

SHORTER NOTICES

Introduction à l'Étude de la Mécanique Ondulatoire. By Louis de Broglie.

Paris, Hermann, 1930. xvi+292 pp.

Recueil d'Exposés sur les Ondes et Corpuscules. By Louis de Broglie. Paris, Hermann, 1930. 80 pp.

In these two books the reader will find set forth in lucid form the basic ideas of the new wave mechanics as developed by the author during the period since his epoch-making dissertation of 1924. The German translation of the first volume (which curiously enough appeared in 1929) has already been thoroughly and ably reviewed in this Bulletin by Professor R. D. Carmichael (vol. 36 (1930), p. 459) and hence further notice is unnecessary here.

The second and shorter of the two works is a collection of five rather general, non-mathematical articles and lectures written or delivered by the author during the years 1927-1929, all bearing to a considerable extent on the new wave conception of matter. The first is a historical essay on the work of Fresnel and its significance for modern physics. Written in 1927, it is peculiarly appropriate, since that year marked the one hundredth anniversary of Fresnel's premature death at the very time when his brilliant intellect seemed destined to solve completely the problems of light. The essay is introduced by an admirably succinct account of the historical development of optics to the early part of the nineteenth century followed by a recital of the way in which in the short space of twelve years Fresnel was able to place the wave theory of light on a firm foundation. The difficulties with the wave theory are then discussed together with the rise of the quantum theory with its emphasis on the particle idea. Though the physical basis of Fresnel's theory has long been seen to be untenable, the mathematical treatment of wave motion which he and Hamilton carried through has been of the greatest assistance in the development of the new theory of the past decade.

The second paper, on waves and corpuscles in experimental physics, was originally delivered as an address before the British Association at the Glasgow meeting in 1928. In it de Broglie retraces briefly the chief features of his wave mechanics and their experimental verification by the beautiful researches of Davisson and Germer, G. P. Thomson, and others. This is followed by a discussion of the precise physical interpretations which have been given to the matter wave by various workers, including Schrödinger and de Broglie himself. An unusually clear presentation of the Bohr-Heisenberg point of view and the uncertainty principle closes the essay.

The third paper, on the recent crisis of wave optics, is based on a lecture delivered in 1929 before the Conservatoire des Arts et Métiers, and takes up in conversational style the difficulties encountered in reconciling the wave and particle conceptions in optics. The fourth likewise is a short popular article on the interference of electron waves.

The last article, on determinism and causality in contemporary physics, is in many respects the most interesting in the collection since it touches on the