

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;

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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 "hyoidean" 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.

W. N. P.

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."

It is not proposed to enter into any detailed criticism of this volume. Some idea of the scope of the work was given in the former notice; we are glad to hear that an English translation is in preparation, and when this appears a further opportunity will be given for a general account of the whole. In point of interest the second volume is fully equal to the first; there is, however, perhaps more room for adverse criticism of certain parts. Speaking quite generally it may be said that while the "biology," or natural history of the subject is admirable, the morphology is on the whole rather weak. The former, however, is the more important for the general reader, for whom the book is intended.

The account of reproduction begins with the asexual organs of propagation, including spores, buds, and gemmæ. This is succeeded by the much more extensive section on reproduction by fruits, including all sexual processes. The great value of this part lies in the extremely full, and in many respects original, treatment of the fascinating subject of the pollination of flowering plants, to which nearly 300 pages are devoted. Special stress is laid here on the phenomena of *geitonogamy*, or the crossing of different flowers on the same inflorescence, and of *autogamy*, or self-fertilisation of hermaphrodite flowers. The whole account is of the greatest possible interest, and familiar as the subject has now become, innumerable fresh points of view are opened up.

The second part of the volume is on the history of species, including the whole subject of variation. Changes produced by external agencies, such as parasitic fungi, and gall-forming insects, form the subjects of special sections.

As regards the origin of new species, the author, like Prof. Weismann, attributes the greatest importance to sexual reproduction, and especially to cross-fertilisation. He occupies a peculiar position in so far as he believes that hybridisation has played an important part in nature as a source of new forms.

This second part of vol. ii. includes classification, and a fairly full account is given of all the important groups of plants, each cohort, or "Stamm," receiving separate treatment.

Sections on the distribution of species, and on their extinction, conclude the book.

A really good index is added, which will be a great boon to all who wish to make use of the vast store of facts which the book contains. The illustrations, consisting of twenty coloured plates and 1547 figures in the text, reach the same high standard as those of the previous volume.

To the book as a whole the highest praise must be given. No such popular account of the natural history of plants has appeared before. The publication of an English version will be anticipated with great interest.

D. H. S.

Bibliografia Medica Italiana. By P. Giacosa, Prof. straordinario di Materia Medica e Chimica fisiologica all'Università di Torino. (Torino-Roma: L. Roux e C., 1893.)

This work is a collection of abstracts of the chief papers bearing on the medical sciences published by various Italian authors during the year 1892. Prof. Giacosa has been aided in his work by several experts, whose names are a sufficient guarantee for the accuracy of the abstracts, such as Profs. Marcassi of Palermo, Maggiora of Modena, and Sperino of Torino. The medical reading public is familiar with the excellent *Jahrbichte* and *Centralblätter* published in Germany, which deals chiefly, though not exclusively, with scientific papers by German authors. There has been a great want of similar publications of Italian work, and Prof. Giacosa's "Bibliografia" is a welcome addition to medical literature. In it will be found abstracts of all the chief Italian papers published

in 1892 on parasites and helminthology (zoology), physiology, biological chemistry, pharmacology, histology, human and pathological anatomy, bacteriology and hygiene. The abstracts are done by experts in the particular subject, are short but clear and intelligible, and have the advantage of not being critical.

The Evolution of Decorative Art. By Henry Balfour, M.A., F.Z.S. (London: Percival and Co., 1893.)

It is remarkable that in these days, when the question of "origins" holds a place of commanding importance in almost every department of investigation, comparatively little should have been done to trace the evolution of art back to what Mr. Balfour calls "its very simplest beginning." Mr. Balfour does not, of course, undertake to present in this small book anything like a complete view of the subject. His aim is merely to indicate some of the main conclusions to which he has been led by his own researches. He finds in early art three distinct stages—(1) adaptive; the appreciation of curious or decorative effects occurring in nature or as accidents in manufacture, and the slight increasing of the same by artificial means in order to augment their peculiar character or enhance their value as ornaments; (2) creative; the artificial production of similar effects where these do not occur (imitation or copying); (3) variative; gradual metamorphosis of designs by unconscious and conscious variation. Mr. Balfour brings out admirably the significance of these stages, and it is scarcely necessary to say that the Pitt Rivers collection, of which he is curator, provides him with ample means for the clear and effective exposition and illustration of his ideas.

LETTERS TO THE EDITOR.

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Palæontological Discovery in Australia.

MANY readers of NATURE will learn with interest that I have this day received a telegram from Prof. Stirling, of the University of Adelaide, as follows:—

"Made discovery immense deposit fossil remains excavated several nearly complete skeletons Diprotodon besides two thousand bones also large Struthious bird giant Wombat particulars letter."

I need scarcely add that I shall await with impatience the promised particulars of this discovery, which may prove to be one of great importance.

ALFRED NEWTON.

Magdalene College, Cambridge, April 21.

An International Zoological Record.

IT is much to be regretted that the praiseworthy agitation of this subject, opened by Mr. Minchin (NATURE, vol. xlv, p. 367), has not been continued. There cannot be the slightest doubt of the desirability of such a reform. Possibly the reason why the letters of Mr. Minchin and Mr. Bathers (*ib.* p. 416) have not aroused more interest lies in the fact that they both wrote as recorders. They showed the absurd burdens that the actual system imposes upon the recorders; but they left somewhat in the background the advantages which the great world of zoologists could receive.

However this may be, it is certain that the rank and file of investigators of the present day are supporting an utterly unnecessary burden, and one from which they ardently desire to be freed. Any one who desires to test the sentiment has only to make inquiries among those of his acquaintance. Having myself agitated in this quiet way a method of reform that had occurred to me nearly two years ago, I can hardly doubt that the concurrence of opinion is strong enough to effect a radical change, if only concerted action can be taken.

Mr. Minchin and Mr. Bathers have pointed out that the