For all NMR users

HIGH RESOLUTION NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY, VOLUME 1. By J. W. Emsley, J. Feeney, and L. H. Sutcliffe 663 pp. Pergamon Press, New York, 1965. $17.50.

by John P. McTague

The field of high-resolution nuclear magnetic resonance spectroscopy has become immense in the past decade. Practicioners of this subject range from theoretical physicists to organic and biochemists. The present monograph attempts to "provide a detailed account of the basic theory . . . which will interest everyone actively engaged in NMR spectroscopy." A second volume will present a compilation of published applications.

Topics covered include the theory and calculation of chemical shifts and spin-spin coupling, the analysis of high-resolution spectra, and the effects of chemical equilibria and molecular conformational motion on spectra, as well as chapters on spectrometers and experimental procedures. There are several appendixes listing calculated frequencies and intensities of A_mB_n spectra and a very extensive compilation of volume diamagnetic susceptibilities of organic compounds.

It has been seven years since the appearance of the classic work on the same subject by Pople, Schneider, and Bernstein (*High Resolution Nuclear Magnetic Resonance*, McGraw-Hill, New York, 1959). The present work follows its format closely and is an excellent source of references to more recent (for example, double resonance) as well as past work.

Because of the wide range of material covered, the treatment is necessarily cursory. The extensive referencing minimizes this disadvantage to the research worker. However, students may find the theoretical sections unsatisfactory because of sketchy derivations and insufficient attention to an attempt to impart a "physical feeling" for the various processes involved.

While this volume does indeed contain something of interest for all workers in NMR, its appeal will probably be greatest to physical chemists.

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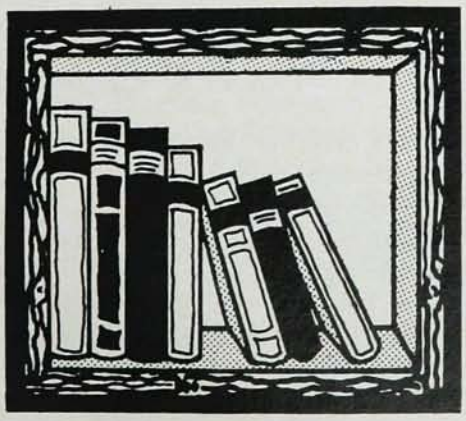
The earth's environment

HANDBOOK OF GEOPHYSICS AND SPACE ENVIRONMENTS. Shea L. Valley, ed. 700 pp. McGraw-Hill, New York, 1965. $24.50.

by Robert L. Weber

A conveniently organized collection of data, formulas, definitions and theories about the earth's environment is presented in the graphs, tables, and text of this book. The information was compiled (1962-1964) by scientists of the Air Force and other government organizations, industrial and university contractors, and private individuals. The handbook was written to serve chiefly scientists and engineers working with aerospace systems. Due to this emphasis, some topics in geophysics are omitted, for example geology, oceanography, and seismology.

Many a science-minded person who is not working with aerospace systems may find in this handbook summaries of areas of knowledge of special interest to him. Chapter 21 ("Astrophysics and Optical Astronomy" by Shea L. Valley) is an especially good 29-page summary which nonspecialists and students would find readable. Many other paragraphs of description and definition, along with appendix tables of constants and conversions, may be of use to physicists not necessarily associated with aerospace work. Examples of such topics are: the electromagnetic spectrum, transmission regions of optical materials, the earth's electric charge, atmospheric composition and optics, solar radiation, electromagnetic whistlers and planetary environments.



Data are presented in numerous tables and graphs, well displayed for easy reading. The binding seems a bit insecure for a 2.5-kg reference book.

Holders of the handbook are invited to return a card to receive future revisions of individual chapters and sections.

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Experimental nuclear physics

EXPERIMENTELLE METHODEN DER KERNPHYSIK. By P. Stoll, 178 pp. Springer-Verlag, Berlin, 1966. DM 10,80.

by H. H. Barschall

In the last few years the experimental techniques used in nuclear physics have undergone tremendous changes. Solid-state detectors and circuits, fast computers, and better accelerators are some of the new devices which have contributed to the improvement of the quality and quantity of nuclear data by orders of magnitude. These developments make it more difficult for the beginner to learn about the many experimental methods, both old and new, that the nuclear physicist uses, since there is a lack of up-to-date introductory texts. Consequently the student frequently has to learn from detailed articles written for the experienced research worker.

The present pocket book tries to fill this gap. The author, who is a professor at the Federal Institute of Technology in Zürich and who has taught

a course in experimental nuclear physics for many years, intends the book to be an aid for the beginner in a nuclear-physics laboratory. About three-quarters of the volume are devoted to the detection of radiation, the remainder to dosimetry, shielding, electromagnetic lenses, and accelerators. The principles of operation of radiation detectors, and the theory of pulse amplification and of coincidence measurements are presented well. Actual counting and analyzing circuits are not included. Most valuable are many tables, graphs, and formulas, which should be useful both to the beginner and the specialist.

Unfortunately the book does not give a realistic picture of the methods used in contemporary nuclear research laboratories. For example, the only accelerator described in any detail is the betatron, nowadays probably the least useful type of accelerator for nuclear research. Geiger counters, which are treated in detail, have become as rare in research laboratories as cloud chambers (which are not discussed); ionization chambers and photographic emulsions (which are described) are being displaced in the laboratories by detectors that permit faster counting. The author refers the reader for more complete information to extensive lists of references, but only two references in the entire book are to articles published since 1959.

This volume is an excellent introduction for the student who wants to familiarize himself with radiation detectors that have been used so widely in many applications (assuming he can read German). Nevertheless there remains a need for an updated version to acquaint the nuclear physics research student with the experimental methods in current use, such as modern detection circuits, data-handling methods, magnetic spectrograph time-of-flight equipment, to name a few examples not included in the present book.

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Pungent natural philosophy

SIX LECTURES ON MODERN NATURAL PHILOSOPHY. By C. Truesdell. Springer-Verlag, New York, 1966. $4.50.

by L. Marton

In a slim volume (only 117 pages) Professor Truesdell presents the text of six lectures in which he defines his concept of Natural Philosophy. Let me quote from the first lecture: "For two hundred years, the fields of scientific research were wilfully shrunk and sharpened to pin-point size, and appropriate microscopes were developed so that organized micro-thought could split them into forklets of micro-science, now budgeted at rates in megabucks per kilohour."

C. TRUESDELL

On page 22 our author tells us, "These lectures are intended for beginners. I have adopted a conservative position. There are times when generality is needed, and others when it is all too easy."

Now that we have been warned, let's examine briefly the areas covered by the six lectures. The first lecture is on the "Rational Mechanics of Materials," followed by "Polar and Oriented Media." The third is on "Thermodynamics of Viscoelasticity," the fourth is on "Electrified Materials," the fifth is "The Ergodic Problem in Classical Statistical Mechanics," and the sixth is "Method and Taste in Natural Philosophy." At the end of the volume, an appendix is added containing the text of the Chairman's Introduction to the Colloquium on the Foundations of Mechanics and Thermodynamics held at the National Bureau of Standards in 1959.

In spite of the author's remark that the lectures are for beginners, the reading is not always quite easy. The treatment of the different subjects is on a very sophisticated level and often an equation may appear without much introduction, a procedure that makes the reading easy only for the specialist. What makes the whole volume very entertaining reading is the author's pungent style. This review would be incomplete without giving at least a few examples of this style, showing the author's attitude toward a certain number of problems and to all the men who worked on them prior to him. On page 35 our author writes: "Thermostatics, which even now is usually called thermodynamics, has an unfortunate history and a cancerous tradition. It arose on a chaos of metaphysical and indeed irrational controversy, the traces of which drip their poison even today. As compared with the older science of mechanics and the younger science of electromagnetism, its mathematical structure is meager. Though claims for its breadth of application are often extravagant, the examples from which its principles usually are inferred are most special, and extensive mathematical developments based on fundamental equations, such as typify mechanics and electromagnetism are wanting. . . . "The early studies of thermodynamics abound in nonsensical wording, some of which the wars among the creators of the subject served to clear away, but they left much policing for later generations to do. As the area receded, from the frontier of physical thought, however, it fell into the hands of text compilers, always eager to water and 'explain' what is generally accepted without re-creating