that it has been found necessary to divide it into two volumes, the first volume discussing the morphology and physiology of plants, and the second volume the morphology and physiology of animals. In addition to various changes and expansions in the text, many new types have been added in the second edition. The most important of these new types are Vaucheria, Selaginella, Gregarina, Taenia, Ascaris, Hirudo, Anphioxus, and chapters upon plant cells and tissues, upon fish, upon geographical distribution, and one chapter devoted to man. In the groups of flowering plants also there have been very many additions, so that the whole new edition is nearly twice as large as the original. Perhaps the most valuable additions that have been made in the new edition have been in the sections upon physiology and development. In nearly every case has the physiology of the types been rewritten and expanded, and this is true also of the sections on development. Several additional sections upon the subject of Cytology, including cell development, fertilization, etc., have been added bodily to the work.

This book on biology is excessively compact, and there is crowded within these two volumes an amount of information and discussion which is certainly beyond that which can be accomplished by classes in our institutions. The book is designed, however, especially for certain phases in English education, and not for education in our schools. It is supposed to be accompanied by laboratory work, and the author has hopes that it does not require the guidance of a teacher, but is in a form by which it can be readily followed without guidance. No laboratory directions are given, however, and the details crowded into the sections on morphology are so numerous that it seems hardly possible to hope that they can be comprehended without a very long course of study under the guidance of competent instructors. As a referenee book, however, one cannot speak too highly of this text-book, and as a treatise in theoretical biology it occupies a place not filled by any other English publication.

An Examination of Weismannism. By GEORGE J. ROMANES. Chicago, Open Court Publishing Company.

ONE is always delighted to receive something new from the pen af Mr. Romanes, for he has demonstrated by many attempts his marvelous power of writing clear English and of taking abstruse subjects and dressing them in the fashion that makes them not only intelligible, but interesting to the ordinary reader. The little book here noted is published in anticipation of the second volume of "Darwin After Darwin," the publication of which we are awaiting. It seems a very surprising thing when one looks through the pages of this book, to find Weismannism discussed without a discussion of the subject of the inheritance of acquired characters, for so thoroughly has the inheritance of acquired characters come to be regarded as a part of Weismannism, that one wonders how the subject can be treated without it. But Mr. Romanes scarcely mentions this subject, reserving it, as he tells us, for discussion in his later book. The present discussion is simply a review of Weismannism as a theory of heredity and of evolution, and not as bearing upon the question of acquired characters. In this little work we are to thank Mr. Romanes especially for three features: First, the clear distinction that he has drawn between the Weismannism theory of heredity and his theory of evolution; second, a logical comparison of the heredity theory of Weismann with others somewhat allied to it, especially that of Galton; and third, for the skilful marshalling of the trenchant criticisms against Weismann's views, which have appeared in the discussions of the last few years, and have led to great changes in Weismann's own opinions. We are also fortunate in having given us a historical view of the gradual growth of the theory as it developed in the mind of its author and of the final abandonment of some of the most essential features of the original view.

No word is needed in regard to the excellence of the English and the plainness of the discussion, for Mr. Romanes' writings always show the most clear logical arrangement. The reader of this work cannot fail to gain a more comprehensive view of the general theory of Weismannism and its relation to biological problems, and will appreciate from this discussion, better than from the writings of Weismannn himself, the significance of the final position adopted by Weismann.

The Life of a Butterfly. By SAMUEL H. SCUDDER. New York, Henry Holt & Co. *Brief Guide to the Common Butterflies of Northern United States aod Canada.* By SAMUEL H. SCUDDER. New York, Henry Holt & Co.

THE object of these two books by our leading student of butterflies in the East is to present certain facts in a familiar way for the use of the student who is as a novice interested in the study of nature. The first book, of 180 small pages, gives a familiar description of the life of our most common and best known butterfly, the so-called milkweed butterfly, presenting, in a familiar and popular style, a description of the animal, of its life-history, and its general relation to its surroundings and to science. The author uses the example, as a basis for a discussion of a few striking scientific laws, most interesting of which will be, to the ordinary reader, the study of the geographical distribution and migration of animals, the subject of mimicry as shown by insects, the subject of the power of vision possessed by insects, and a very clear, satisfactory illustration of certain phases of the general law of natural selection. The general design of the book is excellent, and the style is, on the whole, well adapted to the persons to whom the book will appeal. It is unfortunate that no figures are inserted in the text. A small number of figures are put in at the end of the book, but no reference is made to them in the body of the book, and, consequently, the reader will follow the book through without the proper study of the figures which should go with the text. Perhaps, also, the author has made too free a use of scientific names of species of butterflies to be intelligent to the ordinary reader; but, with these few points of criticism, "The Life of a Butterfly," by Mr. Scudder, is one of the interesting and instructive introductions to nature which our scientists are at the present time endeavoring to put within the reach of the non-scientific reader.

The second book is very different in its nature, and is designed to enable the student of butterflies to determine the names and learn of the habits of all of our common species of butterflies. The author has selected one hundred of the commoner forms for description. The introduction of the book gives a long, careful description of the anatomy of a butterfly; and here, even more, it is to be extremely regretted that no figures are introduced. It is so much easier for the beginner to study specimens by the aid of figures of reference that one must seriously regret the lack of the introduction of explanatory figures in the text which describes the structure and anatomy of a butterfly. The description is followed by a key for determining the species of butterflies, and this key is especially valuable, inasmuch as it not only enables the student to determine the species by the use of the adult butterfly, but also has separate keys for determining species by the use of the caterpillar and of the chrysalis. These two secondary keys

will make this little book of very much more value to the novice than any other attempt to accomplish a similar purpose. Something over one hundred pages are devoted to a description of one hundred of our commonest butterflies, including not only a description of the butterfly, caterpillar and chrysalis, but a general account of the eggs, the habits, feeding plants and distribution of the species, giving the student thus a brief but comprehensive account of our knowledge of each different species. An appendix, which is fortunately illustrated by figures, gives directions to the student for collecting, rearing, preserving and studying specimens.

The two books together form a very valuable introduction into the study of New England insect life.

Cholera: Its Causes, Symptoms, Pathology and Treatment. By ROBERT S. BARTHOLOW, M. D., LL.D. Philadelphia, Lea Bros. & Co.

THIS little book, of 125 pages, is quite opportune in its publication at the present time, when the civilized world is once more agitated over the subject of cholera, and when we are believing that we have succeeded in so mastering the disease as to make the epidemics of former times impossible. Dr. Bartholow writes from an experience of his own through two epidemics, and his words are therefore more authoritative than they might be from one with no personal experience. The book deals with the history of the disease, with the various epidemics that have invaded Europe and America during the present century, and gives, also, a brief account of cholera in this country. It considers carefully the causes of the disease, and accepts the comma bacillus as the existing cause, though recognizing a large factor in personal predisposition toward the disease. The relation of the disease to drinking water is very satisfactorily shown by study of several epidemics in the world, and the details of their distribution through drinking water. The latter part of the book is more strictly for the use of physicians, being an account of the symptoms and treatment of the disease. A chapter on methods of prevention will, perhaps, from its practical standpoint, be the most valuable to the general reader, inasmuch as it is through preventive remedies, rather than through the treatment of the disease, that we are hoping at the present time to be able to stop the spread of this once dreaded scourge. The book is timely, well written and interesting.

Analytical Keys to the Genera and Species of the Water Algæ and the Desmidiceæ of the United States. By ALFRED C. STOKES. 1893. 177 pp. 1 pl. 8 vo.

THIS book has been prepared to serve as a key to the genera and species of Algæ and Desmids described in Rev. Francis Wolle's monographs of the two groups. In the introduction Dr. Stokes puts in a strong plea for artificial keys. He is aware that specialists usually look down upon such aids to a knowledge of their subjects, but he rightly thinks that the keys aid the beginner over the hard places in the new study. While the key can only enable one to find the *name* of an object, this name is what every one must find before he can begin any intelligible discussion concerning it. "The object," he says, "cannot be referred to by speech or in writing until its name is known. What other workers in other parts of the world may have said about it, or done with it, cannot be known until its name is learned, as without the name all indexes are closed in all the books in all the libraries. The name is the clue to further knowledge, its starting point, even the hook upon which further information is to be hung. Whatever advanced scientists may say to the contrary, their first effort—perhaps it is an unconscious one—but their first real effort is to ascertain the name of their new specimen. If it has none, they at once proceed to give it one. All the wild talk about the desirability of learning the name is wrong in principle. The name is, as everyone will cheerfully admit, only of secondary importance when compared with a study of habits or morphology, but it is as essential, since it is, and ever must be, the starting point for further investigations, at least on the part of the amateur." So the author has put much time into the making of these artificial keys, and there is no reason for not thinking that they will serve an excellent purpose in showing the way into the labyrinth of the Algæ and Desmids of the United States. J. F. J.

Human Embryology. By CHARLES SEDGWICK MINOT. New York, William Wood & Co. 1892. 815 p.

WE are extensive compilers of medical works in this country, but are far behind both England and Germany in biological text-books, This important work, by Professor Charles Sedgwick Minot, of the Harvard University Medical School, is actually the first of its kind which can be compared favorably with many similar works done abroad. It is written both for the student of medicine and of biology, and in the past few months since its appearance has taken its place in both these departments of science as a standard, based upon the higher modern conception of medicine as *applied biology.*

By the labors of Gegenbaur, Turner, Cunningham, the death knell of human anatomy taught *per se* has been sounded. It is safe to predict that not only in the brain, but in the muscles and viscera, all medical teaching of the near future will advance to the long ignored truth that man is not only a vertebrate, but a mammal and a descendant of the primates, and that a thoroughly intelligent conception of the human body can only be gained by comparison. Professor Minot will do much to further this progressive idea in medical instruction in this volume, which might very appropriately be called a text-book of vertebrate embryology. In human embryology we are, of course. limited to material obtained after death or by accident, and, considering these limitations, we are surprised by the vast amount of information which the author has brought together upon strictly human development, in addition to the ample treatment of the general features of development of lower types.

These results of ten years' original research and careful compilation from Kölliker, Hertwig, Balfour, Duval, his and others, are brought together in a volume of nine hundred pages which reflects the greatest credit both upon the author and the publisher. There are five hundred illustrations, many of them entirely original and altogether admirably printed. The work, as a whole, marks a great step forward, because it maintains a high level both in thoroughness and in form of publication, as the two essential elements of a successful work. It is difficult for any one not an embryologist to appreciate the labor represented in these pages. The progress of this branch of science has been so rapid, both in respect to fact and to theory, that in a work covering so much ground it is impossible to keep pace with fact and theory. It is this circumstance which should temper our criticism of some portions of the work which are not quite up to date.

The volume opens, appropriately, with a description of the uterus and a general outline of human development. The history of the ova and spermatozoa follows, concluding with the theories of sex. The author is well known as having early advanced the theory that the mature sexual elements differ in respect to sex, stated broadly, that the ovum is a female and the spermatozoan is a male cell. Now, this theory, with others of a similar character, has broken down under the criticisms of Weismann and researches of Hertwig, and has been generally