BOOK REVIEWS

Selection of books for review is based on the editors' opinions regarding possible reader interest and on the availability of the book to the editors. Occasional selections may include books on topics somewhat peripheral to the subject matter ordinarily considered acceptable.

Unified Theory of Nuclear Models and Forces, Third Edition

Author	G. E. Brown
Publisher	American Elsevier Publishing Company, Inc., New York
Pages	316
Price	$14.75
Reviewer	Norman Austern

We have seen in recent years a great outpouring of books about fundamental nuclear physics; these books seem motivated by the belief that nuclear theory has stabilized to a sufficient extent to be worthy of lasting description. The range of publications extends from brief research monographs on particular topics to multi-volume introductory texts based on year-long university courses.

Professor Brown's popular little book, now in its third edition, conforms to neither of the above descriptions. It originated more than ten years ago in a short series of lectures delivered at an elegant, remote Norwegian ski resort to an experienced audience of young Scandinavian and Dutch nuclear physicists. The book preserves the carefree tone of the original lectures, despite subsequent expansion of theoretical formalism, and despite the addition of chapters that nearly double the length since the first edition. The book also preserves the level of the original lectures, it is neither introductory (despite constant claims of simplicity) nor is it ever very advanced.

Professor Brown claims in the Preface that his book is a specialized description of the important nuclear models. On the other hand, nuclear theory consists of little more than developing the consequences and interrelations of models; therefore, it should be no surprise that the book is in fact a quick survey of almost the entire field of nuclear theory. The topics emphasized are ones the author has worked on directly, plus a few more he finds particularly interesting. The book achieves a broad coverage because Brown's own research interests are unusually broad and fundamental. It achieves an authoritative summary of many of the high points of modern research on nuclear theory; the notation is uniform, the style of discussion is confident and lighthearted.

The book opens with three brief chapters on occupation number representation, Hartree-Fock theory, and shell-model notation. These are followed by discussions of collective vibrations and rotations, based on particle-hole excitations and their interaction. The moment of inertia for nuclear rotations is derived and discussed and pairing theory and quasi-particles are presented. A long Chapter 9 presents Kapur-Peierls scattering theory and Brown's old work on the optical model. Four chapters on aspects of many-body theory then follow, giving up-to-date discussions of nuclear matter, finite nuclei, and effective forces. The third edition closes with a new, fifty-page Chapter 14 that treats isobaric analog resonances, the latest topic to catch Brown's attention. This is perhaps the clearest treatment of isobaric analogs yet published; it assists the reader to distinguish between physics and formalism.

This is not a uniformly excellent book. Occasional gaps in basic arguments are difficult for unprepared readers. The frequent folksy humor is sometimes self-indulgent and strident. The carefree style sometimes descends into carelessness. If not the author, one wishes at least the publisher had tried to keep the errors of the first and second editions out of the third. (One such error is a confusion of sign in the original definition of the isospin operators.) Unfortunately, not only are old errors retained, but more than half a dozen new ones damage the chapter on isobaric analogs.

In summary this is not a text, but rather a quick tour by a master practitioner through the high points of current nuclear theory. The style is uniquely his own. The book should be of interest to experts who want to know Brown's point of view, to people who have some background in nuclear theory and want to learn more, as well as to interested bystanders who want to see how basic nuclear theory looks nowadays.

Norman Austern is professor of physics at the University of Pittsburgh, where he has worked primarily on the theory of nuclear reactions. His education was at The Cooper Union and at the University of Wisconsin. He is the author of a recent monograph, Direct Nuclear Reaction Theories, *Wiley-Interscience (1970).*