

BOOK REVIEWS

Lectures in Theoretical Physics, Volume 3 (U. of Colo. Summer Inst., Boulder, 1960). Wesley E. Brittin, B. W. Downs, Joanne Downs, eds. 531 pp. Interscience Publishers, Inc., New York, 1961. \$11.00. *Reviewed by Nandor L. Balazs, State University of New York, Long Island Center.*

DURING each of the summers since 1958 a series of lectures has been delivered at the Summer Institute for Theoretical Physics of the University of Colorado. These lectures have been published subsequently in book form. While each year's lectures have been excellent, the collection in this volume is so brilliant that one does not know whom to thank more: the organizers of the Summer Institute, for bringing this about, the lecturers for their insight, or the publisher for making it available so fast. This volume should be made required reading for the Editorial Board of the *Reviews of Modern Physics*. Why can we not encounter reviews there like these?

The articles are grouped neatly into four sections. The first three are field theory, collision processes, and statistical mechanics of irreversible phenomena, while the fourth stands alone and is a marvelous demonstration of how simple physics is if you possess the penetrating insight of Victor Weisskopf. First he discusses the intriguing phenomenon that in a photograph of a fast-moving object which is emitting radiation, the image would appear not Lorentz contracted, but rotated through a certain angle. (Weisskopf quotes a 1959 paper by Terrell for this discovery; however, in 1951, I heard this phenomenon explained by John L. Synge in Dublin. It seems a time-honored custom in special relativity that phenomena connected with contraction are first discovered in Ireland, left unpublished, and rediscovered later; vide Fitzgerald-Lorentz contraction.) After this, Weisskopf gives a simple analysis of Mach's principle and gravity waves, the influence of the electromagnetic *potentials* on the wave function, the Mössbauer effect, the chemical bond and cohesion in metals, pion-nucleon scattering, low-energy nuclear physics, nuclear matter, and nuclear reactions! Field theory is represented in different disguises. Aage Bohr gives a simple and clear presentation of causality and dispersion relations; R. Haag discusses the canonical formulation of quantum field theory, making use of functional methods; Kurt Symanzik uses Green's-function techniques in deriving nonperturbational consequences in a nonlinear quantum theory of fields, while Neil Ashby applies Green's-function techniques to the many-body problem. Scattering theory is represented by two papers: the formal theory of collision processes by R. Haag and the scattering of electrons on atoms by B. L. Moiseiwitsch.

During the last ten years, there has been a great upsurge of interest in statistical mechanics. Four articles deal with these topics. Melville Green provides a valuable introduction to the use of generating functionals in statistical mechanics. This is especially helpful since ample use is made of generating functionals in the Russian literature and, until now, no simple introduction has been available in English. Elliott Montroll's paper gives a survey of three topics: the problem of Poincaré cycles versus irreversibility, the derivation of phenomenological equations from the dynamical equations of motion, and the solution of certain phenomenological equations. Two other lectures deal with the derivation of the phenomenological equations from the dynamical equations. Radu Balescu treats the method developed by Prigogine and his school. Robert W. Zwanzig develops a new method to deal with this problem. It is truly remarkable how his approach avoids the complicated combinatorics which are the wages of sin in the other graph-theoretical schemes.

Let me urge once more all physicists to buy, read, and enjoy this volume.

Problems of Continuum Mechanics. Contributions in Honor of the Seventieth Birthday of Academician N. I. Muskhelishvili. J. R. M. Radok, ed. 601 pp. Society for Industrial and Applied Mathematics, Philadelphia, 1961. \$10.50. *Reviewed by E. H. Dill, University of Washington.*

SPACE does not allow a review of each of the 49 separate articles which form this volume. Each article is a detailed treatment of some very specialized aspect of continuum mechanics. The list of authors, who are located in several countries around the globe, includes many recognized authorities in the field of applied mechanics.

The topics treated are diverse—including creep, crack formation, viscous flow, thermoelasticity, viscoelasticity, soil mechanics, shells, wave propagation, and the theory of integral and differential equations—but most articles are related to solid mechanics. Some are surveys of a special area while others present new solutions to special problems. Nearly all are valuable contributions to the literature and some should become classics.

Anyone interested in a branch of continuum mechanics should find at least one article of interest. In addition, this volume will be a frequent source of reference by future researchers.