those planning a graduate course in elasticity, especially one conducted as a seminar; and, last, but not least, graduate students in quest of a research problem.

A. C. Smith, University of Windsor

Quantum statistical mechanics, edited by P. H. E. Meijer. Gordon and Breach, 150 Fifth Avenue, New York 10011, 1967. ix + 172 pages. Hardbound: U.S. $9.75 (prepaid U.S. $8.40); Paperbound: U.S. $4.95 (prepaid U.S. $3.96).

This book contains the lecture notes of a summer school on quantum statistical mechanics at the Catholic University of America. Unfortunately there has been a considerable delay in the appearance of this book (the date of the lecture is not given, but seems to be 1964). The course consisted of four parts.

P. H. E. Meijer gives an introduction to the density matrix, the Wigner distribution function, second quantization and the diagrammatic method (40 pages). (In the reviewer's opinion the treatment of the density matrix is inferior to that given in the textbooks of Messiah and Dirac, for example.) T. Tanaka reviews the Green's function method and the perturbation theory approach to the electron gas (64 pages). T. Morita gives a detailed discussion of the diagrammatic method (31 pages). The most interesting material is contained in the lectures by R. W. Zwanzig which are concerned with a careful discussion of master equations. A new derivation (now published, see Physica 30 (1964) 1109-1123) of a generalized master equation is given (33 pages).

E. J. Woods, Queen's University

Theoretical elasticity, by A. E. Green and W. Zerna (Second edition). Clarendon Press, Oxford, 1968. xv + 457 pages.

Since its first publication in 1954, Green and Zerna's treatise has become firmly established as an authoritative treatment of certain areas of the theory of elasticity, a subject which as a whole is now too vast to be adequately treated at the research level in a single volume. The authors have concentrated their development on three main branches of elasticity theory which are of current interest: finite displacements, complex variable techniques for plane problems, and shell theory.

The general arrangement of the second edition remains unaltered. Chapter 1 contains material on tensor analysis and a very brief discussion of Cauchy singular integrals. Chapter 2 develops the general equations of elasticity theory and Chapter 3 derives the solution of certain finite strain problems concerning circular cylinders and tubes. Chapter 4 discusses small displacements superimposed on finite deformations.

Infinitesimal strain is considered in Chapter 5 and the next four chapters are concerned with essentially two dimensional problems for both isotropic and anisotropic materials. Included is an account of Reissner's theory of transverse flexure, a most welcome inclusion. Extensive use is made of the representation of solutions in terms of pairs of complex potentials. This process enables biharmonic type boundary problems to be reformulated as Hilbert problems, the solution of which can be tackled by means of Cauchy singular integrals, a technique which is of wider application and which, in this reviewer's opinion,

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possesses certain advantages over the Wiener-Hopf method.

The remaining chapters, which are devoted to shell theory, have been extensively rewritten, and there is an additional chapter on the derivation of the equations of shell theory from the general equations of classical elasticity by asymptotic expansions.

D. Naylor, University of Western Ontario

Dynamic plasticity, by N. Critescu. North Holland Publishing Company, 1967; distributed in North America by John Wiley and Sons (Interscience). xi + 614 pages. U.S. $25.

This book, which is Volume 4 of the North-Holland series in Applied Mathematics and Mechanics, is a greatly expanded edition of the author's earlier work, Dynamic Problems in the Theory of Plasticity, published in 1958. It develops the theory controlling the propagation of disturbances in various types of plastic media. The difficulties peculiar to this subject which are due in part to the inherent non-linearity and irreversibility of plastic deformation, are brought clearly into focus in the second chapter of the book, which discusses longitudinal waves in thin rods. Later chapters introduce more complicated wave propagation problems associated with strings, circular membranes and thick rods. There is a chapter each on shock waves and axisymmetric problems and the book concludes with an account of waves propagated in soils which includes a discussion of various kinds of pressure density laws, yield conditions, and stress-strain relations. The "plastic-gas" model is used to analyse the effect of a cylindrical explosion in an infinite medium and several other problems are worked out as illustrations of various other models. These include the propagation of a spherical shock in a sandy medium and the rectilinear propagation of plane waves into the ground due to a blast wave at the surface.

The book is claimed to be reasonably self-contained but it would be necessary for the reader to be familiar with at least the elements of the theories of elasticity and plasticity as well as with the method of characteristics as applied to the quasi-linear systems. In general, analytic methods of integration are inapplicable and it is necessary to treat initial and boundary problems by numerical techniques. In fact, such methods are essential since even the simplest problems are incapable of solution by existing analytical tools. In addition, the author has devoted much space to the description of experimental results, since in a subject of this kind the physical processes are not always clearly defined and theoretical work must be guided by and tested against these results.

This book is an excellent introduction to a vigorous and rapidly developing branch of modern applied mathematics.

D. Naylor, University of Western Ontario

Basic equations and special functions of mathematical physics, by V. Ya. Arsenin (Translated by S. Chomet). Iliffe Books Ltd., London, 1968. 361 pages.

One of the unfortunate necessities in the development of applied mathematics has been that an undergraduate student is invariably in his senior year before he is exposed to linear partial differential equations. This subject continues to develop a way of thinking, but it is still removed from the majority of physical phenomena that are essentially non-linear. This approach has become a necessity

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