Nowe Drogi Nauki: Kwanty i Materja. Napisal Dr. Leopold Infeld. (Z Dziedziny Nauki i Techniki, Tom 2.) Pp. x+284+6 plates. (Warszawa: *Mathesis Polskiej*, 1933.)

DR. INFELD'S "New Developments in Science" presents to Polish readers an account of the most recent advances in physics and chemistry, particularly in the domain of sub-atomic phenomena and the structure of matter. The author opens with a reference to Pascal's views (1647) on the aims of physical inquiry and, after a brief historical sketch, proceeds to describe current ideas concerning matter and energy, X-rays, the quantum theory and the new wave mechanics. Attention is directed to the important discoveries of the last few years, including the Compton and Raman effects.

The book, which is well-printed and well-bound in cloth, is illustrated with some good photographs and should serve to acquaint Polish students with the latest developments and discoveries in the borderland of physics and chemistry.

Physics

Introduction to Theoretical Physics. By Prof. John C. Slater and Prof. Nathaniel H. Frank. (International Series in Physics.) Pp. xx+576. (New York: McGraw-Hill Book Co., Inc.; London: McGraw-Hill Publishing Co., Ltd., 1933.) 30*s.* net.

THIS is, in some ways, a remarkable book. The authors are convinced that the teaching of physics by way of a series of separated and more or less watertight courses prevents a student from understanding the unity of physics. Moreover, many problems concerning the structure of matter are necessarily discussed in terms of wave mechanics, and a knowledge of wave mechanics again demands a thorough grounding in classical physics. The authors, therefore, with amazing courage, have endeavoured to build up, in the compass of less than six hundred pages, a consistent and comprehensive picture of modern theoretical physics which shall be something more than a collection of disjointed chapters on unrelated topics.

This task requires some forty-two chapters and the authors are not afraid to begin with such elementary notions as are needed for a brief (and possibly to the pure mathematician inadequate) discussion of power series and Taylor's theorem, exponential methods for the solution of differential equations illustrated by simple physical applications, damped and forced oscillations, vector forces and potentials. Fifty-eight pages of this work bring us to Lagrange's and Hamilton's equations, phase space, precessional motion, vibrating strings and membranes, elasticity, fluid and heat flow. Thence we are led to potential theory, Maxwell's equations, electromagnetic waves, and electron theory. Huygen's principle and Fresnel and Fraunhofer diffraction phenomena are disposed of in twenty-six pages, and the way is now clear for discussions of wave mechanics, Schrödinger's equation, the correspondence principle, matrices and perturbation theory. Then within the limits of about a hundred and fifty pages the authors find space to discuss compactly but very clearly some of the details of atomic and molecular structure, equations of state, nuclear vibrations, collisions, electronic interactions and electronic energy of atoms and molecules, Fermi statistics, and dispersion, dielectrics and magnetism. The book is a remarkable example of unhurried and unostentatious compression, and the authors are to be congratulated on the result of their endeavour "not to teach a great collection of facts, but to teach mastery of the tools by which the facts have been discovered and by which future discoveries will be made".

The book is admirably produced. Each chapter is followed by a set of problems, and judiciously selected references will aid the student in his future reading. A. F.

The Electromagnetic Field. By H. F. Biggs. Pp. viii+158. (Oxford: Clarendon Press; London: Oxford University Press, 1934.) 10*s.* 6*d.* net.

AT its lowest, the mathematical instrument of vector algebra is a labour-saving device, and in dealing with electromagnetic theory time spent in learning how to use the instrument is amply repaid. In many general textbooks on electricity and magnetism the introduction of a mathematical technique which may be unfamiliar to probable readers is avoided; and students of physics often find considerable difficulty in bridging the gap between the Cartesian treatment and the vector treatment usually adopted in more advanced treatises. It is to such students that this book of Biggs is addressed.

The use of vector notation in the representation of static fields is first described, and the circuital relations are developed. Div, curl and related vectorial operators are discussed in connexion with Maxwell's equations, and the relations involving the general scalar and vector potentials are then considered. Many applications are given, and there are neat proofs of a number of well-known theorems. In little more than a hundred pages the author develops practically all of the more important mathematical relations of classical electromagnetic theory. A useful table shows the connexion between the relations discussed, and indicates clearly those which are derived directly from experiment.

The last chapter, which is concerned with the Lorentz transformation, gives an admirable introduction to tensor methods, and to the relativistic four-dimensional formulation of the theory.

The book as a whole should be most useful to all those physicists who can appreciate mathematical methods most readily when they are presented in close connexion with physical applications. E. C. S.