

consideration of fungicides and insecticides. The chemical manufacturer is becoming more and more attracted to this field as an outlet for his products on the large scale, and an extension of chemotherapeutic knowledge is enabling a widely extended range of chemicals to be tried, not merely empirically, but as the result of the correlation of structure with toxicity. The physicist is at the same time learning to understand the theory and technique of spraying, dusting and fumigating with liquid, solid and gas. Hence he has been able to lead on to spreaders, stickers and emulsifying agents so as to promote the formation of the liquid/solid interface.

Fungicides are based on sulphur, copper, arsenic and fluorine compounds as well as on such organic

substances as nicotine, pyrethrum, rotenone. Other materials are being tried in the laboratories, where a technique of measurement is being elaborated as a preliminary to establishing the connexion between toxic action and chemical constitution. Quite another class of chemicals serve as fumigants.

The magnitude of the subject will be apparent from the foregoing remarks. The author has in this third edition made good use of his earlier experience and produced an up-to-date and at the same time stimulating account of the subject. The research station at Long Ashton, from which the book is dated, can regard it as worthy of the scientific standing of the laboratory.

E. F. ARMSTRONG.

ELEMENTARY BIOLOGY

Intermediate Biology

By W. F. Wheeler. Pp. xiii+530. (London: William Heinemann, Ltd., 1940.) 15s.

THE remarkable development of biology in schools during the last decade has been accompanied by the inevitable spate of text-books which follow on the introduction of a new subject. The majority of the writers of these text-books have been stirred to produce works which would include cognate topics relating to the syllabuses of the various examining bodies. From the authors' points of view, it is a little unfortunate that the rapidity of the growth has been accompanied by the constant revision of examination syllabuses in biology, with the result that many of the books produced have quickly become unsuitable. Mr. Wheeler's book has been prepared to meet the demands of present-day students offering biology at higher school certificate, intermediate degree, pre-medical and allied examinations.

In the succinct accounts of the anatomy and embryology of the 'types' set in the plant and animals section of the various syllabuses, the author adheres rigidly to the standard of knowledge that might be expected of Intermediate students, the descriptive technique showing little advance on that in use some ten years ago. A useful innovation is the inclusion, at the end of some of the chapters on animal types, of a short section in which attention is focused upon the more important biological principles that the particular group illustrates. This feature could profitably have been extended to other parts of the book.

In other sections relating to the cellular structure and comparative physiology of organisms, the

author has added a valuable contribution to the teaching of biology, as distinct from the daughter sciences of botany and zoology. The main biological principles are considered in terms of living organisms, plant and animal, adequate attention being devoted to the peculiar as well as the conforming types. Apart from the confused description of hormonal reactions in plants, these sections are clearly set out. The chapters on heredity, evolution and the relation of the organism to its environment are stereotyped, except for a concise description of the evolution of the vascular and urinogenital systems. The latter will probably be ineffective for the type of student for whom the book is intended, but, with a curtailment of detail, would perform useful service in any future edition.

The book is profusely illustrated, many of the diagrams having been taken from books already in use; the original figures are good, although, in contrast to some text-books in school biology which have been published recently, add little to established text-book illustration.

A real criticism of this, as of so many school biology books, is that the subject-matter is narrowly concentrated upon existing examination syllabuses. The need for this method of treatment is readily understood, but until writers of school text-books are prepared to include topics of wider interest to their pupils, examination syllabuses are likely to remain circumscribed.

This criticism is not intended in any way to detract from the usefulness of the book; it is eminently suitable for students preparing for the examinations mentioned above.

T. H. HAWKINS.