possible to check by experiment, the agreement between his theoretical and the experimental results has been good. The purposes of the book are to show that the nomographic method is suitable for solving a large number of problems arising in the design and construction of electrical machines and also that the method may be used with some profit to solve other allied problems; some of these he lists in the final chapter.

The first chapter deals with the shortcomings of the methods generally used in solving magnetic circuit problems, followed by chapters showing how the nomographic method may be applied to ferromagnetic bodies of varying cross-section and series connected bodies.

Chapter 4 considers the much-debated problem of the magnetic relations in the region of the tooth and the magnetically parallel slot. This leads naturally to the problems in the next chapters involving the series connexion of a tooth and a magnetically parallel slot, the magnetic relations in the region of tooth, slot and air-gap, the problem of saturated pole-shoes and the estimation of the transverse slot fluxes due to saturated teeth.

In Chapter 9, it is claimed that the 'exact' eddy current and hysteresis losses in rotating electrical machines may be calculated by the nomographic method. The word 'exact' is perhaps the choice of the translator rather than the author, for it is difficult to see either how the losses could be exactly calculated, or how they could be exactly measured in order to check the calculations. However, methods are developed for calculating the various losses in the different parts of the magnetic circuit and also in the copper conductors.

Throughout, the mathematics is set out in great detail, with many worked examples to aid understanding, and to illustrate the use of the three sheets of nomograms which are included at the back of the book.

The units used are those of the C.G.S. E.M.U. system, which might provide some initial difficulty to those used to the M.K.S. or mixed industrial unit systems. It is pleasing to note that Carter's coefficient is mentioned, so presumably Britain is credited in the U.S.S.R. with some original work. The book was printed in Hungary—this is reflected in the standard of printing, which is not quite so good as one generally expects in a modern text-book. No bibliography is provided This is unfortunate, since it would be interesting to see what other publications had appeared in connexion with this subject.

To those engaged in any branch of non-linear magnetic circuit work, including machine designers, this book should prove to be a useful introduction to the nomographic method. Many will find their problems already solved for them and set out in great detail. One looks forward to more publications in this particular field.

E. M. Freeman

QUANTUM MECHANICS

Quantum Mechanics for Mathematicians and Physicists

By Prof. Ernest Ikenberry. Pp. xii + 269. (London and New York: Oxford University Press, 1962.) 64*s*. net.

Mathematics for Quantum Mechanics

An Introductory Survey of Operators, Eigenvalues, and Linear Vector Spaces. By Dr. John David Jackson. Pp. x + 97. (New York: W. A. Benjamin, Inc., 1962.) 3.50 dollars, paper; 4.75 dollars, cloth.

ACCORDING to his preface, Prof. Ikenberry's intention is to provide a text on quantum mechanics for graduate mathematicians with little or no background in physics and for physicists with a minimum of mathematics. Although the former may feel forsaken by the detailed physical content of the first three chapters on the dual nature of light, the dual nature of matter and the pictorial description of the atom, they will find themselves well catered for in the remainder of the book. The physicist, on the other hand, will visit the rough in the chapters on wave equations and wave packets, observables and linear operators and quantum mechanical operators but, with diligence, at the end will find his mathematical knowledge no longer minimal.

After the introduction of the Schrödinger wave equation in Chapter 8, this book deals with most of the topics which are usually included in books of this kind, the harmonic oscillator, the hydrogen atom and spin, and ends with a very good introduction to relativistic quantum mechanics. I myself found the chapters on sectionally constant potentials and eigenfunctions and eigenvalues quite excellent in presentation, scope and completeness. Criticism can, however, be directed at the chapter on time independent perturbation theory which is ludicrously short, only six pages, and completely ignores some simple applications of this technique which are of considerable physical interest. Indeed, in general, the attention of the reader is not sufficiently directed to the physical interest of the topics considered. Comparable books on quantum mechanics contain sections on the quantum mechanics of simple many-particle systems, on applications of variational principles and on simple collision theory. These are omitted here.

Despite these defects, this book will provide teachers of quantum mechanics with a valuable manual. There are 352 problems listed to form an integral part of the text, and abundant references are provided to guide the student in supplementary reading. There seem to be few errors or misprints, and the presentation and notation are clear and precise. One can hope, however, that the use of the symbol "Lap" for the Laplacian will not become popular.

Dr. Jackson's monograph is a mathematical supplement to the course in quantum mechanics for first-year graduates which he gives at the University of Illinois. He can justifiably claim to have presented concisely the mathematical methods of quantum mechanics in a form which emphasizes the unity of the different techniques. Although Prof. Ikenberry's and Prof. Jackson's books are being jointly reviewed they are scarcely companion pieces, and it is clear that the courses in quantum mechanics given at Auburn and Illinois are considerably different in emphasis. This is not a criticism of either course but is to make the point that maximum value from Prof. Jackson's mathematical supplement will only be derived when read along with a companion volume which covers physical topics requiring this kind of mathematical development. Such treatises usually provide their own mathematical supplement, either in the text or in appendix form, as in the case of Prof. Ikenberry's book. Accordingly it is difficult to believe that this book will command a wide sale among students, most of whom will prefer a single comprehensive treatment of the physics and mathematics of quantum mechanics.

Considered, however, on its own as an applied mathematical text-book with chapters on eigenvalue problems in classical physics, orthogonal functions and expansions, Stum-Liouville theory and linear operators. and linear vector spaces, it is very good. Prof. Jackson has a way of illustrating and developing mathematical concepts which I found refreshingly novel. The reader will take particular pleasure in the use of the Schmidt process of orthogonalization to construct the important polynomial functions of mathematical physics. Problems are interspersed throughout the text, and appendixes on the properties of the special functions are provided. Teachers and students will find the tables of roots of the Bessel functions especially useful, and at last someone has thoughtfully provided a key to the choices of spherical harmonic phase factor used in various standard texts on quantum mechanics. This key could be more comprehensive, but it seems clear that in this connexion Prof. Ikenberry prefers to be with the minority. A. L. Stewart