used extensively, and methods based on decoupling of equations for Green functions are only briefly mentioned. Both in its scope and in the techniques preferred this book is more like my own book than it is like more recent treatments of the subject.

The first two chapters on single-particle approximations and on atoms and molecules introduce Hartree-Fock theory and the Dirac density matrix, and give some useful applications. Chapters on second quantization and perturbation theory develop the graphical notation. The chapter on Fermi fluids contains a particularly interesting treatment of the electron gas, and a brief exposition of Landau's theory of liquid ^{3}He. There is a chapter on Brueckner's theory of nuclear matter. The chapter on superconductivity is clear, but it is wrong (or perhaps oversimplified) in a few places. A number of different approaches to the many-boson problem are introduced in the next chapter. The last two chapters deal with statistical mechanics and with Green functions.

It may be that this book will prove to be the best introduction to the subject. Other books are too short, too specialized or too formal. The only major topic omitted is the theory of nuclear models, for which some of the methods mentioned in this book have proved very useful.

D. J. THOULESS

ASTRODYNAMICS DOUBLE

An Introduction to Astrodynamics

By R. M. L. Baker, jun., and M. W. Makemson. Pp. xiii + 439. (New York and London: Academic Press, 2nd edition, 1967.)

Astrodynamics

Applications and Advanced Topics. By Robert M. L. Baker, jun. Pp. xiii + 540. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1967.) 132*s*.

THIS pair of books is not concerned with the dynamics of stars but with "the engineering or practical application to astronautics of celestial mechanics and allied fields, such as high-altitude aerodynamics; geophysics; and electromagnetic, optimization, observation, navigation and propulsion theory". Most of the material is, in fact, drawn from traditional topics on celestial mechanics and spherical astronomy, but there is much about recent developments in these and related fields that is not conveniently available elsewhere.

The introductory volume covers two-body motion, astronomical co-ordinate and time systems, descriptions of the motions of minor planets, meteors, comets and the Moon, and brief reviews of the determinations of astronomical constants, planetary masses, and properties of the Earth's atmosphere. The advanced volume covers orbit determination and improvement, the nature of perturbing forces on space-vehicles, and the methods of numerical integration for the prediction of orbits. There is an introductory chapter on the analytical development of theories of motion; the last two short chapters are concerned with lunar and interplanetary trajectories. In both volumes there are glossaries of terms and appendices covering various techniques in numerical analysis and other special topics.

About twenty-five per cent of the text of the new advanced volume has been transferred from the first edition of the introductory volume. The second edition now covers a much more restricted range of topics, but, even so, it is longer than the first edition owing to the inclusion of additional detail, numerical examples and exercises; the definition of astrodynamics has also been stretched to include some new topics, including "anomalistic observational phenomena", otherwise known as unidentified flying objects.

These books are primarily intended for use as university textbooks, but it is doubtful whether many courses with such a practical emphasis will be found outside the United States. The authors have gone to a great deal of trouble to emphasize the applications of the topics considered and to explain and justify matters that are often glossed over; these books should therefore provide useful supplementary reading for more conventional courses. Naturally, there are many points of detail that could be criticized, but perfection over such a wide and rapidly developing field is hardly to be expected. It is a pity though that more care was not taken over the long lists of references that have presumably been included to widen the appeal of these textbooks. There is a great deal of unnecessary duplication between the two lists, many of the references are not even mentioned in the text (or else the author index is grossly deficient), and some are so trivial or obscure as to be useless. Shorter, but carefully selected, lists would be much more useful.

The authors acknowledge their debt to Professor Samuel Herrick of the University of California at Los Angeles, and certainly his approach, notations and techniques are evident in many chapters. It is such a pity that we still have to wait for the long-promised publication of his book on astrodynamics.

G. A. WILKINS

TRIGONOMETRIC SERIES

Oeuvres Mathematiques

By Raphaël Salem. Pp. 645. (Paris : Hermann, 1967.) 90 francs.

IN this volume, Hermann have collected the seventy-two mathematical papers of Raphaël Salem, including those of joint authorship, together with his thesis *Essais sur les séries trigonométriques* and his review of Zygmund's *Trigonometrical Series*. There is also an excellent survey of the papers, by Kahane and Zygmund, and a preface in which Zygmund gives a fascinating biographical sketch of Salem, but naturally the books *Algebraic Numbers and Fourier Series* and *Ensembles parfaits et séries trigonométriques*, the latter written in collaboration with J.-P. Kahane, have not been included.

Salem was born and brought up in Greece. When he was fifteen his father, a well known international lawyer, moved to Paris, and in 1919 Raphaël graduated from the law school there. He had simultaneously been studying engineering and mathematics, under Hadamard, and chose to graduate in these subjects in 1921 rather than proceed to a doctorate in law. Nevertheless, possibly under family influence, Salem then entered banking as a career. His interest in mathematics grew stronger, and eventually took up most of his spare time. Working alone, he had written nearly twenty papers on Fourier series by 1938, when Denjoy persuaded the then successful bank manager to seek a doctorate in mathematics. After gaining this in 1940, his thesis being the one mentioned here, Salem had to leave wartime France, and he eventually settled in Cambridge, Massachusetts. He returned to live in France in 1956.

Salem's interest in the application of ideas from number theory to trigonometric series led him to proofs which were elegant and quite original, and frequently enabled him to produce an ingenious counter-example to a conjecture. It also led to the fine contributions of his maturity to the theory of sets of uniqueness, the papers on perfect sets, algebraic numbers, singular measures, and absolute convergence of trigonometric series. The volume contains a wealth of other papers, on such topics as lacunary series, series with random signs, and Riemann sums, and researchers in trigonometric series and other fields will find it a source of inspiration for many years to come.

The papers have clearly been reproduced photographically, on the whole very successfully, but one is not told this or the meaning of the A, B, C classification of Salem's