

## Spin labelling

*Spin Labelling: Theory and Applications.* (Molecular Biology: An International Series of Monographs and Textbooks.) Edited by Lawrence J. Berliner. Pp. xiii+592. (Academic: New York and London, January 1976.) \$49.50; £25.55.

SPIN labelling is an obviously attractive technique. It is relatively easy to attach a spin label to a protein or to insert it into a membrane to act as a reporter group. Furthermore, the electron spin resonance spectra obtained are often aesthetically very appealing. But as with much modern art, the apparent surface simplicity is said to hide a deep inner meaning, which can only be properly discerned by the educated eye. In this book, a number of dedicated spin labellers try, successfully, to pass on the secrets of their art.

Probably the most useful part of the book for the experimentalist is the second half, in which applications of the technique are discussed. Four chap-

ters are concerned with membrane studies, a reflection of the fact that it is in the field of membranology that spin labelling has proved most fruitful. Particularly useful are discussions by J. Seelig, O. H. Griffith and P. Jost on the measurement of spin label order parameters, the overall conclusion being that simple measurements taken directly from the spectra usually give as good results as complex computations.

Two chapters deal with enzyme studies, but it is clear that here spin labelling has, in general, been rather less successful, in spite of the synthesis of a wide range of spin labelled compounds. The technique can be used to obtain distance information, but this is of course, information about the distance to an >N—O group rather than to a part of the native enzyme. Most enzyme studies have, however, been of a much more qualitative nature, merely looking for changes in the spectrum following some perturbation of the system.

A further two very useful chapters provide details for the preparations of spin labelled compounds and discuss

instrumental aspects of obtaining electron spin resonance spectra. The first part of the book is the theoretical section containing chapters on general magnetic resonance theory by P. L. Nordio, on the theory of slow tumbling of spin labels by J. H. Freed and on the theory of biradicals by G. R. Luckhurst.

The only criticism that can be levelled at the book is that it does not meet its claim to be accessible to readers from medical and biological backgrounds. A quick survey of my medical colleagues showed that few knew what quantum mechanical operators or expectation values were, and such knowledge is assumed at the beginning of chapter two. It is a pity that the book does not include a non-mathematical discussion of the basis of electron spin resonance, since, in fact, the latter chapters show that detailed understanding of the theory is not necessary for its application to biological problems. Nevertheless, this is certain to become the spin labellers' benchside book, even if they do have to steal the library copy. **A. G. Lee**

## Stimulus for ecologists

*Ecological Animal Parasitology.* By C. R. Kennedy. Pp. ix+163. (Blackwell Scientific: Oxford and London, 1975.) £3.50.

IN recent years a number of excellent books have been published on the general ecology and population biology of animal species with approaches ranging from the completely theoretical to practical treatments of field study problems. The ecology of two particular groups of organisms—protozoan and helminth parasites—has, however, received very little attention in general ecological texts, host-parasite relationships often being briefly dismissed by reference to the population equations of Lotka and Volterra.

Such treatment seems surprising, particularly when considered in relation to the economic importance of many host-parasite interactions. A careful examination of the parasitological literature reveals, however, that our knowledge of the ecology of the majority of parasitic organisms is very limited indeed. This unhappy state of affairs has undoubtedly arisen as a result of the complexity of many parasite life cycles, which may involve more than one species of host and many distinct parasite populations compounded by the difficulties in measurement and observation created by the intimacy of the relationship between host and parasite.

Clive Kennedy's new book is a welcome addition to the sparse literature on ecological aspects of parasitology. After a brief and perhaps rather superficial introductory chapter on the nature of parasitism, parasite population growth and host-parasite systems, the following four chapters are concerned with the concepts of host specificity and intra- and interspecific competition, the biology of host location and the dispersal and fecundity of parasites. Four of the remaining five chapters, constituting the major part of the book, deal in a fair amount of detail with the population biology of parasites within intermediate hosts, and poikilothermic and homiothermic definitive hosts. The contents of these chapters, reflect to a large extent the information available in the research literature, although they are somewhat biased towards the author's own interests in helminths and in particular parasites of fish. In the last chapter, perhaps the most stimulating of the book, the author attempts to come to terms with the dynamic aspects of the relationship between host and parasite populations. Some of the more quantitative attempts to model the population dynamics of host-parasite interactions are discussed, although it seems surprising that the pioneering and highly relevant work of V. A. Kostitzin 40 years ago is ignored.

This book will be of more general interest to students of parasitology than modern day ecologists since the author has not really achieved his stated objective of interpreting animal

parasitology in the light of current ecological ideas and concepts. For example, many rather important ecological topics such as the relationship between stability and complexity in host-parasite systems and the importance of time delays and genetic factors in population interactions are completely ignored. Furthermore, the author himself seems to be rather confused by certain ecological concepts, such as the role played by density-dependent factors in the regulation of population growth. He frequently refers to specific types of host-parasite interactions as "fundamentally unstable". The reader is first of all unaware of what the author means by stability and in addition is left to wonder how such interactions persist in the world today in the absence of regulatory mechanisms operating on population growth. In certain cases confusion is created by contradictory statements within the same paragraph. The author implying in one instant that mortality of parasites within poikilothermic hosts is a non-seasonal parameter and then going on to state that temperature influences the rate of loss of adult parasites from the host.

Many of the confusing discussions within this book are no doubt due to the lack of quantitative ecological information available in the parasitological literature. As an undergraduate text this book will be of value, and it may stimulate some of the more quantitatively minded ecologists to turn their attention to this fascinating field.

**R. M. Anderson**