tions is in many respects a modern treatment of what is already to be found in Blatt and Weisskopf.

The two final chapters are review papers on pion physics and weak interactions. These are preceded by a very complete discussion of the Dirac theory which serves as a preparation.

This is indeed a very impressive book. Every student of nuclear physics will want to have access to it, because it presents a logical development from basic principles to the point from which much of the current journal literature begins.

Studies in Statistical Mechanics, Volume 2. By J. de Boer and G. E. Uhlenbeck. 272 pp. (North-Holland, Amsterdam) Interscience, New York, 1964. $11.50.
Reviewed by Kurt E. Shuler, National Bureau of Standards.

In late 1962, when this reviewer last made a count, there were being published (at least) 137 annual series headed variously *Advances, Progress, Studies, Developments, Survey, Review, Vistas*, etc., in the fields of physical, biological, and engineering science. Unquestionably, there are more today. Arguing scientifically via the law of supply and demand, it appears evident that these volumes fill a need. I am sure that all of us, at one time or another, have made good use of these valuable compendia of knowledge and wisdom.

These *Advances in*, etc., must be judged, in the long run, by the competence of the editors and the competence of the authors whose arms have been successfully twisted by the editors. In the cases of the present volume and the preceding one in this series, the credentials of both editors and authors are beyond question. The results, i.e., the contents, are of the high quality that one would associate with the names of J. de Boer and G. E. Uhlenbeck (who play the dual role of editors and authors in this volume), K. Huang, J. M. H. Levelt and E. G. D. Cohen, and C. S. Wang Chang.

A particularly valuable feature of these *Studies in Statistical Mechanics*, as promised in the General Foreword, is the reprinting of "important older monographs, reports, or dissertations where these are not easily accessible". This program, which was started in Vol. 1 with the translation and publication of Bogoliubov's "Problems of a Dynamical Theory in Statistical Physics", is continued in this volume with the publication of the expanded and updated Amsterdam dissertation of Levelt and Cohen, "A Critical Study of Some Theories of the Liquid State including a Comparison with Experiment", and the classic, often quoted but previously rather inaccessible 1954 report of Wang Chang, Uhlenbeck, and de Boer on "The Heat Conductivity and Viscosity of Polyatomic Gases". To the latter has been added a historical foreword and some references to the recent literature. The third paper in this volume and the only one which is "new" is K. Huang's review of the quantum theory of the nonideal Bose gas, "Imperfect Bose Gas". We hope the editors will continue their policy of reprinting some of the difficult-of-access classics in addition to new and original reviews.

The book reviewers' version of the Hippocratic oath seems to require that some critical comments be offered to remain a member in good standing of the fraternity. I do not have any. I like the concept, the format, the contents, and the reasonable price of this series. I even like the innovation of the publishers in changing the color of the dust jacket from volume to volume. This not only adds color to my office but also adds suspense to the expected appearance of the next volume.

Progress in Solid Mechanics, Volume 4. I. N. Sneddon and R. Hill, eds. 198 pp. (North-Holland, Amsterdam) Interscience, New York, 1963.
Reviewed by E. H. Dill, University of Washington.

Two articles form Volume 4: "Foundations of Elastic Shell Theory" by P. M. Naghdi and "Some Extremum Principles in Irreversible Thermodynamics with Application to Continuum Mechanics" by H. Ziegler. Like the other volumes, this one is primarily of interest to the research specialist.

There are at least 3000 published articles dealing with thin elastic shells. Professor Naghdi, of the University of California, has cited fewer than 100 of these; but he has chosen well, and his derivation of the equations of the linear theory is the clearest treatment available. The explanation of the relation between the more prominent shell theories should help remove the confusion existing in some minds.

One half of the article consists of a clear and concise statement of the mathematical background, and the kinematics and statics of shells. The remainder is devoted to a derivation of the relations between stress resultants and kinematic quantities and a critique of existing theories. No attempt is made to mention methods of solution of the equations.

The second article by Professor Ziegler, of the Federal Institute of Technology, Zürich, Switzerland, has successive sections dealing with statistical foundations, classical thermodynamics, irreversible thermodynamics, and applications to continua.

The jacket summary reads as follows: "H. Ziegler presents, in elegant and definitive form, his recent fundamental work on thermodynamics of deformation in continua. Among many stimulating ideas is an extension of Gibbs' statistical mechanics to irreversible processes. Much new light is thrown on the constitutive laws of various materials, both solid and fluid."

His treatment continues in the tradition of the "Onsagerist" and may find favor among those who practice the religion of classical thermodynamics. This reviewer has never discovered any logical content to this subject since it always seems to deal with undefined quantities whose definition can be adjusted to fit the experiment.

The present work contains other statements with which the reviewer must take exception. For example, the author states (p. 147) that the principle of material indifference (see "The Classical Field Theories" by C. Truesdell and R. A. Toupin, *Encyclopedia of Physics*, III/1, Springer-Verlag, Berlin, 1960) is not valid in a continuum moving with respect to a rotating coordinate system. Furthermore, he claims (p. 94) that the entropy inequality is "less promising"

than the "principle" of Onsager in restricting admissable constitutive equations because the Onsager relation is of a "more precise nature" and deals with irreversible processes.

This reviewer feels that any new light which is thrown on the constitutive laws will come from a continuation of such work as that of B. D. Coleman and W. Noll (see "The Thermodynamics of Elastic Materials with Heat Conduction and Viscosity," *Arch. Rat. Mech. Anal.* **13**, 167 (1963).

Generalized Functions and Direct Operational Methods. Vol. 1, Non-Analytic Generalized Functions in One Dimension. By T. P. G. Liverman. 338 pp. Prentice-Hall, Englewood Cliffs, N.J., 1964. $14.00.
Reviewed by J. E. Mansfield, Harvard University.

This is a text on differential equations, and specifically on the solution by direct operational methods (as opposed to indirect transform methods) of linear and partial differential equations with constant coefficients, and of certain linear partial differential equations with variable coefficients. In these three problems we have actually three operational calculi. A discussion of such an operational calculus leads to the discussion of functionals on sets of infinitely differentiable functions. These are generalized functions. The class discussed in this book is D.', which is shown to be a space of infinitely differentiable generalized functions. This space, nicely, contains the Dirac delta, the theta function, and the delta functions of Feynman.

There is a heuristic introduction to generalized functions and operational solutions of linear differential equations with constant coefficients. The class of generalized functions (g.f.'s) discussed is defined as a space of functional limits of sequences of functionals on piecewise continuous functions—much as Cantor defines the real numbers in terms of sequences of rational numbers. This is a simplified and more readable version of Temple's approach based on Schwartz' classic papers.

The operational calculus so defined is used to prove a fundamental existence and uniqueness theorem for differential equations with constant coefficients. Green's functions for linear boundary value problems are also discussed in this light.

There are a few, more formal, chapters on the fundamental structure theorems for g.f.'s; the proofs are by classical analysis and rather neat. The first volume ends with a discussion of Laplace transforms on g.f.'s of this class, and with a g.f. version of Fourier series—something of a concession to the indirect method of solution.

This interesting work has a companion volume in preparation, to deal with classes of g.f.'s for which simple operational calculi are valid; the sophistication involved can be expected to include some analytic function theory not demanded in the first. The high standards of rigor, maintained in a monograph of good readability, whet the appetite for the second volume.

Introduction to Atomic and Nuclear Physics (2nd ed.) by Rogers D. Rusk. 470 pp. Appleton-Century-Crofts, New York, 1964. $8.75.
Reviewed by Bruce W. Shore, Harvard College Observatory.

The student overwhelmed by the tedium of inclined planes, rotating tops, and vibrating strings of general physics will find this book by Professor Rusk a welcome change. The author's approach is primarily descriptive rather than deductive, and he provides a good survey of the contemporary view of atoms, nuclei, and matter with a minimum of formality and mathematics. Although differential equations such as the Schrödinger equation and the equation of radioactive decay make an appearance, the student needs no more than a mastery of algebra to follow this text. The laws of electricity and magnetism are carefully reviewed as they are introduced, and the author's physical arguments do not rest heavily upon assumed familiarity with classical physics. Mks units are used consistently, with some of the more common atomic constants given in cgs units as well.

This book touches a broad and surprisingly current list of topics, following the general outline so successful with Richtmyer, Kennard, and Lauritsen. Such subjects as the Mössbauer effect, trapped "Van Allen" radiation, and the "strangeness" quantum number are placed into perspective in a general picture of the nature of matter. A lengthy chapter on various types of particle accelerators, a photographic gallery of charged-particle tracks, and a section on the classification of "fundamental particles" should be particular attention getters.

Each chapter concludes with one or two dozen questions for the students, both the "show that . . ." type, as well as numerical computation. Answers for odd-numbered questions appear in the back of the book. A good list of references follows each chapter, ranging from the *Scientific American* to standard graduate reference texts. (The reference to Heitler's *Quantum Theory of Radiation* seems inappropriate in this text, however.)

With the innumerable books on "modern physics" now available as texts, a choice is largely a matter of personal taste. I found this an exceptionally pleasing book, well written, with well-drawn contemporary illustrations. The author mentions the background of important discoveries without belaboring historical wrong turns. Apart from its use as a text, this book can provide a useful supplement to a general chemistry course, and can be read with profit by students of engineering and physical science who are curious about numerous articles on physics in the popular press. I particularly recommend this book for the shelves of college libraries.

Les Liquides simples. Théories et Données expérimentales. By M. Arnold Münster. 77 pp. Gauthier-Villars, Paris, 1964. Paper 16 F.
Reviewed by Stuart A. Rice, University of Chicago.

The theory of liquids has made great strides in the last five years. Indeed, the classical cliché that the gaseous and crystalline states are well understood but the liquid state is not understood at all can no longer be considered accurate.

The book under review is essentially the contents of four lectures by Professor Münster, delivered in 1962.