rection; in other cases, the articles describe work done in a past collaboration; and in still other cases the discussions involve work only of related interest.

In spite of the diversity of subjects discussed in these articles, certain basic threads extend through from one article to another. For the most part the emphasis is away from setting up formalisms, but toward getting to the basic physics as quickly as possible. Much of the work discussed by the authors has to do quite frankly with applied physics, both with regard to developing weapons for national defense and to applying research efforts to entirely peaceful projects. Furthermore, examples are given in which valuable information of a purely scientific nature can be obtained from nuclear explosions as well as other applied research.

A perhaps more direct path to the peaceful uses of scientific investigations, namely controlled thermonuclear research, is described by the extensive review article (126 pages) by R. F. Post. This article describes clearly essentially all the basic background material with which one should be acquainted upon entering seriously into the field. The strong relationship between this subject and space physics is also brought out. Extensive references are given where the details would be too lengthy or tedious to be included in the article. In several of the articles, mention is made of the usefulness of sophisticated numerical computations in implementing many of the diverse scientific programs. One of the most classic cases is that of neutronics. Fluid flows in general have received much numerical treatment. One of the more recent and most interesting applications of computational techniques is the computer simulation of plasmas. There are also several articles which have relatively little direct connection to applied science of any sort, those on cosmology and on elementary particle physics. One might end this paragraph by pointing out an attitude that most contributors to this volume have in common with Teller to one degree or another, namely, a tremendous enthusiasm for the application of science to practical purposes but an equal enthusiasm for the purely scientific knowledge that can be gained both in the process and apart from it.

It is worthwhile to add one technical point concerning Critchfield's article on the eigenvalues of Casimir operators. Subsequent to the printing of the present book, Louck (*Amer. J. Phys.*, in press) has found a general (but quite different and more complicated) formula for the eigenvalues of the Casimir operators. Although Chritcfield has checked this result against his (with reasonable definitions of the symmetric functions) through order seven, the results have not been related to each other theoretically.

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Ultrasound and Its Uses

Ultrasonics. Theory and Application. G. L. GOOBERMAN. Hart, New York, 1969. xii + 212 pp., illus. $12.

This book is intended to provide the undergraduate student and general research worker with an introduction to the interactions of ultrasonic energy and matter. As the author readily admits, such an undertaking requires a selection of the topics that are to be treated in detail. In this selection, much more attention is paid to theory than to industrial applications. The use of ultrasonics as a research tool is well covered, however. Algebra and a little calculus suffice for following derivations; the style is straightforward and easy to understand.

The general treatment approaches matter as a continuum for waves, with lumped equivalent circuits derived on a voltage-force analogy. The author often uses transmission-line theory rather than energy as a unifying concept. The references are often selected for historical perspective rather than for up-to-date research results; the latest journal reference is 1966.

Several topics of direct use to the research worker receive special attention. The discussion of the near field of pistons will be of interest to those who assume that a plane radiator radiates plane waves. Gain from focusing devices and radiation pressure in linear systems are well presented. Piezoelectric transducers receive a relatively complete treatment, but with little attention to coupling coefficient as a useful parameter. Most of the examples make use of quartz rather than ferroelectric materials. Magnetostrictive devices receive much less attention. Design equations for sandwich (Tonpilz) transducers will provide only a general background, with little information on practical difficulties of construction. Ultra-high-frequency resistive layer transducers receive brief notice.

There is an excellent summary of the theory of cavitation in liquids, with comments on the inadequacies of present data that should spur action. Relaxation processes provide a basic concept for the author's treatment of absorption, dispersion, propagation in solids, and shear waves in liquids. In the treatment of phonons their interaction with electron spin waves receives special attention. Measurement schemes using traveling waves, reverberation, streaming, and the ultrasonic interferometer are presented, with estimates of accuracy.

In accordance with the intent of the text, discussion of applications is rather sketchy, with references that the reviewer found inadequate. One could wish for mention of the analytical work of the Krautkraemers in ultrasonic pulse-echo flaw detection. Medical applications fare somewhat better; the author's earlier text *Ultrasonic Techniques in Biology and Medicine* (Iliffe, 1967) is a useful reference. Sonar, blind guidance delay lines, image converters, and viscometers average less than a page each.

The book provides an excellent introduction to the field for its intended audience. For the reader wishing more detailed information, or data on applications, the references make a useful starting point.

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Correction: The price given for *Peregrine Falcon Populations: Their Biology and Decline*, edited by Joseph J. Hickey (University of Wisconsin Press), which was reviewed in *Science* 31 October, was incorrect. The correct price is $10.

Books Received

Advanced Physical Chemistry. A Survey of Modern Theoretical Principle. S. M. Blinder. Macmillan, New York; Collier-Macmillan, London, 1969. xx + 556 pp., illus. $13.95.

Advances in Electronics and Electron Physics. Vol. 26. L. Marton and Claire Marton, Eds. Academic Press, New York, 1969. xii + 444 pp., illus. $19.50.

Advances in Marine Biology. Frederick S. Russell and Maurice Yonge, Eds. Academic Press, New York, 1969. x + 454 pp., illus. $17.50.

Advances in the Biosciences. Vol. 1, Schering Symposium on Endocrinology, Berlin, May 1967. G. Raspé, Ed. Pergamon, New York, 1969. viii + 324 pp., illus. Paper, $9.

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