

km/sec. Extragalactic radio sources—possibly distant galaxies in collision—seem to indicate a greater density of the universe at large distances, i.e., at an earlier time in the past; this would contradict steady-state models and agree with the concept of an expanding universe. The statistical results, however, cannot be interpreted unambiguously and are not yet conclusive.

The volume contains a wealth of material in current research, illustrated by tables, figures, and theoretical formulas, and is a valuable contribution to the various fields of astrophysics.

Great Experiments in Physics. Edited by Morris H. Shamos. 370 pp. Henry Holt & Co., New York, 1959. \$4.40. *Reviewed by M. W. Friedlander, Washington University.*

TWENTY-FOUR great experiments have been chosen for discussion. After an introductory chapter which sketches the development of the scientific method and of physics in particular, the remaining chapters are each devoted to an experiment of major importance. First comes a brief historical note which sets the scene for the experiment to be discussed; then follows the text of the experiment copied from its original publication (translated where necessary). In the margins, alongside the text, the editor has added many illuminating comments which deal with both the scientific aspects of the experiment and, where necessary, with the altered meaning of words used. There are many references—to the original works, to papers, and to books.

The book was developed "mainly for use by liberal arts students in the new laboratory physics course . . . designed on the 'great experiments' idea". While the content and aim of a general introductory physics course can be debated at length (but not here), there can be no gainsaying the fascination of this book. Well produced, well annotated, well selected, the procession from Galileo to Chadwick's experiment on the neutron encompasses an impressive demonstration of the growth of our physical knowledge through painstaking experiment and inspired interpretations. Those more advanced than freshmen will better appreciate this, and will gain much from perusal of these pages.

The Physics of Electricity and Magnetism. By William Taussig Scott. 635 pp. John Wiley & Sons, Inc., New York, 1959. \$8.75. *Reviewed by Jacques Romain, University of Elisabethville, Belgian Congo.*

MORE is contained in this book than its title claims. Not only is the physics of electricity and magnetism explained in detail, but also a good deal of mathematical reasoning is included. Although not written on an advanced theoretical level, it does offer a sound theoretical and experimental basis for understanding, and as such it can be used either as a reference book or as a textbook, especially since the contents are up to date and include many topics not currently

found in introductory textbooks. Since the book covers more territory than is likely to be condensed into a one-year course, the instructor must be selective in choosing the material he deems most appropriate. A standard grounding in differential and integral calculus is assumed.

The main topics are: charges, fields, and potential; conductors; dielectric and magnetic materials; steady and alternating currents; an introduction to semiconductors, thermoelectric and electrochemical effects; signal propagation in coaxial conductors and lines; electromagnetic radiation; and an introduction to the special theory of relativity in the four-dimensional formulation.

A full list of abbreviations and symbols is welcome, as are the carefully prepared index and a detailed table of electromagnetic quantities, units, and physical constants. The bibliographical references are unfortunately given only in footnotes, and authors are not indexed or otherwise listed.

Care in the writing is apparent throughout the book and definitions and explanations are neat and precise. Numerous worked out examples of direct physical interest clarify each new concept step by step, and many problems (without answers) are included at the end of sections.

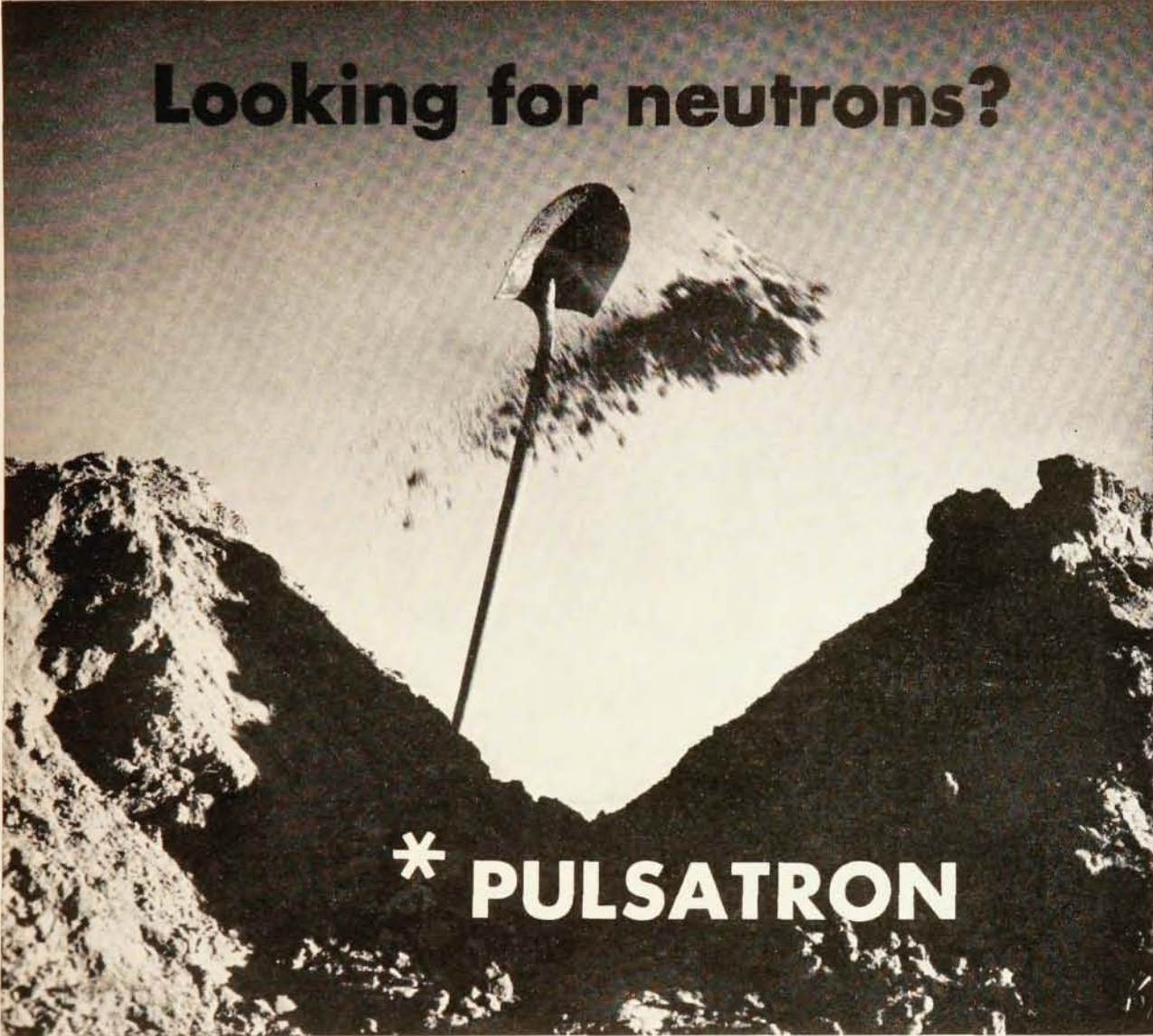
The main unit system used is the rationalized mks system, according to the modern trend, but the important equations, as well as the table of units, are written both in the mks and the cgs Gaussian systems.

High-resolution Nuclear Magnetic Resonance. By J. A. Pople, W. G. Schneider, H. J. Bernstein. 501 pp. McGraw-Hill Book Co., Inc., New York, 1959. \$13.50. *Reviewed by D. J. E. Ingram, University College of North Staffordshire.*

NUCLEAR magnetic resonance has now become recognized as a standard research technique in most physics and chemistry laboratories of any size. Its development has followed the trend of all the earlier branches of spectroscopy, the original ideas and concepts having arisen in physics departments where the basic experimental techniques and theory were established. It was then rapidly taken over by the chemists, however, and it would probably be fair to say that the major applications of nuclear magnetic resonance are now in the fields of physical and organic chemistry. The techniques and possibilities of this new form of spectroscopy have been outlined in several reviews and books of general character, and one or two elementary texts on its chemical applications have recently appeared. An authoritative treatment of "high-resolution nmr" has so far been lacking, however, and the present volume by three well-known workers in the field should go a long way to meet the growing demand for just such a book.

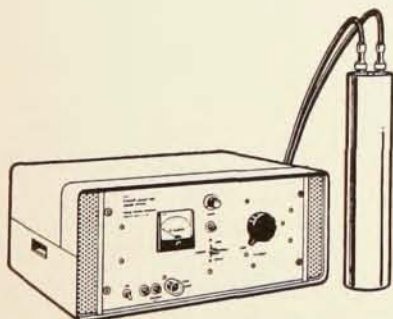
The contents are divided into two major groups: "principles" and "applications". In the first section, the general magnetic properties of nuclei are considered

Looking for neutrons?



*** PULSATRON**

*** the Kaman neutron source**
small - lightweight - portable



10^7 neutron/pulse - nominal.
 5 microseconds — pulse length.
 Adjustable - 1-10 pulses/sec.
 H^3 (d, n) He^4 reaction.
 Accelerator Unit — 4" OD x 18" long.
 Control Unit — $21\frac{3}{4}$ " x $15\frac{1}{4}$ " x $10\frac{1}{2}$ ".

The NT-60-8 Pulsed Neutron Generator Assembly . . . an Exclusive Development by

Research and Development in Nuclear Weaponry and Instrumentation.

Scientists and Engineers . . . Live and Work in the fabulous Garden of the Gods vacationland. Write Employment Division 14



KAMAN NUCLEAR
COLORADO SPRINGS, COLORADO

A Division of the Kaman Aircraft Corporation

INTERSCIENCE announces New North-Holland Books...

Modern Analysis of Diffraction by Matter

by R. HOSEMANN, *University of Berlin*, and S. N. BAGCHI, *University of Calcutta*
1960 Approx. 640 pages \$19.50

The Theory of Brillouin Zones and Electronic States in Crystals

by H. JONES, *Imperial College, London*
1960 Approx. 300 pages \$9.50

Optics of Thin Films

by ANTONIN VASICEK, *University of Brno*
1960 Approx. 420 pages \$12.50

Relativity: The General Theory

by J. L. SYNGE, *Dublin Institute for Advanced Studies*
1960 Approx. 550 pages \$16.50

Paul Ehrenfest: Collected Scientific Papers

edited by M. J. KLEIN, *Case Institute of Technology, Cleveland*
1959 644 pages \$13.75

Analytical and Canonical Formalism in Physics

by ANDRE MERCIER, *University of Berne*
1959 230 pages \$6.75

INTERSCIENCE Publishers, Inc.
250 Fifth Avenue, New York 1, N. Y.

first and then the basic principles of the resonance method are outlined. This is followed by a section on experimental methods and then by six chapters on the detailed theory necessary to interpret and analyze the spectra. The emphasis throughout, as the title suggests, is on "high-resolution" spectra, and hence is confined to samples in the liquid state from which very narrow spectral lines can be obtained. There is therefore little to be found in the book on nuclear resonance as applied to solid-state problems, which are probably of more interest to the physicist. On the other hand, it is an exhaustive and reliable account of all the theory and applications of nuclear resonance that are of interest to the chemist, and should prove invaluable to any entering this field of research and eager to understand the implications of its results.

The section on applications has a comprehensive chapter on the determination of molecular structure from the chemical shifts observed for protons, followed by one in which the chemical shifts for other nuclei are considered in detail. The following chapters then deal with more complex phenomena on which nuclear resonance can give very precise information, such as internal rotation, hydrogen bonding, and solvent effects. Many specific examples are given throughout these chapters which help to illustrate and underline the points under discussion.

The presentation of the subject matter and the production of the figures are of a high standard throughout and this volume will undoubtedly find its place as one of the standard reference works on the subject.

Physikalisches Praktikum: Eine Sammlung von Übungsaufgaben mit einer Einführung in die Grundlagen des physikalischen Messens (9th Revised Ed.). By Wilhelm H. Westphal. 285 pp. Friedr. Vieweg & Sohn, Braunschweig, Germany, 1959. DM 19.80. Reviewed by L. Marton, National Bureau of Standards.

THE ninth revised edition of Westphal's book is reviewed here without reference to the earlier editions. The reason for this is twofold—I haven't seen the earlier editions, and to my best knowledge they haven't been reviewed in *Physics Today*. The book is a syllabus of undergraduate physics laboratory experiments which is used widely in German-speaking universities. I don't believe that there is a similar distribution for any of its American counterparts. Many American schools prefer to use their own mimeographed laboratory manuals. For comparison purposes, I am taking a representative American text which covers approximately the same topics; this arbitrary choice is the printed syllabus of Wall and Levine prepared for the University of Minnesota in 1951.

Westphal's book is very neatly conceived and skillfully executed. The introductory chapters are on the system of units, the calculation of the results of measurements, and error calculation, and they give some practical hints about the execution of measurements and the keeping of notes. Personally, I would have