

many workers and make the evidence seem a trackless jungle. As Mani says, "The present-day flora and fauna of India [the word is used here in a generic sense to refer to the region] are indubitably the product of such a continual change in the past; they represent the modified descendents of past floras and faunas. The evolution of the flora and fauna must be interpreted in terms of the continual changes in the size, location, configuration, topography, stratigraphy, drainage patterns and other tectonic changes which have taken place in the region in the past." The editor believes, as I do, that, given the evidence of continental drift, the single most important influence on these parameters and hence on biogeographical evolution in the region is the uplift of the Himalayan range.

The book consists of an introduction by Mani and 23 subsequent chapters, 10 of them also by Mani and the remaining 13 by such authorities as the late M. S. Krishnan on geology, L. A. Ramdas on climatology, K. Subramanyam and M. P. Nayar, A. S. Rao, and M. A. Rau on phytogeography, P. Lal on the human hunter-gatherers, and A. K. Mukherjee, whose contribution is a timely and fascinating discussion of recent faunal impoverishment and regression. As an ecologist I regard consideration of the present-day influence of man, as well as of the important role of more aboriginal man in the past, as a necessity in a treatise on biogeography, and I am delighted to see that evolution *in process* in socioeconomic terms has intruded itself between the covers of this work. The sole complaint in this regard is that such information tends to be dated when written, so badly does the world wag these days. The only solution would have been to insert Mukherjee's chapter 12 in loose leaf so that the dismal tale could have been brought up to date at intervals.

Finally, there are a number of chapters on ecology and ecological associations of vertebrates and insects of the Indian region. These are in some ways less valuable, being essentially a tabulation form of ecology reminiscent of the old "Fauna" volumes of the former government of British India series. Holloway's chapter on Indian butterflies takes a broader, less quantitative approach than the others, presumably because of his interests outside the region, in Indochinese and Sunda-land biogeography.

One matter that became of great interest to me in my own work on avian biogeography in this area is the question of Ethiopian affinities, a question that has recently been revived by Moreau in his work on African biogeography. I could wish that more had been said about these affinities or that a more penetrating analysis had been included of the arc of the interchange between Ethiopia and Arabia and the northwest that must have taken place since the end of Miocene times and of the gradual changeover in biota that occurred as the Tethys sea closed. Perhaps this matter is of less interest to these authors, but it remains for a future work to delineate.

At all events this volume should be in every library collecting important source works in that newly reawakened subject, biogeography.

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## Physics in the Early 1900's

**The History of the Quantum Theory.** FRIEDRICH HUND. Translated from the German edition (Mannheim, 1967) by Gordon Reece. Barnes and Noble, New York, 1974. 260 pp., illus. \$20.

The development of the quantum theory and its applications in atomic physics from 1900 to about 1930 has had a very special fascination for physicists, historians of physics, and popularizers of various kinds. The history has been repeatedly retold, by Rubinowicz and Guth, by d'Abro, by Whitaker, by Tomonaga, by Jammer, by Hund—to name only those addressing students of physics primarily. In each case, however, the treatment has been at roughly the same physicomathematical level, has offered roughly the same account of what actually happened, and thus has rendered the history at roughly the same length and depth.

Hund's *Geschichte der Quantentheorie* (1967; Hochschultaschenbuch 200/200a\* of the Bibliographisches Institut, Mannheim), although generally faithful to the canon, is in several respects the best of this group. Hund goes farther than most in offering chapters on post-1926 developments other than indeterminacy. With an extended range encompassed in considerably less than half the volume of Max Jammer's well-

known *Conceptual Development of Quantum Mechanics* (1966), the treatment is necessarily extremely concise. This concision is facilitated by frequent recourse to a logicohypothetic treatment of historical causation. But as Hund is careful not to violate "causality" (temporal sequence) and is usually clear when and where he is representing the development as it might or should or could have been (subjunctive rather than indicative; present rather than imperfect), the historian, though he may find the genre less satisfying, cannot challenge its legitimacy. Neither is Hund's history entirely free of factual errors or wrongheaded contentions, but they do not repose upon those double columns of crenelated footnotes that give Jammer's work the appearance of impregnability. It is, moreover, the best-balanced history of the quantum theory, above all in presenting—as no other history has—the effort to unravel the complex structure of spectral lines in its true historical proportions and perspective, namely, as the avenue "of choice" to the quantum mechanics. Finally it contains rudiments of a social history—which is more than can be said of any of the other histories of the quantum theory. Rather than simply advancing from result to result, Hund regularly stops to look around and characterize the state of the field at a given point in time, in particular pointing up the "crisis" that emerged in 1923 and the "flood of applications" in 1927. This important perspective is belied, however, by the very limited number of original papers and contributors Hund chose to cite. In this respect his account unfortunately caters to the scientists' predilection for a history carried on the shoulders of giants.

The concision of Hund's history and the precision of his choice of words, moods, and tenses—outstanding virtues in the original German—render the book especially vulnerable in translation. The translator was not notably expert or careful in his work. Quite apart from the infelicities and inexactitudes, he has introduced roughly one falsehood or nonsense statement in every two pages. Thus he who takes this translation to hand, though he can learn from it, won't have much pleasure from it.

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