the other limit of low-Knudsen number or slightly rarefied flows. The boundary conditions are derived in the same way as Patterson does in his book. After a brief discussion of the Burnett and Grad equations, solution of the Couette flow problem is based upon the Navier–Stokes equations. The boundary-layer equations are used for the flow over a semi-infinite flat plate in slip flow and in hypersonic flow. This chapter ends with the problem of supersonic flow around a blunt-nosed body. Again it is the solutions of Russian authors that is stressed.

The fourth chapter considers approximate solutions of those particular problems that have been found for arbitrary Knudsen number. There are very few of these transition-flow problems. One is the structure of a plane shock wave in steady flow using the Mott–Smith moment method. Another is plane and axisymmetric Couette flow, which are also solved by the use of moment equations. There is finally a discussion of Koshmarov's solution of Rayleigh's problem using the two-stream distribution functions of Mott–Smith.

All in all, this is a pretty good introduction to the theory of rarefied gas dynamics. It brings together under a single cover many widely scattered papers that, published over the years, contain solutions of the more elementary problems in this field. Approximate solutions of some of the more difficult problems, numerical solutions, Monte Carlo techniques, as well as all experimental results, are left out; the interaction of the gas with a solid surface, which leads to the boundary conditions, is inadequately treated. Additional references given by the translation editor help somewhat.

* * *

The reviewer is a professor of aeronautics and astronautics at the University of Washington. He has published several papers in rarefied gas dynamics and teaches a course on the subject.

Maze of many-body theory

THEORY OF FINITE SYSTEMS AND APPLICATIONS TO ATOMIC NUCLEI. By A. B. Migdal. Trans. from Russian. 319 pp. Interscience, New York, 1967. $17.50

by JOHN L. GAMMEL

With the publication of this book, another of the contributions to many-body theory first published in the Russian language becomes available in English. This book may be grouped with Kirzhnits's *Field Theoretical Methods in Many-Body Systems* (Pergamon Press, 1967), Abrikosov's, Gorkov's, and Dzyaloshinski's *Methods of Quantum Field Theory in Statistical Physics* (Prentice-Hall, 1963), and Bonch-Bruevich's and Tyablikov's *Green Function Methods in Statistical Mechanics* (North Holland, 1962) to form a reasonably complete account of work along these lines in the Soviet Union up until approximately 1964.

The book does not represent an effort to derive all properties of finite nuclei from the two-nucleon interaction (and, of course, the Schrödinger equation). Kirzhnits refers to this book as a source of material that he omits relating to phenomenological aspects of many-body field theory. The idea is, as stated in the beginning of the introduction, that a number of quantities describing the simplest excitations and interactions between these excitations are introduced as phenomenological parameters and that the relationships between other quantities are rigorously derived. The author compares this procedure to procedures currently used in quantum field theory. I suppose he has in mind, for instance, the introduction of ρ-meson and a ρ-meson and a ρ-nucleon coupling constant and then working out some property of the nucleon–nucleon interaction from one-ρ exchange.

The book consists of three chapters (there is a fourth that consists of very brief abstracts of papers on nuclear theory) entitled (1) "Green's Functions in the Study of Fermi Systems," (2) "Fermi Systems in an External Field," (3) Applications to Nuclear Physics." One may expect that chapters 1 and 2 will overlap considerably with material already available (not only in Kirzhnits, Abrikosov and colleagues, and Bonch-Bruevich and Tyabikov but also in many other places–for example, Kadanoff's and Baym's *Quantum Statistical Mechanics*, Benjamin). Nor is chapter 3 an altogether unique English-language account of A.B. Midgal's work. In the *Proceedings of the International School of Physics Enrico Fermi*, Varenna, Italy, Course 36 edited by Claude Bloch "Many-Body Description of Nuclear Structure and Reactions," Academic Press, 1966), Migdal has a 63-page account of his work, and some of

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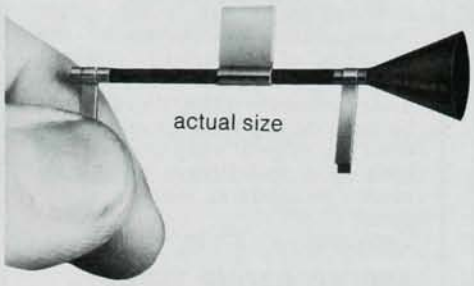

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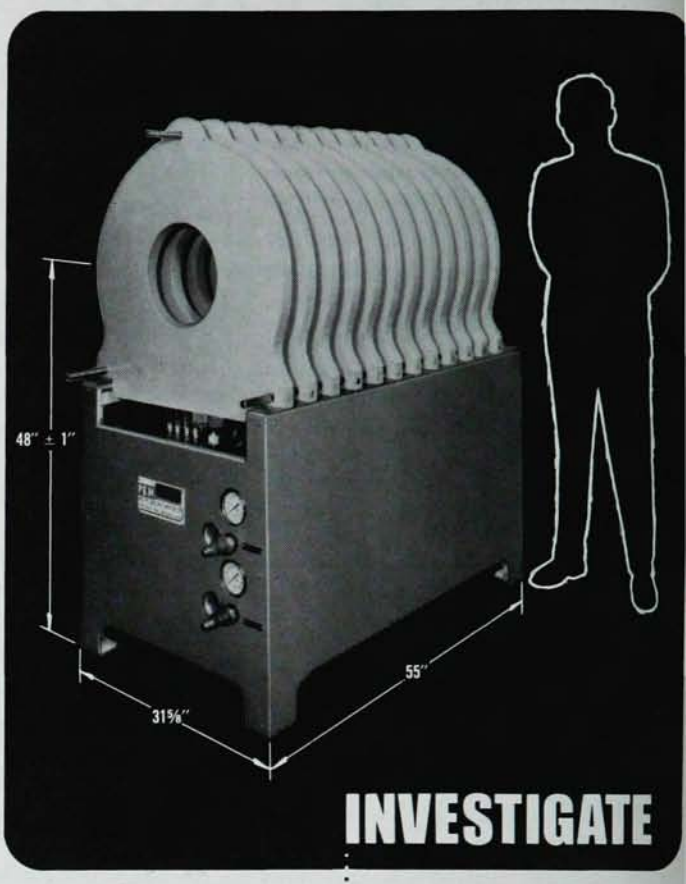

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the table comparing results of calculation that appear there do not appear in the book under review.

When I consider the maze of material that is available, what shall I say? I ought to be able to say read this and not that. But I can not. And yet I have to conclude that it is well that Migdal's book is available in English.

* * *

The reviewer is with Los Alamos Scientific Laboratory.

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Theory of Finite Groups. Richard Brauer and Chih-Han Sah, eds. (Howard Univ., May 1968) 263 pp. W. A. Benjamin, New York, 1969. $12.50

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Problems in Geophysics Relating to the Crust of the Earth. The Geophysics Research Board, eds. (Osmania Univ., Hyderabad, India, 30–31 Jan. 1964) 223 pp. National Geophysical Research Institute, Hyderabad, India, 1966.

Déformation Plastique des Metaux et Alliages. By G. Champier and G. Saada. 318 pp. Masson et C^{ie}, Paris, 1968. 80F

Chemical Reactions in Electrical Discharges. Robert F. Gould, ed. (Miami Beach, Fla., 11–13 April 1967) 514 pp. American Chemical Society, Washington, DC, 1969. $1500

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Introduction to Quantum Chemistry. By Jay Martin Anderson. 445 pp. W. A. Benjamin, New York, 1969. $14.95

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Handbuch der Physik, Vol. XVII/1: Magnetism. (In English and German) S. Flugge and H. J. P. Wijn, eds. 592 pp. Springer-Verlag, New York, 1968. $42.00

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ASTRONOMY, SPACE, GEOPHYSICS

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