

## THREE TEXT-BOOKS IN BIOLOGY

*The Principles of Biology.* By J. I. HAMAKER.

Philadelphia, P. Blakiston's Son & Co. 1913. 8vo. Pp. x + 459. 267 illustrations.

Within the brief space of 438 pages, the author of this little volume has condensed a large amount of accurate information. As is stated in the preface, the book has been prepared as a substitute for the lecture notes of the ordinary pupil and of its superiority over such sources of information, or misinformation, there can be no doubt. After a very brief introduction, there follows over a hundred pages on plant biology and over three hundred on animals. Brief laboratory directions are included and a great variety of subjects are dealt with. A general review of plant physiology is followed by an account of the classes of plants and a consideration of their ecology. In a similar way the general physiology and morphology of animals is followed by a description of the classes of the animal kingdom. The whole account is concluded by an interesting section on general principles such as the structure of the cell, embryology, origin of species, adaptations, etc. In fact the list of headings at once indicates the scope and shortcomings of the book, for with so much to be covered and with so little space in which to do it, much of the treatment is necessarily abridged and inadequate. Yet as a condensation the volume has many points in its favor. The illustrations are often very good, particularly some of those taken from photographs of the original objects.

*Elementary Biology. Plant, Animal, Human.*

By J. E. PEABODY and A. E. HUNT. New York, The Macmillan Company, 1913. 8vo. Pp. xxi + 170 + 194 + 209. Over 300 illustrations.

This volume is avowedly intended for high schools and covers those parts of botany, zoology and a study of the human being that are most worthy of emphasis. The general structure and physiology of plants is first dealt with, then their relation to human welfare, and finally their classification. Under animal biology chapters are devoted to insects, birds, frogs, fishes, crayfishes and their allies, and the

one-celled animalcules. The remaining groups of the animal kingdom are briefly considered in a final chapter. The section on man is mostly concerned with his physiology. The chapter on stimulants and narcotics is particularly to be recommended in contrast to similar chapters in the older school physiologies. There is an appendix that contains many useful suggestions to the teacher and the volume is concluded by a good index. Most of the illustrations are excellent, but in Fig. 26 the size of the head in comparison with that of the viscera is quite misleading and Fig. 99 is unnecessarily crude. It is to be regretted that the three sections of which the book is composed should have been separately paged and their figures separately numbered. It is difficult to see how this can be anything but an inconvenience unless it is intended to allow the publisher to divide the book easily into its three separate parts.

*An Introduction to Zoology.* By R. LULHAM.

London, Macmillan and Co., Limited, 1913. 8vo. Pp. 457. 328 illustrations.

This volume is on most conservative lines even to the classical quotation preceding the introduction. It takes up in methodical fashion group after group of the invertebrates and thus includes an account of all the chief divisions of the lower animals. The author believes there is place for such a compact volume as this and that it should be read by those pupils who spend much of their time in the laboratory. The book is like so many that have been published in the last decade that it carries scarcely the air of novelty. In a reading text such as this it is unfortunate that so interesting and important a group as the chordates should have been intentionally omitted. For originality of treatment and an air of modernity this volume is much behind the other two already noticed.

G. H. PARKER

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THE ATOMIC WEIGHT OF LEAD OF RADIO-ACTIVE ORIGIN

THE atomic weight of lead obtained from radioactive minerals has recently been studied

by Professor Theodore W. Richards, of Harvard University, and Mr. Max E. Lembert, who came to America from the Grand Ducal Technical School of Karlsruhe for this purpose, on the initiative of Professor Bredig and Dr. Fajans. The latter well-known investigator, as well as Sir William Ramsay, Professor Boltwood, Miss Gleditsch and Mr. Miner generously provided the experimenters with residues containing lead of this sort. It was found that all the lead obtained from uraninite, carnotite or thorinite exhibited a lower atomic weight than ordinary lead, the deficiency amounting in one case to as much as 0.75 unit. The ultra-violet spectrum of a typical specimen appeared to be exactly identical with that of ordinary lead. The necessary inference seems to be that lead from radioactive sources consists of a mixture of at least two substances, of which one is ordinary lead. The foreign substance must be very similar to ordinary lead and very difficult if not impossible to eliminate by chemical means; for many precautions were taken to purify the samples. This amazing outcome is contrary to Harvard experience with several other elements, notably copper, silver, iron, sodium and chlorine, each of which has been found to have a constant atomic weight, no matter what the source may have been. The new results on radioactive lead are qualitatively in accord with a recent hypothesis brought forward independently by Fajans, by Russell, and by Soddy, although quantitatively not exactly consistent with it. A preliminary paper, setting forth the detailed methods and results, was sent to press on May 14, and will appear in the July number of the *Journal of the American Chemical Society*. The research was generously subsidized by the Carnegie Institution of Washington.

#### SPECIAL ARTICLES

##### THE PRODUCTION OF MALES AND FEMALES CONTROLLED BY FOOD CONDITIONS IN HYDATINA SENTA

THE factors that regulate the production of the sexes in the rotifer *Hydatina senta*

have been zealously sought for during the past twenty-five years and various results have been obtained. Temperature, starvation of the young females, unknown external agents, and finally the intangible unknown internal factors, have been decided to be the potent influences that regulate the sex ratio in the parthenogenetic reproduction.

Mitchell<sup>1</sup> has recently experimented with the rotifer *Asplanchna* and has found that a sudden change of the food will bring about the production of a certain one of the polymorphic forms of this rotifer. This particular form of the female produces males. He therefore concludes that a change of food eventually causes male individuals to be produced. He suggests that this food factor may be found to regulate the sex production in *Hydatina senta*.

Some time ago it was shown by Whitney<sup>2</sup> that uniform food conditions caused a production of only females for 289 generations in *Hydatina senta*. Since that time many attempts have been made to find some food conditions that would cause the females to produce only male offspring. Many kinds of mixed cultures of various protozoa have been tried as food and a varied assortment of results have been obtained. This winter pure cultures of several species of protozoa have been grown and more definite results have been obtained. Several kinds of colorless flagellates as well as several kinds of green flagellates were reared and used as food for *Hydatina senta*. Some were tried as a continuous diet and others were used in an interrupted diet. The colorless flagellate, *Polytoma*, was found to be the most satisfactory as a continuous diet for producing only female offspring. A species of the green flagellate *Dunaliella* (Teodor) or *Chlamydomonas* (Cohn) was found to be the most effective in causing the females to produce a high percentage of male offspring by an interrupted diet.

Some fertilized eggs were taken in November from a covered culture jar of rotifers that

<sup>1</sup> *Jour. Exper. Zool.*, Vol. 15, August, 1913.

<sup>2</sup> *Biol. Bull.*, Vol. 22, 1912.