shells are of great interest, and these, with the introductory chapters, form the bulk of the book. Both Hill and Prager and Hodge deal with a wider range of problems, but as an introductory text-book Ilyushin has great merits. Ilyushin uses tensors (without summation convention) and vectors throughout; Sokolovsky uses 'engineering' notation, and we may perhaps look forward to a translation of this more practical work on plasticity.

Éditions Eyrolles are to be congratulated on their high standard of printing and mathematical type setting.

JACQUES HEYMAN

INSECT PESTS OF NORTH AMERICA

Insect Pests of Farm, Garden, and Orchard

By Leonard Marion Peairs and Ralph Howard Davidson. Fifth edition. Pp ix + 661. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1956.) 68*s*. net.

THIS is the fifth edition of a book first published in 1912, and originally written by E. Dwight Sanderson. The fourth edition, in 1941, was revised by L. M. Peairs. Although Dr. Peairs's name appears here as the senior author, his illness and death prevented him from taking an active part in the latest revision, for which R. H. Davidson, of Ohio State University, is responsible. The new edition is largely rewritten, various pest insects are included for the first time, and much new information on insecticides and control measures has been included.

This book is intended primarily for students attending college courses in economic entomology. The first fifty pages deal with insect morphology, physiology, development and systematics. This is intended to serve readers with little previous training in general zoology and entomology. Though this introduction is well written, and could serve as a useful revision for those who may have been out of touch with the subject for a time, it seems a very inadequate substitute for a proper grounding in zoology and entomology, which is surely necessary for anyone making a career in agricultural entomology.

Some seventy pages are devoted to a general discussion of insect control by natural, biological and chemical means. A lot of useful information has been compressed into a small space. The chapters on insecticides and their use are up to date at the time of publication, but new work will almost certainly make the recommendations obsolete in a very few years. It is perhaps unwise to include such information in a text-book, particularly one like this which is expensive and may be kept by its purchaser for many years.

The bulk of the volume (some 540 pages) deals with insects which are injurious to crops, to stored products and to property; more briefly, there is some description of insects injurious to man and to domestic animals. Several hundred species are included. This means that, as a rule, the descriptions of the morphology are so brief as to be of little assistance in identification, and the accounts of the biology are far from adequate. The disadvantage of the sketchy descriptions would be less if the illustrations were good. Unfortunately, they are not. There are no less than 577 figures, the majority of which are reproduced from publications of the United States Department of Agriculture. Many are smudgy photographs of little value, others are tiny and indistinct line drawings which illustrate few of the relevant characteristics.

The major criticism of this book is that it attempts the impossible. There are so many pest insects in North America that it is not practicable to deal adequately with their anatomy, life-history and control, together with various general problems, in one volume. This publication does at least give a list of the insects of importance to an agricultural entomologist in North America (the fauna of Europe is sufficiently different for this to be of little use in that continent) and it sometimes indicates where more adequate information may be sought.

KENNETH MELLANBY

BACTERIAL PHYSIOLOGY

The Life of Bacteria

Their Growth, Metabolism, and Relationships. By Prof. Kenneth V. Thimann. Pp. xviii + 775. (New York and London: The Macmillan Company, 1955.) 65*s*.

THIS book deals, as its sub-title indicates, with the physiology, anatomy and biochemistry of bacteria. It treats these subjects lucidly, and on the whole fairly, on generally conventional lines. The subject is rather attractively introduced in the first chapter by a historical introduction which should succeed in making students realize that the subject has been something of an adventure. Some of the more modern adventures are, however, passed over in silence.

After the introduction there is an interesting and extremely well-illustrated section on the classification and structure of bacteria. Many readers in Britain at least will find the nomenclature a little unfortunate, and will not care much for *B. coli* and *Bac. subtilis*; but this is a detail in a book full of interesting observations and comments. The author appears to accept rather readily the thesis that bacteria contain chromosomes.

The descriptive and experimental parts are in general excellent, but in questions which involve physico-chemical principles the author sometimes seems a little out of his element. In Chapter 4, for example, there is a serious confusion between rate and equilibrium constant. The 'heat of reaction' is certainly not the parameter which determines the change of rate constant with temperature.

In a more subtle way the discussion of the approximately logarithmic law of population decline is inadequate. The author states that departures from the law are explained by varying sensitivity of different individual cells. The main problem is, however, not why there are departures from the law, but why the law is ever nearly true at all. This section also illustrates a failing of an otherwise good book, namely, that the reader may not infrequently be led to suppose that highly complex and controversial matters are in fact much simpler than they are.

The biochemistry of bacteria is fully dealt with, and there are good accounts of oxidation and of carbohydrate metabolism and of nitrogen fixation. Probably the biochemical section, which is the largest part of the book, is the most judicious and balanced.

The last 150 pages deal with growth and synthesis. The present book has the advantage over many works on bacteria that the enormous mass of intricate