Wave Mechanics; Advanced General Theory. By J. Frenkel. Oxford, Clarendon Press, 1934. viii+525 pp.

This second part of a general treatise on wave mechanics is primarily devoted to the "mathematical development of the general ideas underlying the new mechanics." The following are the headings of the nine chapters: *Classical mechanics as the limiting form of wave mechanics*; *Operators*; *Matrices*; *Transformation theory*; *Perturbation theory*; *Relativistic remodelling and magnetic generalization of the wave mechanics of a single particle*; *The problem of many particles*; *Reduction of the problem of a system of identical particles to that of a single particle*; *Second (intensity) quantization and quantum electrodynamics.* The name of the author is sufficient guarantee of the interest of the book to students of wave mechanics and the work reflects credit upon both the author and publisher. It is inevitable, however, that a comparison be made between the present work and the treatises of Dirac and von Neumann. In such a comparison it is at once evident that Frenkel relies much more than do Dirac and von Neumann upon analogy, and it is the present reviewer's opinion that this reliance is unfortunate. While the analogy between relativistic wave mechanics and Maxwell's electromagnetic theory of light, discussed at length in the book, is interesting, in the end an argument from analogy is helpless before the cant question of the day "and so what?" The book gives a good account of the Pauli theory and of Dirac's four-dimensional matrix theory, and ends with Breit's formula improving the quantum electrodynamics of Heisenberg, Pauli, and Dirac. It is significant that the last paragraph of the book begins as follows: "Now it seems quite certain that this new theory is in principle just as wrong as the old one. . . ."

F. D. MURNAGHAN

Signification de l'Histoire de la Pensée Scientifique. By F. Enriques. (Actualités Scientifiques et Industrielles, No. 161.) Paris, Hermann, 1934. 68 pp.

That scientific concepts can be understood only in terms of their historical development is the thesis of this pamphlet. The author has given a persuasive and vigorous presentation of this "genetic" philosophy of science and of the consequent importance of the history of science. He infers that science is not a body of absolute doctrine but a series of approximations to the truth; that there is a "unity" of all the sciences; that there is a continuity in scientific discovery. The latter point is applied to the background of the Newton-Leibniz controversy. Many other suggestive remarks are made, for example: the genetic analysis of abstract concepts runs counter to the axiomatic approach.

SAUNDERS MACLANE