SHORTER NOTICES

Grundlagen der Hydromechanik. By L. Lichtenstein. Berlin, Springer, 1929. xii+506 pp.

This book by the well known mathematician of the University of Leipzig constitutes volume 30 of the Springer collection, Die Grundlehren der mathematischen Wissenschaften in Einzeldarstellungen. As might be expected, it is very different from every other treatise on hydrodynamics. For the author, the fundamental problem of hydrodynamics is the integration of certain systems of partial differential equations with assigned boundary conditions, and he calls to his aid all the resources of modern mathematics. This makes necessary a large amount of preliminary material; the first chapter is devoted to topology, the second gives a brief but interesting account of vector analysis, the third treats potential theory, a subject to which the author has made valuable contributions, and so on. It is not until we reach page 290 that the equations of motion are derived. One of the most interesting and important chapters of the book is that devoted to the propagation of discontinuities, a difficult subject, the understanding of which is essential to any comprehension of wave motion. The last chapter is devoted to existence-theory questions.

The book could not profitably be recommended to a beginner, but to one who has studied Lamb and who wishes to understand more fully the mathematical foundations of the subject it should prove very valuable. For practical applications of the theory one must still turn to Lamb and to some such book as Tietjens' account of Prandtl's lectures on hydro- and aero-mechanics. The printing has the degree of excellence we have come to expect in the books of the Springer collection.

F. D. MURNAGHAN

Les Méthodes Nouvelles en Analyse Quantique. By Julien Pacotte. Paris, Blanchard, 1929. viii+139 pp.

The rapid development of the newer quantum theories of atomic structure during the past five years with the differing mathematical methods of the matrix mechanics and the wave mechanics has rendered particularly necessary and desirable the attempt to examine critically the various treatments, correlating them and ascertaining their similarities and differences, so that ultimately a synthesis shall result which may justly be called *the* quantum mechanics. It is a preliminary critical study toward this end which is provided by the present volume, which thus lays no claim to originality in its material content but provides a brief digest of most of the principal work in quantum mechanics through the year 1928.

The author begins with a rapid résumé of the principles of the Bohr theory —the quantum conditions, correspondence principle, etc. At the very outset he inserts comparisons between this early theory and the newer points of view of Heisenberg, de Broglie and Schrödinger. These are rather illuminating to the reader who already has at his command a reasonably thorough knowledge