negie Lyceum, February 3, 8 P.M.) to sustain your assertions against its accuracy. Miss Lind-af-Hageby will be glad to show you that you are in great error. Very truly yours,

DIANA BELAIS

New York, January 31.

We have received a similar letter from a woman who says she wrote the leaflet. She shall be nameless. It is typical of the light-hearted irresponsibility of the anti-vivisectionists that neither the woman who is responsible for the publication of the leaflet nor the woman who boasts of having penned it offers the least defense of her part in the matter. Instead we are told that a certain young woman from England "will be very pleased to meet any one in debate." This young woman, we may remark, was joint author of a scandalous publication entitled "The Shambles of Science," which the publisher was compelled to withdraw from circulation several years ago, with a public expression of "sincere regret for having printed and published the book in question." We have no desire to enter into any controversy with this woman, who confesses that she has some difficulty in finding opponents at debate in the country of her adoption—a circumstance which does not astonish us in the least.

Mrs. Belais boldly proclaimed the other day that no "unjustified assumptions or allegations" were published by her precious society. We picked up a leaflet and extracted this single passage: "Pasteur and his followers increased a very rare disease called rabies, and are making fortunes out of the anti-rabic virus." To call this an "unjustified assumption" is to state the case mildly. It is nothing less than an infamous and malicious lie. And we maintain that it is a disgusting spectacle to see so great a benefactor of the human race as Pasteur treated in this frivolous manner by a parcel of unscrupulous women.—New York *Evening Sun.*

SCIENTIFIC BOOKS

Biology and Its Makers. By WM. A. LOCY. With portraits and other illustrations. New York, Henry Holt & Co.

It was the purpose of the author of this book to give "an untechnical account of the rise and progress of biology" which "would be of interest to students, teachers, ministers, medical men and others"; "to bring under one view the broad features of biological progress and to increase the human interest by writing the story around the lives of the great leaders." "The portraits [82 in number] with which the text is illustrated embrace those of nearly all the founders of biology." The scope of the volume is best seen from its table of contents:

Part I.—The Sources of Biological Ideas Except Those of Organic Evolution. Ch. I. An Outline of the Rise of Biology and of the Epochs in its History. Ch. II. Vesalius and the Overthrow of Authority in Science. Ch. III. William Harvey and Experimental Observation. Ch. IV. The Introduction of the Microscope and the Progress of Independent Observation. Ch. V. The Progress of Minute Anatomy. Ch. VI. Linnæus and Scientific Natural History. Ch. VII. Cuvier and the Rise of Comparative Anatomy. Ch. VIII. Bichet and the Birth of Histology. Ch. IX. The Rise of Physiology—Harvey, Haller, Johannes Müller. Ch. X. Von Baer and the Rise of Embryology. Ch. XI. The Cell Theory—Schleiden, Schwann, Schultze. Ch. XII. Protoplasm and the Physical Basis of Life. Ch. XIII. The Work of Pasteur, Koch and others. Ch. XIV. Heredity and Germinal Continuity—Mendel, Galton, Weismann. Ch. XV. The Science of Fossil Life.

Part II.—The Doctrine of Organic Evolution. Ch. XVI. What Evolution is: The Evidence upon which it Rests, etc. Ch. XVII. Theories of Evolution—Lamarck, Darwin. Ch. XVIII. Theories Continued—Weismann, De Vries. Ch. XIX. The Rise of Evolutionary Thought. Ch. XX. Retrospect and Prospect. Present Tendencies in Biology. Reading List. Index.

This book is of much value and should be placed upon the shelves of all school libraries. Biologists will find it a convenient book of reference. Few readers will be so well informed that they will gain no information from its pages. Of especial value are the portraits, many of which are rare and unfamiliar.

The volume is a compilation. Its author makes free use of other studies in the same field, and accepts, for the most part, the gen-

eral judgment as to the men whose work he describes. These judgments and characterizations are occasionally rather naïvely expressed, but the reader is not often inclined to take exception to them, though in certain instances one must do so. For example: The somewhat extended reference to Ehrenberg's work on the protozoa and the very brief mention of Stein is hardly consistent with the fact that Ehrenberg's work, though extensive, was inaccurate and as a whole made no such valuable contribution to our knowledge of this group as did Stein. Richard Hertwig's influence upon the progress of protozoology has hardly been second to that of Bütschli. In the chapter upon classification no emphasis is laid upon the recognition of the sponges as clearly distinct from and sharply contrasted with all the other metazoa. In the discussion of advances in cytology no mention is made of the evidence that the male and female parents are equipotential heredity, nor is there any reference to the work of Richard Hertwig, Schaudinn and others upon the presence and behavior of generative and vegetative chromatin in the cell, though these subjects are surely as important as recent studies of cell-lineage and regeneration which are mentioned. One wonders if the author's confidence that vitalism is a wholly mistaken conception (p. 181) is justified. Are psychic phenomena chemical and physical?

The descriptions of the men and their work and place in the progress of biology are not so vivid as they are, for example, in Foster's "History of Physiology," but this doubtless is in part due to the greater scope of the book and its necessarily briefer treatment of each man and his period. The treatment impresses one not as masterful, but as faithful, and in general sound. In its reference to modern workers, American students receive disproportionate mention, but in a volume designed for American readers, this is perhaps not unnatural.

The second part, dealing with the doctrine[1] of evolution, is not so satisfactory as Part I. The author might have been more successful in his attempt to condense into brief statement the essential features of the theory. He might well have included reference to isolation as a factor in evolution, and perhaps, even in so condensed a treatment as this, organic selection might be mentioned. The presentation of Mendelism (p. 316) would hardly be clear to any one not already familiar with the subject. The statement (p. 389) that "sexual selection is almost wholly discredited by biologists" is of course a mistake. Probably all recognize its past importance among human kind, and some believe that it will in time become of greatly increased importance in human evolution.

A few inaccurate statements, and some of doubtful truth, might well be modified in a second edition. Weismann's theory of heredity was presented in his essays upon heredity some years before the appearance of his volume "'The Germ Plasm' published in 1893." Is it true that "Davenport, Tower and others have made it clear that species may arise by slow accumulations of trivial variations, and that, while the formation of species by mutation may be admitted, there is still abundant evidence of evolution without mutation?" It seems, on the contrary, increasingly probable that fluctuating variations do not form a basis for the evolution of new species. It is difficult to see the author's meaning in his statement (p. 404) that "neither mutation nor natural selection is a substitute for the doctrine of the continuity of the germ plasm," or in the statement (p. 405) that "the body cells are not inherited"; and we can not but object to the form of the statement (p. 406), that "natural selection presides over and improves variations arising from mutation," and to the last phrase in the sentence (p. 316). "In this country the experiments of Castle, Davenport and others with animals tend to support Mendel's conclusion and lift it to the position of a law." Sexual selection in the sense now accepted, though not in Darwin's usage, has no relation to the "law of battle" (p. 413). In view of evidence presented by Poulton in his address at

[1] Theory might be a better word, for the word doctrine carries with it, not logically but actually, a little of the flavor of the word dogma.

the Darwin celebration in Baltimore last Christmas, there is need of modifying the statement (p. 414) that "it is altogether likely that Lamarck was wholly unacquainted with" [Erasmus] "Darwin's work, which had been published in England." Charles Darwin lived at Downe not Downs.

Is it true (final chapter, p. 441) that experiments with "artificial fertilization by changes in osmotic pressure . . . have greatly altered opinions regarding the nature of fertilization, and of certain other phenomena of development," or (p. 442) that "recent advances in physiological chemistry have greatly widened the horizon of our view regarding the nature of vital activities"? Would not both statements be stronger if more modest in their claims for the results of recent research in these most important fields? It is doubtful if even in a popular book of this sort it is justifiable to attempt to state the duration of geologic periods in years (cf. p. 344–5).

One finds in the book some phrases and sentences whose form is not beyond criticism —(p. 443) "studies of a pathological character"; (p. 294) "sheep and other cattle"; (p. 383) "pigeons and other fowls"; (p. 429) Wallace is said to be "notable for the publication of important books, as the 'Malay Archipelago,'" etc.; the phrase "fossil life," is frequently used, once it appears as "fossil vertebrate life"; it seems strange (p. 337) to refer to Leidy, Cope and Marsh as "these gentlemen" instead of these men. They were big enough to deserve the bigger word. Why does it seem strange (p. 335) to speak of Huxley shedding light "*in* the province of paleontology," for the phrase is good and is exactly what is meant; or why does one smile when the author refers (p. 190) to Johannes Müller as "one of the lights of the world."

A few errors which escaped the proof reader will doubtless be corrected in another edition. The index is so incomplete as to lessen the usefulness of the book. Many important subjects and men treated in the text are not mentioned in the index. Such a historical account does not soon become out of date. It will surely have a number of editions and its minor defects can readily be removed.

Professor Locy has done good service in bringing together into one volume information as to the development of all the broader phases of biology and in presenting a general view which is, on the whole, so sound and well balanced.

MAYNARD M. METCALF

OBERLIN, O.,
January 29, 1909

The Young of the Crayfishes Astacus and Cambarus. By E. A. ANDREWS. Smithsonian Contributions to Knowledge. Vol. XXXV. Pp. 1–80, pls. I.–X. Washington. 1907.

The European crayfish has been upon the whole exceptionally fortunate in its biographers, for with it are associated the names of such excellent observers as Réaumur, Roesel von Rosenhof, Rathke, Huxley and Reichenbach, whose combined work, and more especially that of Huxley, have made it a classical type in the teaching of modern zoology. It is accordingly a little surprising that the American species, especially of *Cambarus,* which everywhere abound, should have escaped that careful analysis of their habits and development which their importance would seem to demand, until a series of papers extending to the monograph under review was begun by Professor Andrews five years ago.

The distribution and description of the many species, as well as the embryology and physiology of the common *Astacus fluviatilis* of Europe form the subject of a rather extensive literature, while the behavior and development of the young after leaving the egg, and the interesting family life first described by Roesel more than a hundred and fifty years ago, have hitherto received but scant attention. As the author suggests, this neglect may be attributed in some measure to the lack of a complete metamorphosis for which the crayfishes have been distinguished from the time of Rathke. Since their young are invariably hatched in a form which closely resembles the adult, greater interest has been taken in the life histories of marine crabs and shrimp, which, as a rule, hatch from