tological and phylogenetic. He believes that the last period extends to the present time, but to the writer the interest in theories of vertebrate descent, and the belief that the "law of von Baer" can yield a fundamental conception of the history of animal forms, seem to have given place to the desire to understand the principles of growth and of inheritance.

The first chapter, upon the germ-cells, maturation, fertilization and segmentation, is of a general and comparative nature and includes an exposition of the theories of the significance of maturation and fertilization, and of the problem of heredity. It does not contain, however, any reference to Mendel's work or to that of his successors.

In order to have a consistent and continuous description of the early stages of development, Tourneux devotes a long chapter—slightly more than one sixth of the text proper—to a description of the history of the ovum of the rabbit up to the time of the establishment of the body-form. This account is very clear and convincing, and is particularly acceptable because the author does not interrupt its continuity by making a patch-work of fragments of the history of the ova of many vertebrates.

The third chapter, which completes the first part of the book, contains brief accounts of many of the best preserved early human embryos.

The second part of the book is divided into thirteen chapters, which may be subdivided according to size into three groups: those upon the digestive and urogenital systems are long, having 79 and 74 pages, respectively; those upon the nervous, locomotor and circulatory systems, and the fœtal envelopes are of moderate length, about 40 pages; and finally, those upon the respiratory system, suprarenal organs, the skin and upon the organs of taste, smell, sight and hearing are short. The treatment of the digestive and urogenital systems seems disproportionately long, and the section upon the voluntary muscles, consisting of about thirty lines in the chapter on the locomotor system, is ridiculously small. Otherwise the discussion of the several organs and organ systems is excellently proportioned. There is an index and an appendix upon the length of the period of incubation or of gestation in several birds and mammals.

The failure to adopt the Basle anatomical nomenclature, and even the occasional omission, in an extensive series of synonyms, of the name used in this nomenclature, seem to the writer to be the great fault of the book.

The figures, 248 in number, are well chosen and are excellently reproduced. The use of only a very few diagrams is commendable. The book deserves a thorough success.

Leonard W. Williams

Broad Lines in Science Teaching. By F. Hodson. New York, Macmillan Co. 1910. 8vo, pp. xxxvi + 267. $1.25.

This book consists of a series of essays by a number of writers, edited by Mr. F. Hodson, of the Bedales School at Petersfield, England. The papers all deal with the teaching of science to boys and girls of secondary school age; and the editor's object has been "to cover a wide field, to achieve, through variety of the contributor's experience, a variety of presentation, and so to convince the reader of the many-sided human value of science in modern education."

The introduction is by Professor M. E. Sadler, who calls attention to the necessity for a more careful study of the methods of teaching science. He says (p. xix):

> Science has secured a place in the curricula of the higher schools, a firm place and respectful recognition; but scientific method and the spirit of science have not yet influenced the whole of the intellectual life of the schools, have not yet remolded the ways of teaching in other than what, in the narrower sense of the words, are called scientific subjects.

He then reviews the essays that follow, and draws some general conclusions from the study of the entire collection. As distinct marks of successful teaching of science he mentions four as being most essential—an alert interest in things seen; patience and exactitude in observing, verifying and recording them; a disposition to brood over new

facts before reaching a judgment as to their meaning and classification, and an habitual willingness to take great trouble in getting at the truth.

The first essay is by Professor J. H. Badley on the Place of Science in the School Curriculum. He tests the value of science in education by "the kind of motive it appeals to and arouses, the kind of power it develops, and the kind of discipline it gives." He shows that, tested by these criteria, science has an important place in the schools.

The remaining essays in the book are as follows: The Scope of Nature Study, Edward Thomas; The Teaching of Nature Study, Clotilde Von Wyss; Biology in Schools, Oswald Latter; The Teaching of Hygiene, Alice Ravenhill; The Place of Hypotheses in Science Teaching, T. Percy Nunn; The Claims of "Research" Work and Examinations, Fred Hodson; School Mathematics in Relation to School Science, T. James Garstang; Coordination of Physics Teaching in School and College with Special Reference to Electricity and Magnetism, Alfred W. Porter; Geography, J. H. N. Stephenson; Science in the Teaching of History, F. M. Powicke; Economic Science in Secondary Schools, Augustus Kahn; Domestic Science, Arthur Smithells; The Teaching of Chemistry in Technical Schools, Henry Garrett; How the School may help Agriculture, E. W. Read; Engineering, An Associate of the Institution of Civil Engineers—Science Teaching and the Training of the Affections, Sidney Unwin; Science Teaching and a Child's Philosophy, Cora B. Sanders; The Present Condition of Physics Teaching in the United States, C. R. Mann; School Science in Germany, the Editor; Some Practical Notes on the Planning of Science Laboratories, T. H. Russell.

In the brief space of a review it is impossible to give any definite idea of the content and richness of these essays. They are all excellent and full of suggestion. Every one who is interested in the problems of science teaching on broad lines should read and study this book at first hand. It is an important contribution to one of the most pressing of our school problems of the present day.

C. R. MANN

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Design in Nature. By J. BELL PETTIGREW, M.D., F.R.S., 3 vols. New York, Longmans, Green & Co. 1908.

Dr. J. Bell Pettigrew, professor of anatomy and medicine in the University of St. Andrews, was more especially known for his contributions to mammalian anatomy and discussions on the physiology and mechanics of flight. He was not a skilled zoologist, in the sense of being an expert student of any particular group of animals; but he had a keen interest in nature and a wide, if somewhat shallow, knowledge of a great variety of subjects. Being firmly convinced that the order and beauty of the visible world bore eloquent testimony to the existence of an invisible but ever-present "creator, designer and upholder," he conceived the idea of preparing a work which should make this evident to every reader. The "argument for design" presented nothing new, of course; but never before had it been supported by such a wealth of illustrative facts, gleaned from the storehouses of modern science. Just as Darwin profited by the mass of data accumulated by those who knew nothing of evolution, now Pettigrew was to utilize the contributions of an unbelieving age, in support of the ancient doctrine of special creation. The work was finished, and partly printed, at the time of the author's death in January, 1908. It consists of three great quarto volumes, aggregating 1,416 pages, with innumerable illustrations. The printing and binding are excellent, and at the beginning of each volume is a portrait of the author. As is remarked in the preface, "it was necessary to deal with physics, chemistry, botany, zoology, anatomy, physiology, psychology and paleontology more or less in detail," but most space is given to the author's favorite subjects, vertebrate anatomy and animal locomotion. Those who have no sympathy with the main purpose of the work will find it a sort of glorified scientific scrap-book, full of entertaining and instructive matter. It does not