

BOOK REVIEWS

Progress in Fast Neutron Physics. Conf. Proc. (Rice U., Feb. 1963). G. C. Phillips, J. B. Marion, and J. R. Risser, eds. 397 pp. The University of Chicago Press, Chicago, 1963. \$8.50.

Reviewed by Herbert Goldstein, Columbia University.

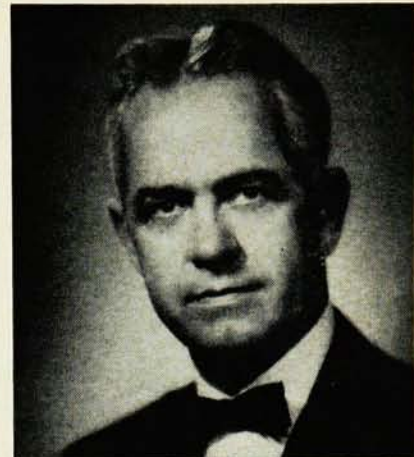
This volume is worth a permanent place on one's shelves if only for the record it preserves of a classic duel in conferencemanship between Professors Havens (p. 215) and Newson (p. 235). These gentlemen have clearly studied their Wilkinson hard and long, and the virtuoso performances they presented should provide both enjoyment and instruction for all who participate in scientific conferences. The editors have obviously gone to some pains to reproduce faithfully the details of the encounter, even appending a footnote to one of the figures to ensure that the nuances of slidesmanship it exhibits do not go unnoticed by the casual reader.

The proceedings chronicled here have in addition more conventional claims to our attention. In February of 1963 Rice University in Houston, Texas, was host to an international conference on fast neutron physics. The meeting fulfilled two functions. It formed part of the academic celebrations of the semicentennial of the founding of Rice. The conference was also a tribute by the participants to the memory of one of the most active and creative workers in fast neutron physics, T. W. Bonner, the shock of whose untimely death in December of 1961 is still keenly felt by the many who cherished him as colleague and friend. There were four technical sessions covering neutron sources, non-elastic reactions, resonance phenomena and elastic scattering, and lastly polarization studies. In a final fifth session W. V. Houston spoke briefly and movingly in commemoration of T. W. Bonner; Sir John Cockcroft and R. G. Herb recalled nostalgically the earlier (and less expensive) days of nuclear research; and E. Bretscher indicated some of the interactions between neutron physics and nuclear technology.

As far as this reviewer can recall the proceedings reproduce quite accurately all the twenty-two invited papers, the five contributed short papers and almost the entirety of the lively discussion from the floor. As conferences go now-a-days, a relatively small number of papers were presented, but they are still too numerous and too diverse to be commented on individually. Purely on the basis of personal predilections, this reviewer found the papers in session II on inelastic scattering and radiative capture particularly exciting for the volume of new data now being obtained from the fast time-of-flight techniques, pioneered at Los Alamos and Oak Ridge. Also most impressive is the record of recent improvements in resolution with both Van de Graaff generators and time-of-flight machines (the subject of the display of conferencemanship referred to above).

It will be recalled that the American Physical Society met at Rice immediately following the Conference recorded here. The APS meeting included a session of invited papers dealing with a number of subjects pertinent to fast-neutron physics, e.g., on the optical model. It is to be regretted that these papers could not also be included in these proceedings, for even though not formally part of the Conference they belong most appropriately to a review of *Progress in Fast Neutron Physics*. But this is a minor cavil. The editors, their co-workers, and the publishers, are to be congratulated on the completeness and accuracy of the record, the speed with which it appeared, the handsome and pleasing typography, and not least for the price which is refreshingly low in comparison to that of most Conference proceedings.

In looking over the volume of material coming out of fast neutron research and reported at this conference, one is struck by the extent to which we are indebted to this field for our knowledge of processes in complex nuclei. To mention but one



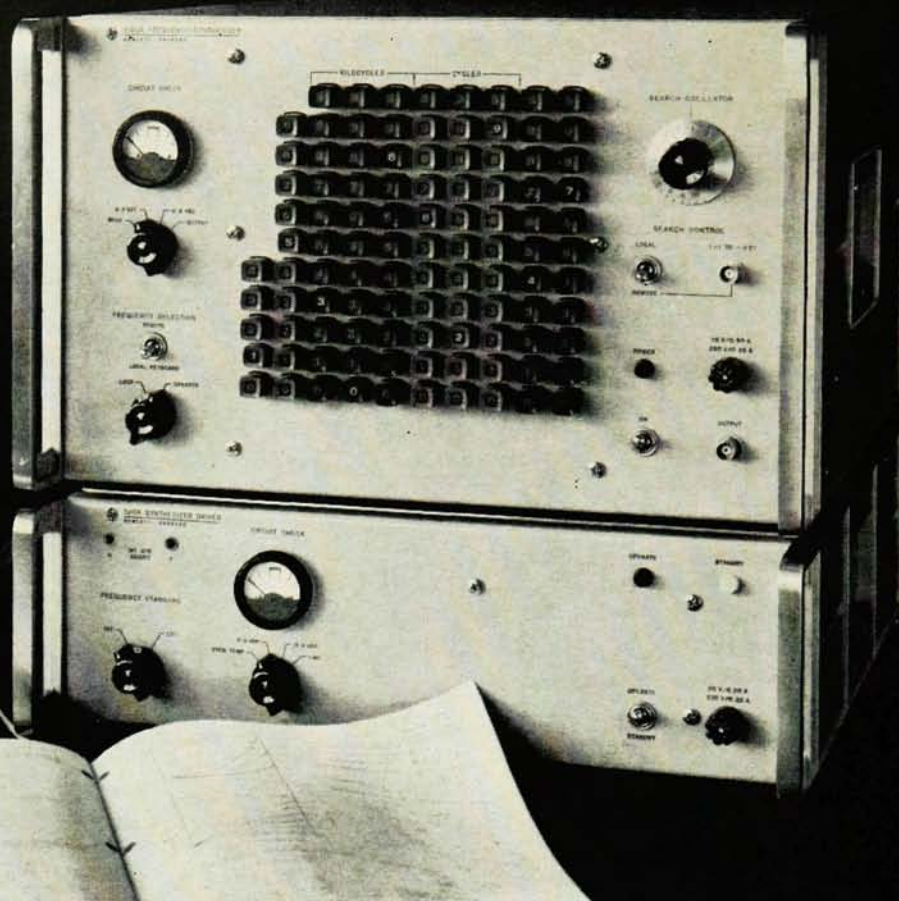
Tom W. Bonner

example—the optical model of the nucleus was conceived and flowered as a result of efforts to understand fast neutron measurements. Yet it is widely recognized, even by graduate students in search of these topics, that fast neutron research is not one of the currently fashionable fields of physics. Paradoxically, therefore, it has often not been the love of pure research that has produced these new insights into nuclear structure, but the result of the pressing interests of nuclear technology for neutron cross section data. Perhaps this is the most lasting lesson to be gleaned from these proceedings, a lesson whose moral must be pondered by both the physicist and the historian of physics.

Introduction to Wave Mechanics. By Louis Harris and Arthur L. Loeb. 300 pp. McGraw-Hill, New York, 1963. \$8.95. Reviewed by C. H. Holbrow, Haverford College.

Although there are currently many introductory quantum mechanics texts available, it is still possible to make a useful contribution. For one thing there are not many good texts suitable for a one-semester introductory quantum mechanics course. Harris and Loeb have written a book which in many ways follows the usual line of development of introductory texts: a survey of the experiments which led to the conception of quantum theory,

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the Bohr model, the free particle, particles in square wells, the harmonic oscillator, the hydrogen atom, etc.

The authors depart from the usual treatment by giving an unusually good introduction to the mathematics of quantum mechanics. An extensive chapter on waves and their mathematical description supports this introduction. In view of the student's usual ignorance of waves and the central role of this subject in quantum mechanics, inclusion of this chapter seems very wise. Interspersed throughout the text are many useful problems, most of which require thought and further development of the text material by the student rather than simple manipulation. It is also of interest that more emphasis is laid on operator techniques than is usual in an introductory text.

Because the text is designed to be compact enough for a one-semester course, emphasis is on developing important techniques rather than on demonstrating their application. The principal examples of practical and pedagogical interest are the hydrogen molecule ion and the helium atom. The illustrative material used reflects the authors' interests in chemistry and electrical engineering. For example, no attempt is made to relate quantum mechanics to nuclear properties. Nevertheless, the authors have clearly and concisely described the principles of quantum mechanics in a way which should make this book useful to teachers and students whose interests lie elsewhere than in chemistry or engineering.

Paramagnetic Resonance. Conf. Proc., (First International Conference, Jerusalem, July 1962). W. Low, ed. Vol. 1, 396 pp., \$16.00; vol. 2, 525 pp., \$19.00. Academic Press, New York, 1963. \$30.00 per set. Reviewed by J. H. Van Vleck, Harvard University.

It is obvious that in discussing these two books, embracing over one hundred papers by different writers, the reviewer cannot follow the usual procedure of discussing how the volumes reflect the personality of the author. Instead he can merely stress that this document of almost a thousand pages strikingly exhibits how the subject of paramagnetic resonance in solids has

mushroomed in size and importance since the first experiments were performed by Zavoisky in the USSR seventeen years before the 1962 conference in Jerusalem, an appropriate locale, in view of Professor Low's noteworthy contributions in the field.

This conference can properly claim to be the first international one on paramagnetic resonance sponsored by the International Union of Pure and Applied Physics. However, other conferences have increasingly been fringing on this subject because it is so important. For instance, the annual "Colloques Ampères" are steadily becoming more international in character and pointing more and more toward resonance phenomena as the central theme. Recent international conferences in magnetism have usually had sessions on magnetic resonance. (For this reason, Professor Low graciously postponed the Jerusalem meeting from 1961 to avoid its coming the same year as the international conference on magnetism in Kyoto.) There is, however, one respect in which a conference on the subject of paramagnetic resonance has a different emphasis from one on bona fide magnetism as ordinarily understood. With magnetic resonance, one can investigate small amounts of paramagnetic impurities embedded in a virtually nonmagnetic matrix of known crystal structure, but the effect of the bulk magnetism in these materials is too small to be detectable by ordinary measurements of susceptibilities. Conversely, the resonance lines of concentrated magnetic materials are usually too broad to be observable except at very low temperatures. Consequently, in leafing the pages of the conference report, one finds frequent mention of such materials as CaF_2 or Al_2O_3 (with magnetic impurities), but comparatively little discussion of ferrites or iron garnets.

Since the two volumes are for sale separately, it is well to delineate the subject matter of each, thereby, incidentally, giving an idea of the scope of the conference. Volume 1 has Part I, "ESR Spectra of Iron Group Elements"; II, "ESR Spectra of Rare Earth and Uranium Elements"; and III, "Theory Related to ESR". Volume 2 contains Part IV, "Paramag-

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