SHORTER NOTICES

Mécanique Analytique et Théorie des Quanta. By G. Juvet. Paris, Blanchard, 1926. 6+153 pp.

Two-thirds of this book deal with general mechanical principles and perturbation theory. The opening chapters are concerned mainly with the Hamiltonian canonical equations and the Hamilton-Jacobi partial differential equation. The style and method of demonstration are usually varied enough from those given in the standard texts on dynamics so that even the discussions and proofs of the standard theorems do not seem hackneyed, but occasionally one feels that the mathematical framework is a bit more elaborate than necessary for understanding most of the literature of the quantum theory. A happy feature is the emphasis that the canonical equations furnish the "characteristic curves" of the Hamilton-Jacobi partial differential equation, for this observation to a certain degree bridges the gap that usually exists between the physicist's presentation of the Hamiltonian dynamical technique and the analysis of general first-order partial differential equations found in such treatises as those of Goursat, Jordan, etc. In Chapter V the separation of variables is considered at some length. The two following chapters are devoted to perturbation theory and the methods of successive approximation developed by Delaunay, Lindstedt, and Bohlin. No attempt is made to delve into the intricate question of the convergence of the trigonometric series. One admires the candor with which Juvet acknowledges that his treatment in Chapter VII follows closely that in Poincaré's *Méthodes Nouvelles de la Mécanique Céleste.* One might wish that all authors were equally frank, for to quote Juvet, "Nous ne croyons pas qu'il suffice de citer un auteur lorsqu'on lui prend tout ce qu'on dit, il convient de dire que tout lui revient." Nevertheless this chapter is of distinct value because it summarizes and brings together material which is rather widely scattered through the various chapters of volume II of Poincaré's treatise. It is indeed interesting that the perturbation technique of the astronomer has lent itself with so little modification to the Bohr theory of atomic structure.

The last third of the book deals with application of dynamics to the quantum theory of atomic structure. The analysis is, of course, entirely on the basis of the old Bohr theory, as it was written before advent of the new matrix dynamics of Born, Heisenberg, and Jordan, or of the wave mechanics of Schrödinger. Chapter XII presents Burgers' first method of proving the principle of adiabatic invariance, and no mention is made of his second method (summarized in an appendix of Sommerfeld's *Atombau*), which in our opinion is simpler once the transformation theory of dynamics has been established. The last few pages contain an interesting discussion of the relative utility of the various perturbation methods developed in Chapters VI and VII, but these methods are not illustrated