

the interaction of radiation with matter to provide the necessary background for the discussion in the succeeding chapters. This is followed by an account of the infra-red spectra of molecules, for which the reader would find it useful to have read *Introduction to Quantum Mechanics* by Pauling and Wilson. The authors have written an excellent comprehensive description of the optical properties of semi-conductors which is illustrated with well chosen data and diagrams. The theory of the optical properties of metals has been making great progress in recent years, which can be seen, for example, from *Proceedings of the International Colloquium on the Optical Properties of Metals and Alloys*, Paris, 1965, much of which is due to the application of the theory developed for semi-conductors. It is therefore a pity that metals have been specifically omitted from the discussion. Dare we hope that, for the next edition, the authors will be persuaded to extend their account to include metals?

The rest of the book is concerned with experimental techniques and applications; a description of infra-red detectors is followed by a clearly presented discussion of the various dispersive systems available, which is remarkable for the wealth of useful information contained in so few pages. In contrast, the section on interference filters confuses the reader by compressing too much information into too few pages. The difficulties of applying conventional microwave techniques to the far infra-red spectral region (50–1,000 μ) are well illustrated, though perhaps too much space is devoted to these methods at the expense of the grating and interferometer techniques that are producing results.

In general the book is well presented, with clear diagrams and a useful quantity of data. There is a good selection of references.

The book provides a link between the elementary undergraduate texts and the more specialized texts on molecular and solid state theory of infra-red spectroscopy. It should therefore be useful to final year students, and have a strong appeal to research workers to whom it is highly recommended.

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SANDWASPS OBSERVED

Comparative Ethology and Evolution of the Sandwasps
By Howard E. Evans. Pp. xvi + 526. (Cambridge, Mass.: Harvard University Press; London: Oxford University Press, 1966.) 120s. net.

THIS book is probably the most detailed comparative behavioural study of a large group of wasps that has ever been published, and it is written, moreover, by a worker who has made a very large number of personal observations. The insects studied are not all the sandwasps (Sphecidae) but one large subfamily, the Nyssoninae, the members of which nearly all nest in sand and constitute a fairly compact group of about 1,000 species with a considerable range in structure and habits. They include the genus *Bembix*, which has long been famous for its elaborate nesting behaviour and which is now made even more interesting because a comparative study of many species (more than a dozen in the western United States) shows how some of the more specialized features such as day to day provisioning of the larvae could have been evolved. As the author remarks (p. 495), it is difficult to reach any certainty about the evolution of instinctive behaviour. It is certain, however, that it is easier and more profitable to speculate about a wide range of species of somewhat different habits and living in different habitats than it was for such early workers as J. H. Fabre, who were not usually familiar with more than one or two species in each genus.

It is clear that even in this long book the author could not have made a detailed survey of structure as well as

of habits, and indeed structure is not neglected. There is a considerable section devoted to the classification of the genera and to their fossil history in Chapter 13. Yet I feel myself that more work of the conventional type on the comparative morphology of the group would have been justified. In *Bembix*, for example, where there is such an interesting range of specific behaviour, very little attempt has been made to group the apparently rather uniform wasps within the genus. The unexpected correlations between structure and behaviour which are often discovered in this way appear to supply the best though far from conclusive test for any phylogenetic speculation. The very few identified fossils at least have the value of proving that insects like modern Gorytinae (relatively unspecialized members of the group) occurred in the Eocene and Miocene. It is difficult to overestimate the support that such fragmentary facts lend to a conventional classification.

Apart from the comparative and evolutionary study of behaviour, the work is also a mine of facts. The habitats, nests, oviposition type, cocoons, prey and parasites of a great many species are listed and often illustrated by excellent photographs or by drawings. Although the American fauna forms the backbone of the study, observations from all over the world are brought together and a large literature is summarized. Moreover, to many entomologists the work will also be a revelation of how a study of comparative ethology should be made on a group which is eminently suitable for the attempt. It is not always easy to find nesting sandwasps, and even when found they demand prolonged observation under daunting climatic conditions. Dr. Evans has been studying them for ten years, but it is a matter of admiration how much he has done, how clearly he has described it, and to what interesting though well supported theories he has been led.

O. W. RICHARDS

MICE IN LABORATORIES

Biology of the Laboratory Mouse

Edited by Earl L. Green. Second edition. Pp. 700 + 3 plates. (New York: McGraw-Hill Book Company, Inc.; Maidenhead: McGraw-Hill Publishing Company, Ltd., 1967.) \$16.50.

THE mouse is by far the most important laboratory mammal, not least because the existence of many inbred and genetically homogeneous strains provides a unique basis for quantitative studies in virtually every field of biology and medicine. The first edition of the *Biology of the Laboratory Mouse* was published in 1941 under the editorship of G. D. Snell. After the lapse of a quarter of a century, we now have the long awaited second edition. Its editor is Dr. Earl L. Green, the director of the Jackson Laboratory at Bar Harbor, Maine, U.S.A., and the successor to Dr. C. C. Little, who founded that famous institution. The team of thirty-one contributors to this volume includes some of the foremost authorities in their respective fields. The scope of the work is indicated by the chapter headings: the laboratory mouse; breeding systems; keeping records; husbandry; nutrition; nomenclature; nuclear cytology; mutant genes and linkages; multiple factor inheritance; radiation genetics; reproduction; early embryology; anatomy; teratogenesis; genes and development; physiological characteristics; blood and blood formation; blood coagulation; inherited metabolic variations; endocrine variations; pigmentation; acute responses to ionizing radiation; responses to drugs; genetics of tissue transplantation; cell, tissue and organ culture; lifespan and ageing patterns; characteristic tumours; transplanted tumours; constitutional diseases; infectious diseases; immune functions; neural, sensory and motor functions; and patterns of behaviour. There is also a useful bibliography of techniques. In