pletely ignored, and one wonders why they were included in this volume. To make a long complaint short, I believe that only about half the papers herein presented really belong in a volume of this sort.

The section on "Primitive Biochemistry and Biology," which I thought somewhat out of place in the book on *Molecular Evolution*, would have fitted the subject matter of this volume perfectly. Particularly because both volumes are from the same publisher, I am disappointed that the editors did not get together and split up the material into a "chemical evolution" book and a "biochemical evolution" book.

Regardless of whether they were published elsewhere, the papers in this book that I particularly liked, and whose enumeration will give the flavour of this book, are: (1) The discussion of Britten and Kohne on DNA associations. They show that if "1% of the base pairs are not complementary, the temperature at which dissociation occurs (melting temperature) is about 1° C lower than that for perfectly complementary strands." (2) Jukes's exposition of protein amino-acid sequences as a reflexion of the base sequences in DNA. (3) The summary by McReynolds *et al.* on the formation of nucleic acid-like polymers on the ultraviolet irradiation of deoxyribonucleotides. (4) Fox's summary of the case for the possible route to primitive heterotrophs through the heating of dry amino-acids, followed by solution of the resultant "proteinoid" in warm water, and the appearance of "microspheres" on cooling the solution. (5) The paper by Degens and Matheja that demonstrates enhanced peptide bond formation, in aqueous solutions at 80° C, by the presence of the catalytic surfaces of clay minerals.

I doubt that this volume is worth the purchase price to an individual scientist; but this, too, belongs in the library of any laboratory organization that has an interest in the subject.

RICHARD M. LEMMON

Group Theory

Electronic Energy Bands in Solids. By L. Pincherle. Pp. vi+196. (Macdonald: London, September 1971.) £4.

Group Theory in Solid State Physics. By Hans Waldemar Streitwolf. Pp. 248. (Macdonald: London, September 1971.) £5.

THE theory of electronic energy bands continues to form the basis for much of solid state physics, and consequently it is a subject of great importance to both theoretical and experimental physicists. Professor Pincherle's book will be welcomed as a very valuable addition to the literature on this topic. It provides for postgraduate students a very clear and thorough introduction to the subject, and leads them to the stage where they should be able to follow the more specialized accounts of contemporary developments. It keeps an excellent balance between the formal exposition of the theory and simple applications, with brief discussions of a number of topics that are related to band theory. The level of presentation is such that it could be read with ease by any graduate in physics or engineering.

In his first two chapters Professor Pincherle has carefully and lucidly presented the basic concepts of band theory, the arguments being illustrated by many well chosen diagrams. The third chapter deals with some aspects of the formalism of band theory, such as momentum Eigen functions and Wannier functions, while the fourth gives an excellent account of the dynamics of electrons in crystals. Although the fifth chapter is entitled "Band Calculation", Professor Pincherle has devoted most of his attention to the construction of Fermi surfaces in the free and nearly-free electron approximations, with relatively little space being given to *ab initio* band calculations. This is a wise choice, as there are already several specialized expositions of this topic. Professor Pincherle has also prudently refrained from attempting to list and describe all the specific calculations that have been carried out. The final chapter deals with the classification of bands using group theory. A knowledge of the fundamental concepts of group theory has been assumed, and then a brief but clear sketch has been given of the sort of results that this theory can predict. Of course nothing more detailed or ambitious is possible in a book pitched at this level, for a complete treatment requires a book to itself.

One such treatment has been given by Dr Streitwolf. His book was first published in 1967 with the title *Gruppentheorie in der Festkörperphysik*. The English edition has been translated by Dr J. B. Sykes, whose translation reads very easily.

The title suggests a much wider range of topics than that which actually appears in the contents, for, as the author admits in his preface, there are a number of applications of group theory in solid state physics which are not mentioned. In particular there is no treatment of magnetic groups, of crystal field theory, and the role of permutation groups in many-electron problems. In fact the book is devoted almost entirely to a study of the crystallographic space groups and their application in the one-electron band theory and the theory of lattice vibrations. It gives a detailed and clear account of these topics. The treatment is self-contained, and assumes only an elementary knowledge of quantum mechanics and matrix theory, the theory of groups and their representations and the role that they play in quantum mechanics being developed from scratch.

The book has been written for mathematical physicists, and experimentalists may have some difficulties with the presentation. Dr Streitwolf has chosen to develop the subject by deriving first the general (but rather complicated) results on the representations of non-symmorphic space groups, and then, very briefly, treating symmorphic space groups as a special case. This approach has all the advantages of conciseness, but possibly many students would be happier with the alternative development (available elsewhere) in which they can approach the subject in a more gentle fashion, mastering the relatively straightforward theory of symmorphic space groups before tackling the general theory.

Dr Streitwolf has included an account of the theory of double groups, of time-reversal symmetry, and a particularly good description of selection rules. The very important diamond structure has been used throughout as an example to illustrate the various aspects of the theory.

One surprising point for a book written at this level is the sparseness of the list of references. The classic papers in the development of the subject all appear, but there is a serious lack of references to the tabulations of the characters of the 240 space groups. These have actually all been calculated, and there exist at least two books, by Kovalev and by Miller and Love, giving completely comprehensive sets of tables.

J. F. CORNWELL

Oligochaetes

Aquatic Oligochaeta of the World. By R. O. Brinkhurst and B. G. M. Jamieson. With contributions by D. G. Cook, D. V. Anderson and J. van der Land. Pp. xi+860. (Oliver and Boyd: Edinburgh, November 1971.) £12.

MORE than forty years ago Stephenson (1930, *The Oligochaeta*) was of the opinion that the Oligochaeta had become too large for a monograph by any one person. His prediction has so far proved correct, for in this new book no less than five authors have collaborated to produce a long needed, comprehensive work on the aquatic species alone.

The work is divided into two main parts, Biology (Chapters 1–4) and Systematics (Chapters 5–15), each chapter being followed by a list of references. The first part opens with a chapter on anatomy by D. G. Cook and B. G. M. Jamieson and this is followed by a lucid account of the embryology