SCIENTIFIC BOOKS.

Die Elemente der Entwickelungslehre des Menschen und der Wirbelthiere. Von Oscar Hertwig. Jena, Gustav Fischer. 1900. 8vo. Pp. vi + 406, mit 332 Abbildungen im Text.

This work is an abbreviated reissue of the author's well-known 'Lehrbuch'—the new work being about one-third the size of its par ent. There is otherwise exceedingly little change, for there is no important modification of the general plan or of the style of treatment or in the point of view from which the author treats his subject. There has been no effort at all to recast the work so as to render it more suited to the requirements of embryological study in the laboratory. The text is taken from the 'Lehrbuch,' with here and there modifications of the phraseology, and with connecting new short parts to supply the place of some of the elided portions. The figures are nearly all from the 'Lehrbuch.'

Those who are familiar with the larger textbook will therefore have a very good conception of the character of the new volume and will find again the familiar merits and defects.

The author has been one of the foremost of embryological investigators, confining, however, his original researches to a few fields. On such topics as the history of the genital products he writes with full mastery of the subject, and his fine gift for the understanding of morphological problems, and his rare ability as an expositor, have combined to render all such parts of the volume of the very highest excellence. Unfortunately he seems to have been indifferent to the study of many other aspects of embryological study, and to have been satisfied with a somewhat vague aquaintance with many important parts of the science. This general defect shows very strongly in the absence of original illustrations, and in the fact that a large proportion of the minority of original figures are diagrams. Of these diagrams some are strangely incorrect, as, for instance, those of the development of the middle germ layers and those of veins. These diagrams indicate developmental processes, which are diametrically opposed to the observed facts. Equally unfortunate are his diagrams of the fœtal envelopes in birds and in mammals, since they are in part quite erroneous. As some of the figures are copies after inaccurate originals, there is need for still further revision: thus in Fig. 144, the amnion and chorion are wrongly represented, and the epithelium of the chorion is not only misdrawn but is labeled *decidua reflexa*. There are in the text also deficiencies which would certainly be corrected if the author's study of the embryonic conditions were made to a larger degree at first hand, for example, and notably in the case of the liver, the veins, the thymus, the pharynx and its appendages, the brain and certain other parts.

But though one may regret these and other deficiencies, some of which are very difficult to excuse, it remains true that the book deserves far more praise than fault-finding, and it ought to have a generous and hearty welcome, so that further editions may be called for soon, in which the author will have an opportunity to make the much-needed improvements. It is with regret that the reviewer finds himself obliged to qualify his recommendation of a work which he has found very helpful and stimulating.

C. S. Minot.

Studies of American Fungi: Mushrooms, Edible, Poisonous, etc. By George Francis Atkinson, Professor of Botany in Cornell University, and Botanist of the Cornell University Agricultural Experiment Station. Andrus & Church, Ithaca, N. Y., U. S. A., publishers. 8vo. Pp. i–vi, and 1–275, with 76 plates and over 150 text illustrations. Price, $3.00, postpaid.

In the publication of this book, which has just come from the Genesee Press, Rochester, N. Y., it seems desirable that the author should call attention to some of its features, the importance of which might at first be overlooked. In this connection it may not be out of place to first make some general statements regarding the book, a few of which are adapted from the introduction.

Since the issue of my 'Studies and Illustrations of Mushrooms,' as bulletins 138 and 168 of the Cornell University Agricultural Experiment Station, there have been so many inquiries for them, and for literature dealing with a larger number of species—it seemed desirable to

publish, in book form, a selection from the number of illustrations of these plants which I have accumulated during the past six or seven years. The selection has been made of those species representing the more important genera, and for the purpose of illustrating, as far as possible, all the genera of agarics found in the United States. This has been accomplished except in a few cases of the more unimportant ones. Nearly all of these genera, then, are illustrated by photographs and descriptions of one or several species, and in the more important genera like *Amanita*, *Lepiota*, *Pleurotus*, *Mycena*, *Lactarius*, *Russula*, *Paxillus*, *Agaricus*, *Coprinus*, etc., a larger number of species are very fully illustrated, showing stages of development in many instances, and with a careful comparison of the different kinds.

Among the other orders of the higher fungi many genera and species of the *Polypores*, *Hedgehog Fungi*, *Coral Fungi*, *Trembling Fungi*, *Puff Balls*, *Stinkhorns*, *Morels*, etc., are illustrated and described. Among these such genera as *Boletus*, *Fistulina*, *Polyporus*, *Hydnum*, *Clavaria*, *Tremella*, *Morchella*, etc., come in for a large number of species with beautiful photographs and careful descriptions. In making the descriptions they have been drawn from studies of living specimens, in many cases showing important characters of development. An attempt has also been made to avoid, as far as possible, technical terms; or to use but few such terms, and the descriptions are intelligible to one who is not a technical student of the fungi. There is some progression in the use of the technical terms in the book, fewer of them being employed in the first part of the book; here they are explained, so that the reader becomes gradually familiar with them. The first few chapters are devoted to a description, in plain language, of the form and characters of mushrooms, as well as the course of development. In addition, there is a chapter, at the close, dealing with the more technical characters, and illustrating them.

There are chapters on the collection and preservation of the fleshy fungi, how to photograph them and keep records of the important characters, which often disappear in drying; on the selection of the plants for the table, etc. Mrs. Rorer contributes an excellent chapter on 'Recipes for cooking Mushrooms,' and Mr. J. F. Clark one on the chemistry and toxicology of mushrooms. There are also complete analytical keys to the genera of the agarics found in the United States, and keys to the orders of the higher fungi. The glossary deals only with the few technical characters employed in the book.

The photographs have been made with great care after considerable experience in determining the best means for reproducing individual, specific and generic characters, so important, and so difficult to preserve in these plants, and so impossible, in many cases, to accurately portray by former methods of illustration. Over 200 of the illustrations are half-tone engravings from these photographs. Seventy of these are used as full-page plates and over 150 of the half-tones are text illustrations. Fifteen additional species are illustrated in color. In the legend of the half-tones, text illustrations, as well as plates, the color of the cap, stem and gills is given.

One feature, which the author regards as a very important one, needs explanation, since it might seem unnecessary to some to introduce it in the book. There is at present so much confusion in the determination of the American mushrooms, and so many references to them are made in some publications, which are unsupported by any evidence which would serve as a guarantee that the species has been rightly determined, or that it occurs at all in the locality cited, I have followed the plan in late years of preserving all the material from which the photographs are made, even of the common species.

Furthermore, all material collected and preserved for the herbarium, or for photographic purposes, is entered in a record book, even different collections of the same species, so that this material if divided and distributed will carry the original number. The negatives and photographs carry a corresponding number. In nearly all the photographs in this book, then, it is possible to find the actual specimens from which the photograph has been made if ever any doubt should arise as to the correct determination of the illustra-

tion in question. For this reason the number of the specimens from which the photograph has been made is given in parentheses usually following the description of the species. These specimens and photographs, then, become of nearly, if not quite, equal value to type specimens.

The purpose of the book is to present the important characters which it is necessary to observe, in an intelligible way; to present life-size photographic reproductions accompanied by plain and accurate descriptions, so that by careful observation of the plant, and by comparison with the illustrations and text, even a beginner will be able to add many species to the list of edible ones, where now, perhaps, the collections are confined to the 'pink unders.' The number of people in America who interest themselves in the collection of mushrooms for the table is small compared with those in some European countries. This number, however, is increasing, and if a little more attention were given to the observation of these plants and the discrimination of the more common kinds, many persons could add greatly to the variety of foods and relishes with comparatively no cost. The quest for these plants in the fields and woods would also afford a most delightful and needed recreation to many, and there is no subject in nature more fascinating to engage one's interest and powers of observation.

In addition to the purposes named above, the book has others. There are many important problems for the student in this group of plants. Many of our species and the names of the plants are still in great confusion, owing to the very careless way in which these plants have usually been preserved, and the meagerness of recorded observations on the characters of the fresh plants, or of the different stages of development. The study has also an important relation to agriculture and forestry, for there are numerous species which cause decay of valuable timber, or by causing 'heart rot' entail immense losses through the annual decretion occurring in standing timber. If the book contributes to the general interest in these plants as objects of nature worthy of observation; if it succeeds in aiding those who are seeking for information of the edible kinds; and stimulates some students to undertake the advancement of our knowledge of the group which may form a more scientific basis for their arrangement, it will serve the purposes the author had in mind in its preparation.

GEO. F. ATKINSON.

Engine Tests. By GEORGE S. BARRUS, S.B., New York, D. van Nostrand Co. 1900. 8vo. Illustrated. Pp. 338.

This work is of a kind always welcomed by the scientific practitioner in engineering; it is a collection of experimental data gathered together by a well-known and skilled expert of rare experience and, what is still more rare, one who is accustomed to compel every scientific device and method to his service in his professional work. Mr. Barrus was one of the first in his profession to make use of the laboratory and exact scientific methods of determining the quality of steam supplied by the boiler and received at the engine, and to correct the previously always approximate figures for engine and boiler efficiency by reference to this datum. He had the exceeding good fortune to be engaged in some of the first and most important of the scientific studies of engine and boiler efficiency made at the Massachusetts Institute of Technology. He went out into an extensive and varied and fruitful practice as consulting engineer for New England steam users and carried with him that knowledge of scientific methods and that appreciation of their value which made him a pioneer in the introduction of precise measurements into the practical work of the engineer. His publications represent the outcome of twenty-five years of excellent scientific work.

In 1891 Mr. Barrus published a volume of selected reports upon steam-boiler efficiencies, and its reception was such as to induce him to publish this volume on steam-engine data. The two volumes probably contain a larger body of recent and exact data of this kind than any similar mass of existing technical literature.

The introductory portion includes a carefully written account of the methods employed in securing the data submitted, as of measuring the feed-water, determining leakage, calibration of