

THURSDAY, SEPTEMBER 20, 1888.

*A TEXT-BOOK OF PHYSIOLOGY.*

*A Text-book of Physiology.* By J. G. McKendrick, M.D. LL.D., F.R.S. Including "Histology," by Philipp Stöhr, M.D. In Two Volumes. Vol. I. General Physiology. (Glasgow: MacLehose and Sons. London: Macmillan and Co. 1888.)

THE present volume deals with the general principles of biology, the chemistry of the body, the early stages of development, the microscope, and the methods of microscopical research, the histology of the tissues and the physiology of muscle. It is no doubt very difficult to say what should and what should not be included in a text-book of physiology. The primary object is to explain as much as we can of the phenomena of the animal organism by physical and chemical laws. To understand such an explanation, a knowledge of chemistry, physics, and of the structure of the organism is essential. These subjects are treated of in special text-books which do not contain any physiology, and their introduction into a work devoted to this subject cannot fail to exert an injurious influence on the full exposition of the actual state of the science.

The present work is noticeable for the large amount of subsidiary matter which has been introduced, rather than as being a very complete account of modern physiology. The book is, however, intended by its author to aid the student to an intelligent knowledge of physiology, or rather, of all the subjects which are commonly dealt with by lecturers on physiology. It supplies the physical and chemical information more immediately required in physiological problems; it explains the methods by which the more important results have been obtained; and it gives a general insight into important biological facts.

Considering the very wide range of subjects, the choice of matter has been very well adapted to the object in view, and the book will doubtless find a larger circle of readers than the Professor's own class, for which it is especially intended. However, the degree to which the various sections have been brought up to date is very unequal. Some of the subjects have evidently been thoroughly worked up, whilst others appear to have been chiefly compiled from existing and not wholly modern text-books. In a work of this character, unless the author be endowed with almost superhuman industry, such a result is inevitable, and is fully foreseen by the author himself.

The section devoted to the general structure and physiology of the cell, the phenomena of fertilization, and the modern views on heredity, will certainly be much appreciated. General biological knowledge of this kind is often eagerly sought for by the student, and not always readily obtainable.

The microscope and the methods of microscopical research are very good and modern, but this is a subject which is hardly expected in a text-book of physiology. The histology of the tissues calls for no special comment.

In connection with the physiology of muscle, the object and use of the graphic method is explained with

great care, very clear and good illustrations being given of the apparatus used. Muscle physiology itself is treated in considerable detail, to which is added the physiology of the electrical organ in fishes, containing the recent researches of Prof. Sanderson and Mr. Gotch. The physiology of smooth muscle is very scantily touched on, and the figures in connection with the heat produced by muscle are not correct; nor is any reference made to the observations of Ludwig and Meade Smith, on the heat produced in the mammalian muscle when tetanized under different conditions of blood-supply. Surely they are much more to the point than the observations of Billroth and Fick, which are only applicable to the organism as a whole.

The best feature in the chemical part of the work is the introduction of sections on the general chemical processes of the organism and on fermentation. With regard to the former, the paragraph devoted to reduction—as an important chemical process of the organism—is too short: the interesting observations of Ehrlich on the reducing powers of the tissues (as shown by the injection of alizarin-blue, endophenol-white) are surely worthy of mention. The undoubted fact that the blood of asphyxiated animals contains reducing substances is not alluded to, nor is the rôle which modern physiological chemists ascribe to these reducing substances in producing nascent oxygen, and so bringing about the oxidations of the tissues, pointed out with sufficient clearness. Fermentation is considered in its historic aspect, and from its chemical and biological sides. The history of organized ferments is adequately treated, as are also the early and important observations of Pasteur. What we actually know about the relationship of enzymes and organized ferments is not clearly expressed, no account being given of the researches of Musculus, Lea, and others, which have shown that enzymes can be obtained from organized ferments. Nor is the question of the chemical nature of enzymes sufficiently discussed.

The remainder of the section of chemistry contains numerous defects. Thus a long chapter is devoted to the signification of chemical formulæ, but we are later told of the albumins that their "chemical constitution oscillates round the following:  $C_{54}H_{77}N_{16}O_{22}S$ ." No mention is made of the observations of Schmiedeberg, Drechsel, or Grubler, on artificial albumin crystals—observations of the highest importance for all future work on proteids. The accounts given of casein, mucin, and nuclein are not in accordance with our present knowledge. The chemical relations of indigo are given in detail, but the indican of the urine is said to have the formula  $C_{26}H_{31}NO_{17}$ , and no mention is made of indoxyl potassium sulphate. So with uric acid, nothing is said about the most important facts of Horbaczewski and E. Ludwig on the formation of uric acid from glycocholic acid and urea, which correspond so well with Strecker's view of uric acid as a body analogous with hippuric acid (the benzoic acid being replaced by cyanic), and with the remarkable physiological fact observed by Wöhler, that calves, as long as they feed on milk, excrete only uric acid, and no hippuric, whilst the reverse is the case when they take a vegetable diet. Again, in regard to the formation of uric acid, two extremely important researches have been made—that of Schroeder on the influence of

ammonia salts in producing uric acid in birds, and the remarkable confirmation of this by Minkowski, who found, after extirpation of the liver, the uric acid of the bird's urine replaced by ammonia.

The subject most fully treated is that of the pigments, but here again the important works of Nencki and Sieber on hæmoglobin and its derivatives, find no mention. A work like the present is necessarily a compromise. It does not give so equable and well-judged an account of what it is important to know in physiology as might be expected from the reputation of the author and the size of the book; but it shows the judgment of an experienced teacher in endeavouring to make every subject perfectly intelligible and in leaving no branch of physiological science untouched.

L. C. WOOLDRIDGE.

### OUR BOOK SHELF.

*The Mind of the Child.* Part I. The Senses and the Will; Observations concerning the Mental Development of the Human Being in the First Year of Life. By W. Preyer, Professor of Physiology in Jena. Translated from the original German by H. W. Brown. "International Education Series." (New York: Appleton and Co. London: Whittaker and Co. 1888).

It is with no small satisfaction that we notice the issue of this work in the English language. It has already remained much too long in the German and French tongues only; and it speaks ill for the enterprise of British publishers that now the name of Appleton appears upon the cover. For, although comparisons as a rule are invidious, in the present instance there can be no doubt that the work in question holds the first place in the literature of the subject with which it deals. And since the study of infant psychology was inaugurated by M. Taine and Mr. Darwin, it has become so popular a branch of scientific literature that an English translation of "Die Seele des Kindes" must be an assured success, even from a commercial point of view.

In the case of a book already so well known, it is needless to say much by way of analysis. We must remark, however, that the present volume comprises only Parts I. and II. of the original—the remainder being reserved for publication as a second volume. Hence the instalment of the translation now before us deals only with the senses and the will; the next instalment having to treat of the intellect, and all supplementary matter. As everyone who has read the original is aware, Prof. Preyer has devoted himself to his subject with an assiduity and a thoroughness which only an assured conviction of its importance could inspire. And, in the result, his patiently continuous observation, his skilled intelligence as a well-read psychologist, together with his high attainments as a professed physiologist, combine to render his work, not only as before remarked the most important, but also in many respects the most interesting, that has hitherto appeared upon the subject of psychogenesis. Therefore we recommend this work to all our English readers as the best that they can procure on "the mind of the child"—and this whether their interest in such a mind be scientific only or likewise parental.

G. J. R.

*Arithmetical Exercises.* By H. S. Hall, M.A., and S. R. Knight, B.A. (London: Macmillan and Co., 1888.)

IN this book we have a collection of examples comprising about eighty progressive miscellaneous exercises and a set of fifty papers taken from such examinations as the London University, Oxford and Cambridge Local, Previous Cambridge, Army Preliminary, &c. The examples

are judiciously chosen, and great care seems to have been taken to make the work as progressive as possible. An appendix is added, consisting of two hundred graduated questions in logarithms and mensuration, preceded by a list of the numerical constants and formulæ used in the latter. The answers to the examples are all collected together at the end.

*An Elementary Treatise on Mensuration.* By E. T. Henchie. (London: School Books Publishing Company, 1888.)

IN this work we have an excellent treatise for those who are about to begin the study of this subject. All reference to trigonometry has purposely been avoided, and the author has in the second chapter added the enunciations of Euclid's propositions which bear on the work, together with an explanation of each.

Plain rectilinear figures, curvilinear areas, the circle, surfaces and volumes of solids, are dealt with in turn, and each chapter is accompanied by a set of illustrative examples thoroughly worked out and explained, followed by a separate set to be worked out by the student. Land surveying forms the subject of the eighth chapter, in which are described the various instruments with the methods of using them. The figures throughout are very clear, and the shading used in those of the chapter on solids is excellent. The book concludes with a set of miscellaneous examples, making in all about 1260, together with the answers to the above.

### LETTERS TO THE EDITOR.

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#### Lamarckism versus Darwinism.

I HAD hoped that my previous letter might have closed this correspondence, but Mr. Poulton's reply suggests to me the propriety of making one additional remark. This is, that while writing the sentence in the *Contemporary Review* to which he has taken exception, it never occurred to me that anyone would gather from it that I intended to disparage the work of an eminent man, who happens to be also a personal friend. But, as this appears to be the impression conveyed to Mr. Poulton, I should not like to allow his statement of it to pass unnoticed. As a matter of fact, no one can appreciate more thoroughly than I do the extensive knowledge, the clearness of thought, and the great powers of original research which are now being so conspicuously displayed by Prof. Weismann.

From the first it has been sufficiently obvious to me how the present misunderstanding arose; and if, instead of affirming that I was ignorant of Prof. Weismann's writings, Mr. Poulton had begun as he has ended, by asking me to "explain" my remark with reference to them, of course I should at once have done so. However, as stated in my last letter, it is my intention at no very distant date to deal with the whole question of so-called "Lamarckism versus Darwinism"; and, therefore, my only object in this communication is to stop from going further the impression that I hold in light esteem the highly important achievements of Prof. Weismann.

GEORGE J. ROMANES.

Geanies, Ross-shire, September 8.

#### Mr. Gulick on Divergent Evolution.

MR. GULICK's paper on this subject appears in the last number of the *Journal of the Linnean Society* as having been "communicated by Alfred Russel Wallace, F.L.S." It may therefore be supposed that I recommended its publication, or that I agree with its main argument; and as this is not the case, I ask permission to say a few words on the subject in the columns of *NATURE*.