tion of Migdal's work, it must be admitted that he has raised a number of interesting and provocative points.

Let me draw special attention also to the article of D. Brink, "The alpha-particle model of light nuclei," which is one of the most beautiful developments in this subject. Brink likes to sit on his work for years and, on the whole, doesn't even answer letters inquiring about it, so that one must either adopt the expedient of traveling to Oxford to talk with him, or invite him to lecture at summer schools. Both are worth while.

Systematic and conservative expositions of by now standard shell-model and "beyond" techniques are given by Gillet ("Approximate methods in nuclear-structure calculations") and J. P. Elliott ("Effective interactions in the shell model"). Both articles are carefully prepared and should become standard works in the subject. The new multipole and sum-rule methods in spectroscopy are described in detail by J. B. French. These are undoubtedly very useful, although I have not mastered them yet. It is nice to have a systematic exposition on hand. C. Bloch presents "An introduction to the many-body theory of nuclear reactions" in his characteristically elegant fashion. One should not forget to mention the excellent introduction to the Hartree-Fock formalism with which F. Villars begins the book. Finally, at the end come many seminars, some good, some bad.

In sum, this is an excellent book which should come into the shelf of every nuclear physicist who can afford it.

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Sound and Matter

Ultrasonic Absorption. An Introduction to the Theory of Sound Absorption and Dispersion in Gases, Liquids, and Solids. A. B. BHATIA. Oxford University Press, New York, 1967. 441 pp., illus. $13.60.

The scientist who measures the absorption and velocity of ultrasonic waves in bulk matter is an ultrasonic spectroscopist. His task, in addition to measuring these quantities, is to attempt to relate his data to the molecular nature of matter. In order to do this, it is usually necessary that his measurements be made over a range of values of some external parameters such as ultrasonic frequency, temperature, pressure, and magnetic field. The data so obtained provide him with such information as the strength and location of the absorption peaks and the magnitude of the velocity dispersion. From these he attempts to answer the question: Why does a gas, liquid, or solid absorb ultrasonic energy?

Ultrasonic Absorption by A. B. Bhatia is essentially a systematic collection and discussion of the various answers that can be given to this question. The processes or mechanisms responsible for the absorption are discussed, and, where one exists, the molecular theory describing the process is outlined. The book is aimed at scientists "who are interested in the study of the properties of matter and wish to acquaint themselves with the basic . . . results in this field. . . ." For the researcher who is actually carrying out ultrasonic investigations it will not be as useful as somewhat more detailed accounts such as *Absorption and Dispersion of Ultrasonic Waves,* by K. F. Herzfeld and T. A. Litovitz, or *Physical Acoustics,* edited by W. P. Mason.

After several introductory chapters the book treats systematically the theoretical ideas and experimental results in gases, liquids, and solids. The sections dealing with the fluid states of matter are essentially a condensed version of the material covered in the text by Herzfeld and Litovitz. The condensation is skillfully done, and these sections provide a coherent, well-written introduction to ultrasonic research in fluids. It is unfortunate that some of the more up-to-date developments in this field are not included, but perhaps any advantage gained by their inclusion would have been offset by a corresponding loss in the simplicity of presentation.

The chapters dealing with the attenuation of ultrasound in solids are equally good. In particular, the discussion of the interaction of ultrasonic waves with electrons and phonons deserves commendation. On the whole, though, the solid-state treatment is rather more abbreviated than one would like. And while I am sympathetic toward the author's attempt to emphasize the physical content of the subject, there are some sections where a slightly more rigorous approach would be preferable.

In evaluating any book there are two critical questions that must be answered: (i) Is there a need for a book designed to meet the specific objectives of the volume under consideration? and (ii) does this particular work fill that need? To the first question the answer here is a qualified "yes," the qualifications being those mentioned above; to the second it is an unqualified "yes."

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Aquatic Life

Aspects of Marine Zoology. Proceedings of a symposium, London, March 1966. N. B. MARSHALL, Ed. Academic Press, London, 1967. 280 pp., illus. $14.

The symposium reports of which this book is composed deal with a variety of topics, some broad and some specialized. Two articles present new observations on the vertical movements of pelagic animal communities which form acoustic scattering layers, and show how these movements may be controlled by natural light or influenced by artificial light. A paper dealing with the luminescence of fishes recommends an anatomical classification of light organs, presents a review of the control mechanism for integumental photophores, and discusses critically the various explanations that have been offered for the function of luminescence in this group of animals.

In two additional reports on fishes a survey of the olfactory organs of bathypelagic species is given and methods for sampling mesopelagic fishes are summarized. Various types of trawls, traps, and nets are evaluated, and the need is shown for supplementary information from high-speed samplers, fishing with lines and lights, photographs, and direct observation from deep submersibles.

The sensitivity of invertebrates to small changes in hydrostatic pressure in the shallow marine environment is discussed by another symposium participant; the mechanisms involved and behavior observed in both field and laboratory experiments are considered. Another investigator reports that the neuston of the warmer seas has predominantly blue and purple pigmentation, with similarities to crustacyanin,