understood. In his new book, Dr. Ferri gives an account of those pre-war theories (as well as of his experimental methods), describing them as the elementary aerodynamics of the supersonic flow of a 'perfect' fluid, though without making the nature of the underlying physical assumptions, or the extent of their validity, very clear while discussing fundamentals.

Dr. Ferri is probably right, for the purposes of an elementary account, in confining himself to the work of the Continental schools and of a few American writers who have made further investigations along similar lines. Nevertheless, it is a shock to see no reference to British work other than well-known books by Lamb and Rayleigh (whose initials are misquoted, while Kelvin's birthname is misspelt) and the joint papers of Taylor and Maccoll. Again, at times the author's avoidance of modern ideas costs him a lot of space. Thus he includes the Kármán and Tsien numerical solutions of integral equations for the flow past bodies of revolution, and the (corrected) Schlichting approach to the lift of trapezoidal wings; in both cases modern theories are simpler, and give equally good information about a much greater variety of flows (for example, slender bodies not of revolution, lift of wings of any plan-form). He is also wrong about certain points; in calculating the pressure on a body of revolution he neglects the energy of radial flow, while in estimating the shock position in plane steady flows from the adiabatic solution he places it firmly on the limit line itself. But it is arguable that to have included more of the modern theories of (say) flow past wing–body combinations, flow in boundary layers, shock dynamics or oscillatory flows, without a full account of the earlier work on which they were based, would have overtaxed aspirants to knowledge in this field. This is perhaps not true of the experimental information, however, which is mostly based on Dr. Ferri's own excellent work, but where modern wind tunnels have produced further data.

The book is sound on the method of characteristics, even in difficult problems with vorticity and/or rotational symmetry, though in the latter case the full difficulty of application near the axis in certain problems is concealed from the reader. An account of static tubes, total head tubes, interferometers and *Schlieren* apparatus is thorough though brief, and the book is clear about nozzle design, and the starting difficulties with supersonic diffusers. The flows past cones of different angles at different Mach numbers are clearly exhibited by a variety of suggestive diagrams, though no reference is made to the recent computations at the Massachusetts Institute of Technology. Again, the results of the theories of the drag of supersonic wings are very fully displayed; and tables of the relations between physical quantities in adiabatic flow, and across shocks, fill forty pages. Thus it will be seen that so large a mass of useful information has been included that a serious complaint that one man has been unable to maintain the same high standard throughout his account of so large a field would be out of place.

The only comparable books in existence are that of Liepmann and Puckett, which is more elementary especially in its mathematical demands, and that of Courant and Friedrichs, which is more concerned with non-linear wave propagation in general than with aerodynamics in particular. The new book will be valuable groundwork for students of a rapidly expanding subject. M. J. LIGHTHILL

QUANTUM MECHANICS

Quantum Mechanics

By Prof. Leonard I. Schiff. (International Series in Pure and Applied Physics.) Pp. xii+404. (New York and London: McGraw-Hill Book Co., Inc., 1949.) 33*s*.

THE author writes in the preface to this book: "The book is intended to serve as a text on the graduate level and also as a reference book" It is difficult to do both these things well.

A reference book has to be reasonably complete, and the author has little freedom in the choice of material. In this respect, I found the book amazingly rich, containing much more material than its volume would indicate. The author starts the four hundred pages with an introductory chapter on the physical bases of quantum mechanics, containing the experimental background, the Bohr–Sommerfeld quantization rules, etc. The last seventy pages of the book are devoted to the quantization of wave fields and quantum electrodynamics. Between these portions, the book contains the usual topics like the Schrödinger wave equations, matrix formulation, approximation methods, radiation theory and collision problems. There is even a chapter on atomic nuclei and molecules, and also a fairly complete treatment of relativistic wave equations.

Since knowledge of neither specialized mathematical tools nor quantum mechanics is assumed, any book covering such extensive material must be economically written. Indeed, the writing is very careful and succinct, and some topics are shifted to the problems. Such an economy may be discouraging to the student. As in an uncertainty principle, the virtues of this book are necessarily connected with its faults. It will be an excellent guide for anyone who looks for broad knowledge and is willing and able to do the hard thinking for himself. It will be less valuable to those interested in general ideas rather than details. Indeed, it is impossible nowadays to give both. If we admit that the impossible cannot be done, then Prof. L. I. Schiff's book should be regarded as a valuable contribution to the literature of quantum mechanics. L. INFELD

DIELECTRICS IN PURE AND APPLIED SCIENCE

Theory of Dielectrics

Dielectric Constant and Dielectric Loss. By Prof. H. Fröhlich. (Monographs on the Physics and Chemistry of Materials.) Pp. vii+180. (Oxford: Clarendon Press; London: Oxford University Press, 1949.) 18s. net.

A KNOWLEDGE of the dielectric properties of materials is valuable in both pure and applied science; for the electrical engineer its importance is obvious, and for the pure scientist it throws light on molecular structure. The subject is one in which careful reasoning is essential, and it is easy to reach false conclusions; this is particularly so when considering the relation between the dielectric constant and atomic polarizability. It is therefore of great value to have this book by Prof. H. Fröhlich, who is a master of the subject and well acquainted with its difficulties. The book is intended mainly for applied scientists; but any man of science working in this field will wish to have it.