripts were turned over to a committee of German scientists for the purpose of printing other than the strictly limited edition for general distribution.

The present two paperbound volumes constitute reprintings for Germany of volumes 8 and 9 of the FIAT series. The subject matter of the two volumes is subdivided under six general headings: structure, mechanical properties, and thermodynamics of solids are treated by eighteen authors in Part I; magnetic properties, electrical properties, and optics by twelve authors in Part II. The reviews are concise and replete with references to the original papers. A short foreword by Sommerfeld in Part I draws attention to some of the more important advances and Part II closes with good author and subject indices and a useful check list of the principal German books in the field of solids published in the 1939-46 period under review.

It lies in the nature of the case that these summaries do not include similar or related work outside of Germany during the review period. That most of the material can no longer be considered as new must

be attributed in large part to the success of the original FIAT effort. Nevertheless, these volumes will continue to provide excellent reference channels to the German work in this field during the war period.

Richard A. Beth

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Moderne Messmethoden der Physik. Part I, Mechanik-Akustik. By Franz X. Eder. 340 pp. Deutscher Verlag Der Wissenschaften, Berlin, Germany, 1952. DM 13.30.

The present volume, covering mechanics and acoustics, is the first of a projected four part compendium on modern methods of measurement in physics. The succeeding volumes will be: II, *Thermodynamics*; III, *Electrophysics*; and IV, *Optics and Atomic Physics*. It is the author's intention to provide a comprehensive summary of the physics underlying presently available methods of measurement, particularly recognizing the increasing use of electrical procedures, to serve as a text for university students in physics and as a reference work for research physicists, engineers, and others in neighboring fields who may be called upon to evaluate and select a suitable measuring method for a given problem. The foreword concedes the general similarity in purpose and level to the well-known "Kohlrausch" book on experimental physics.

Fourteen sections are devoted to mechanics dealing with fundamentals (sensitivity of eye and ear, errors and precision), lengths and angles, time, mass, volume, density, high and low pressures, velocity, force, mechanical vibrations including a brief treatment of servo systems, elasticity and hardness, production and properties of single crystals, viscosity, and surface tension.

The seven sections under acoustics treat basic concepts, transducers, sound sources, microphones, field quantities, propagation constants, and wave form analysis.

There are almost 400 references to original papers in the mechanics part and over 150 in acoustics. The table of contents seems to be a more useful guide for finding material in the text than the rather brief two page subject index. The book should not only be useful as a physics reference for students, teachers, and researchers, but would serve well as material for classes in scientific German and for those who wish to increase their command of German terminology in physics on their own.

The title page of this volume indicates that it is Volume I of a larger series *University Texts in Physics* under the general editorship of Franz X. Eder and Robert Rompe.

R. A. B.

Design For a Brain. By W. Ross Ashby. 260 pp. John Wiley and Sons, Inc., New York, 1952. \$6.00.

W. Ross Ashby's *Design for a Brain* is a clearly-written, informative, stimulating—sometimes even exciting—book whose major fault consists in its mislead-