

up with these plausible suggestions are such things as hypothetical whirls of ether within the solar system that seem, to say the least of them, to require some elucidation as to how comets go through them in every sort of direction without any sensible action of the whirl on the comet.

A person who has brought forth, after enormous labour of thought, a series of theorems concerning the universe, and who is not very familiar with the equally carefully thought-out suggestions of others naturally looks with more favour upon his own children than upon those of others; but, if he is reasonable, and in a reasonable mood, he will not be surprised nor even distressed, because those who look at all these children with critical eyes see very serious defects in all of them, and feel very confident that without great changes no one of them can possibly grow into a second Newton.

#### VERTEBRATE BIOLOGY.

*Text-book of Biology.* By H. G. Wells, B.Sc. Lond., F.Z.S. With an Introduction by G. B. Howes, F.L.S., F.Z.S., Assistant Professor of Zoology, Royal College of Science, London. Part I. Vertebrata. (London: W. B. Clive and Co., University Correspondence College Press.)

MR. WELLS'S book is avowedly written mainly for the purpose of helping solitary workers to pass the Intermediate Science examination of the University of London, and it would therefore be unfair to criticise it from a wider point of view. The scope for originality in such a work is naturally somewhat limited, but it is a pleasant surprise to come across one which is far above the average as regards soundness of treatment and method. The author not only possesses a practical knowledge of the greater part of the subject he deals with, but also evidently takes pleasure in it for its own sake, and has a healthy dislike of "that chaotic and breathless cramming of terms misunderstood, tabulated statements, formulated 'tips,' and lists of names, in which so many students, in spite of advice, waste their youth." He states that "the marked proclivity of the average schoolmaster for mere book-work has put such a stamp on study that, in nine cases out of ten, a student, unless he is expressly instructed to the contrary, will go to the tortuous, and possibly inexact, description of a book for a knowledge of things that lie at his very finger-tips" (p. 31); and again, on p. 125, that "it is seeing and thinking much more than reading, which will enable" the student "to clothe the bare terms and phrases of embryology with coherent knowledge." Throughout the book the importance of actual observation is insisted upon.

The present part deals with the Rabbit, Frog, Dog-fish, and Amphioxus, and includes an account of the development of these animals and of the theory of evolution, as well as a number of questions, most of which have been set at the examinations of the London University. The morphological portions are, on the whole good and clearly written, and a fair amount of physiology is also introduced. A syllabus of practical work is given at the end: this would in many respects bear amplifying. The student is not warned that his time will be wasted if he wanders off the direct path of the examination syllabus;

NO. 1226. VOL. 47]

and on the contrary, points of general biological interest are referred to here and there, and these go far to show what a good many of our elementary text-books do not—viz. that the London University syllabus, "as at present constituted," affords "considerable scope for efficient biological study." The student, moreover, is told that this "little book is the merest beginning in zoology," and the last paragraph, on p. 131, indicates the aspect of mind with which the author regards his subject.

Twenty-four folding sheets of sketches are inserted in the text, but the figures are, on the whole, exceedingly rough; and though many of them may be found useful as guides, we feel that the student would do better to postpone drawing until his dissections are made, or even copy some of the numerous good figures to be found elsewhere, than to "copy and recopy" these sketches first, as advised by the author.

Numerous inaccuracies and awkward expressions occur, only a few of which can be here mentioned. The terms superior and inferior, as applied to the great veins, are likely to confuse a beginner after reading the definition of the regions of the body given on p. 3. "Metabolism" and "metaboly" occur even in consecutive sentences on p. 23. Peristaltic movement is said to move the food "forward" (p. 41). It is stated that the thyroid is similar in structure to the thymus and to "botryoidal tissue" in general (p. 26), and that the epithelium of the villi, with its striated border, "is usually spoken of as leading towards "ciliated" epithelium (p. 22). It is misleading to say that "a tarsus (tarsalia) equals the carpus," and that the vomer of the dog is paired (pp. 38 and 76). As the term "Chordata" is adopted on p. 96, it is unfortunate that the student is told on p. 60 that vertebrata occur in which cartilage is absent, and that Amphioxus possesses the "essential vertebrate features," is "twisted, as it were," and that its "vertebral column is devoid of vertebræ:" it is, moreover, inadvisable to use the term "hoyoidean" with regard to this animal. On p. 61 "classes" and "orders" are used in a correct and an incorrect sense in the same sentence. The expression, "carotid gland" requires a better explanation on p. 67. The morphology of the cardinals, azygos, and post-caval is incompletely explained (pp. 87, 120, and 124). Several serious mistakes are made with regard to the homologies of the urinogenital apparatus (*cf.*, *e.g.* pp. 92 and 114). Misprints are also fairly abundant throughout.

Most of these faults are, however, such as can be remedied in a future edition, and the book will, we think, serve the purpose for which it was written very satisfactorily.

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#### OUR BOOK SHELF.

*Pflanzenleben.* Von Anton Kerner von Marilaun. Band II. Geschichte der Pflanzen. (Leipzig und Wien: Bibliographisches Institut.)

THE first volume of this excellent book was reviewed in NATURE, vol. xxxix. p. 507. The present volume, which completes the work, treats of the "history of plants," by which is meant their *development*, in the widest sense, including both ontogeny and phylogeny. The former subject ("origin of descendants") occupies the first 480 pages, while the remainder is devoted to the "history of species."