

discussion of the problem of the distribution of electrons in atomic orbits and the spectroscopic method of solution of the problem. The twelfth chapter is a very fine and up-to-date survey of our knowledge concerning X-rays. Finally, in the last chapter the problems of the nucleus are briefly reviewed, and here, in order to appreciate the care with which the book has been written, the reader may be recommended to consider the simple diagram of the magnetic deflection of  $\alpha$ -,  $\beta$ -, and  $\gamma$ -rays and to compare it with the diagrams given in other textbooks. Among the appendices is a table showing the distribution of electrons in atomic orbits, according to Foote, and a table of important physical constants, and an efficient index is provided.

The book is excellently printed and illustrated, and Prof. Richtmyer is to be congratulated upon the appearance of a useful work which may be confidently recommended to teacher and student alike.

L. F. B.

### British Myrmecophilous Insects.

*The Guests of British Ants: their Habits and Life-Histories.* By H. St. J. K. Donisthorpe. Pp. xxiii + 244 + 16 plates. (London: George Routledge and Sons, Ltd., 1927.) 18s. net.

ONE of the most interesting and remarkable features of the biology of social insects is betrayed in the relationships they maintain with other animals living in association with them. A very large number of the latter creatures are myrmecophiles or ant guests and the majority of them are insects. Although British ants number only 35 species, many times that number of myrmecophiles are known to live in a more or less definite biological relationship with them. In some cases they are extranidal, or in other words, the ants seek out their myrmecophiles, while in others they are intranidal, the ants being passive and are sought out by their guests. Mr. Donisthorpe's enthusiasm and energy have enabled him to add 146 species to the myrmecophilous fauna of Great Britain, of which no less than 70 were new to science at the time of their discovery. His intimate knowledge of this subject has enabled him to produce a book that will long remain a standard work.

The volume is arranged so that each order or group of myrmecophiles is dealt with in a chapter of its own. The Coleoptera are by far the most numerous in point of species and, since they are a favourite order with the author, are discussed at length. Five British species are true guests or symphiles, which are tended and often fed and licked

by their ant hosts. The largest number, however, are synoeketes or forms which are indifferently tolerated within the nest: they are represented by members of nine families of beetles, the majority being Staphylinidæ. A small number of species of the latter family are synechthrans, which are hostile in behaviour, forcing themselves on their hosts and usually devouring them or their offspring.

In the chapter on Hymenoptera the relations which ants exhibit with members of their own or of different species are discussed, while the various kinds of Parasitica found within the confines of the nests are enumerated. We know less concerning these than almost any other group of myrmecophiles: some are unquestionably parasitic upon ants, a larger number probably parasitise various other myrmecophiles, but with regard to the majority, little beyond conjectural remarks can be made, and they offer a promising field for exploration by a skilled observer.

In the short but interesting chapter on Lepidoptera, five species of moths are regarded as synoeketes which live within the nest in the rôle of scavengers. The relations between ants and certain Lycænid caterpillars are largely extranidal, the ants seeking out such larvæ wherever they are feeding in order to imbibe their glandular secretions. In the case of *Lycæna arion*, the larva, when in its fourth instar, is carried by ants into the nest, notwithstanding the fact that it lives at the expense of their own larvæ. Other chapters are concerned with Diptera, Hemiptera (three chapters), Acarina, Isopoda, etc., and the book concludes with a bibliography and both authors and species indexes.

A. D. IMMS.

### Our Bookshelf.

- (1) *Comparative Physiology of the Heart.* By Prof. A. J. Clark. (Cambridge Comparative Physiology Series.) Pp. vi + 157. 8s. 6d. net.
  - (2) *The Comparative Physiology of Internal Secretion.* By Prof. Lancelot T. Hogben. (Cambridge Comparative Physiology Series.) Pp. vii + 148. 10s. 6d. net.
  - (3) *Ciliary Movement.* By J. Gray. (Cambridge Comparative Physiology Series.) Pp. viii + 162. 10s. 6d. net.
- (Cambridge: At the University Press, 1927 and 1928.)

HUMAN physiology will ever continue to be the science which will pre-eminently fascinate the mind of man in virtue of the directness and personal character of its appeal. The versatility of man, which has placed less resourceful creatures under his dominion, has also led to the combination of so many physiological processes in a single species that it is not surprising that several of these processes,