by S. J. Buchsbaum, is found tucked between p. 127 and 222.

A second reason for buying the book is to obtain a reference collection of some of the basic papers in gaseous electronics. Professor Allis is a major contributor to the field, as the reader of this book soon finds. Any well-rounded scientist should be familiar with the theoretical analysis of the Ramsauer effect, coauthored with P. M. Morse on p. 19. (Unfortunately for English-speaking readers, the paper is in German). The papers on diffusion in gaseous discharges and on wave propagation in plasma, for example, also deserve to be widely read.

A third, nonscientific reason for buying this book is that one can study the evolution of Professor Allis' career. One sees the beginnings in quantum mechanical studies of electron-atom impacts, the move onward to gaseous discharges, and finally to the study of fully ionized plasmas. The cause-and-effect relationships in this development provide material for interesting speculation. Unfortunately, the papers in the book are not placed in chronological order, so a little effort is required to discover the proper time sequence.

Concerning the construction of the book, the printing is clear and the book is well bound. There are a few minor errors, but these detract little. One major complaint is the lack of a few photographs of Professor Allis inside, although his face appears on the dust cover. The price ($20) is a bit high for the student. The publisher is the MIT Press, Cambridge, Massachusetts, and London, England.

In short, this combination of papers plus the very useful interpretative notes makes the book a pleasant addition to the reviewer's library. Both the author, W. P. Allis, and the editor, Sanborn C. Brown, deserve our appreciation.

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About the Reviewer: Igor Alexeff received his graduate training at Wisconsin following earlier studies at Harvard. In addition, Dr. Alexeff was with the Westinghouse Research Laboratories and was a National Science Foundation Research Fellow at Zurich before going to the Oak Ridge National Laboratory where he is presently a group leader in the Laboratory's Controlled Fusion research program. He is also an associate professor of electrical engineering at the University of Tennessee.

Experiments in Modern Physics. By Hans Mark and N. Thomas Olson. McGraw-Hill Book Company (1966). xii + 300 pp. $9.50.

This book represents a guide to selected laboratory experiments in modern physics. It is based on a laboratory course in modern physics given for junior and senior students in engineering science at the University of California in Berkeley. In their choice of experiments, the authors have succeeded in illustrating some of the most important fundamental concepts of modern physics while dealing with mundane topics of significance in practical applications. Thus, engineering students will find the contents of this laboratory course stimulating and useful. The course material is well suited to familiarize the student with modern laboratory techniques. This feature should prove beneficial in the students' advanced studies and future professional career.

The different experimental topics are discussed in 11 chapters titled as follows: 1) The measurement of atomic masses; 2) The passage of charged particles through matter; 3) Vacuum technology; 4) The detection and measurement of ionizing radiations; 5) X-ray spectroscopy and x-ray analysis; 6) Properties of neutrons and their interactions with matter; 7) Solid-state electronics; 8) Nuclear magnetic resonance; 9) The thermionic emission of electrons from metal surfaces; 10) Lasers and the stimulated emission of radiation; and 11) Ion accelerators. The scope of the material presented spans the wide range from the almost classic matters found in the cradle of modern physics to the most advanced and en-vogue subjects virtually at the forefront of present-day research.

In addition to the topics listed above, the book contains an introductory chapter with corollary information. This includes, among other items, a rather brief treatise on measurement methods and error analysis and a section dealing with important basic rules of safety and good laboratory practice. Finally, there are three appendixes dealing with: (I) Oscilloscopes; (II) Classical and Quantum Statistics; and (III) Physical Constants.

The overall ideas presented in the book are very well conceived, indeed. The approach taken by the authors to emphasize fundamental concepts resulted in a treatise on selected topics of modern physics that goes far beyond the genre of a "cookbook" manual. The book is designed to enhance the reader's insight and understanding of the structure of matter and to guide the reader in the application of this knowledge to the execution of typical experiments. From this point of view, the author's endeavor was certainly a successful one.

The aspect where the book does not measure up to expectations concerns the lack of formal rigor and meticulous care in presenting some details and fine points. Although these shortcomings, depending on the reader's opinion, may be considered as minor in nature, this reviewer feels they are nevertheless of significant consequence as a matter of principle. Moreover, they could have been avoided easily with little effort on part of the authors, the editor, and the publisher.

In the discussion on error analysis (Sec. 1.3), the conceptual difference between the standard deviation of a normal distribution and the limited-sample estimate of this standard deviation has not been clarified. A brief discussion of student's distribution would have provided a most helpful and elucidating addition concerning this matter.

Many symbols and abbreviations used throughout the book are at variance with the adopted usage of the American Institute of Physics. Particularly unfortunate in this regard in the use of "mev" in lieu of "MeV" because of the inherent ambiguity (the prefix "m" designates normally 10^{-3}, while 10^{6} should be indicated by the prefix "M"). Furthermore, the meaning of certain symbols is not always consistent throughout the book but changes from one chapter to another; there are also several instances where symbols are introduced without explanatory definition. Moreover, there are quite a few cases where the appropriate units for physical quantities have been omitted in equations and graphs.

A notable and potentially confusing misprint can be found in Eq. (II.8) of Appendix II, where multiplication signs are shown erroneously as lower-case "*x*."

The book contains several figures in half-tone reproduction on non-glossy paper. Understandably, these pictures are of very poor quality with many details of the original photographs undiscernible.

Finally, some criticism is in order regarding the outdated values of physical constants listed in Appendix III as most precise values. There were certainly more up-to-date compilations of physical constants available in 1966, the year of publication, than the referenced source of 1957 vintage.

In summary, this reviewer believes the book should be very valuable as a guide for laboratory-course instructors. Students, however, should be instilled with a few words of caution concerning the cited deficiencies before the book is handed to them for use.

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About the Reviewer: Hermann J. Donnert has been Associate Professor of Nuclear Engineering at Kansas State University since 1966. Following formal education in mathematics and physics at Innsbruck, Austria, he conducted postdoctoral research in theoretical physics at the universities in Köln and Freiburg. Dr. Donnert has been a member of the staff of the U. S. Army Nuclear Defense Laboratory, Edgewood Arsenal, Maryland, and concurrently, he served on the faculty at the University of Maryland. He participates actively in the CINDA program and ANS standards efforts. His research interests are in quantum field theory, low-energy nuclear physics, radiation transport and shielding, radiation effects and measurement techniques, radiation chemistry, and nuclear-weapon effects.

Nuclear Physics. By R. R. Roy and B. P. Nigam. John Wiley and Sons, Inc. New York (1967). 590 pp. $15.95.

This book was written by physicists for use in physics education. Thus it is not surprising that it is not ideal for use by nuclear engineering students. Of course, no one book could be, since nuclear engineering education encompasses nuclear physics over widely ranging levels of sophistication with primary emphasis for most being at the descriptive level. However, the advanced graduate student, specializing in reactor physics, requires a substantial quantitative appreciation of low-energy nuclear physics. In particular, he needs an understanding of the bases for the diverse interpolation and extrapolation formulas employed for the description of nuclear reaction rates. For these students, this book is as well suited as a text and/or reference work as any of which this reviewer is aware.

The presentation is nicely balanced with respect to attention paid to nuclear structure and to nuclear reactions. Of course, the physicists' viewpoint shows up here somewhat in that there is perhaps relatively more emphasis on structure and less on reactions than suits the nuclear engineer. More importantly, no attention is paid to one aspect of nuclear reactions that is of prime importance to the nuclear engineer, namely that of the effect of the environment upon neutron-nuclear reaction rates. But the latter has little to do with nuclear physics (except for its influence on the interpretation of cross-section measurements in terms of nuclear structure), and hence to look for it in a text of this kind is probably unreasonable. Neither of these mildly negative observations is to be construed as unfavorable criticism.

Much care is taken by the authors to be as quantitative as is feasible, given the uncertain state of the subject matter. Furthermore, considerable effort is devoted to the comparison of calculation with measurement. These aspects of the text make it extremely useful to the reactor physicist and the nuclear engineering student.

The first five chapters are mainly devoted to a discussion of nuclear properties and nuclear forces. The concepts of nuclear size, shape, charge distribution, and electromagnetic moments are carefully reviewed. Numerous calculations of these properties are presented in sufficient detail to be instructionally useful to the student, and are also compared with the corresponding measurements. Incorporated into the fifth chapter is a good discussion of fission.

Nuclear models are reviewed in Chapters seven, eight, and nine. The shell model, collective model, and the unified model (a marriage of the first two) are examined in considerable detail, both as to their formulation and as to their implications and predictions. Because of the successes these models have had in correlating data on nuclear ground and low-lying excited states, a working appreciation of them is of substantial importance to the applied nuclear scientist. Chapter nine is given over to a discussion of attempts to understand the many-nucleon nucleus in terms of what is known of the two-nucleon potentials. Because of the lack of concrete results here, this material is perhaps of little immediate interest to the nuclear engineer.

Chapters six, ten, and eleven describe various methods for attempting to analyze and understand nuclear reactions in quantitative terms. Of course, neutron-nuclear reaction-rate analysis (at least) is central to reactor analysis. Hence, the relevance of this material in nuclear engineering education is obvious. The presentation in these chapters is sufficiently detailed for the sophisticated student to learn from it; and, at the same time, sufficiently advanced to provide a useful reference for the working reactor physicist.

The last two chapters treat electromagnetic interactions with nuclei and with beta decay. Both of these topics are of importance to the nuclear engineer, particularly the latter. Both are dealt with quite thoroughly in the text.

In sum, I feel this is a good text on nuclear physics for use in physics education. Furthermore, until a nuclear physics text is written with the needs of the advanced nuclear engineering student specifically in mind, I feel that it is about the best available for use in nuclear engineering education as well.

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Unitary Symmetries and Their Application to High Energy Physics. By M. Gourdin. Interscience Publishers, New York (1967). 303 pp. $12.75.

Unitary groups are widely used in modern elementary particle physics. No clear understanding of new theories