

index. Though the book covers too wide a field to afford a thorough treatment of special subjects, it furnishes a useful, concise introduction for students to the general principles of hydraulics, and the machines relating to water.

*The Story of the Chemical Elements.* By M. M. Pattison Muir, M.A. Pp. 189. (London: George Newnes, Ltd., 1897.)

THIS book forms one of a series constituting a "Library of Useful Stories," and the object of the author has been to "put forth in some kind of orderly sequence a few of the chief guiding conceptions of chemistry" as exemplified by familiar things and phenomena. Mr. Muir deals with his subject in a philosophical spirit, but we fear he assumes too much of the same spirit in his readers for the book to prove really attractive to people unacquainted with chemistry. It is difficult to expound the elements of chemistry otherwise than by experiment—impossible, in fact, to do so satisfactorily—and we should imagine that the readers for whom the book is intended are of the kind that require very careful wooing. Nearly one quarter of the book is devoted to carefully marking out the distinction between elements and "not-elements," and between physical and chemical change; and though much pains have been taken to interweave homely and attractive illustrations, we doubt very much whether the desired end will be reached. Distinctions of the kind in question cannot be said to be intrinsically interesting, and we think that the author exaggerates both their importance and the nicety of treatment required for the main purpose of his book. The task attempted by Mr. Muir is, as already remarked, a hard one, and when we recall the opinions which he has so often expressed concerning the right method of teaching chemistry, we cannot suppose the task to have been entirely congenial. A. S.

*Physics: an Elementary Text-Book for University Classes.* By Dr. C. G. Knott. Pp. vi + 351. (London: Chambers, 1897.)

IN taking up such a book as that of Dr. Knott's, one cannot help feeling that the attempt to treat such a subject as physics within the limits of a book of between three and four hundred pages, must be attended with extreme difficulty. When, on further perusal, we notice that this work contains references to such subjects as contours, determination of the mean density of the earth, the theory of the formation of mirages both erect and inverted—to mention only a few of those matters which the elementary text-book usually leaves out of consideration—we are struck with amazement. But though it might be said that Dr. Knott treats "*de omnibus rebus et quibusdam aliis*," he has succeeded beyond expectation in making his book not only readable but attractive. To one who has read the subject in other works, or who has attended a series of lectures, it will prove most useful as a help to revising his knowledge and giving him a general view of the whole science, which every year makes it more difficult to obtain; and we feel certain that many a student of physics will be grateful to Dr. Knott for furnishing him with such a useful compendium.

*Le Déterminisme biologique et la Personnalité Consciente.* By Félix Le Dantec. Pp. 158. (Paris: Alcan, 1897.)

THIS volume is a sequel of the author's "*Théorie nouvelle de la vie*," which was published last year. The most interesting feature of that theory was the doctrine that constructive activity of living substance was to be regarded as the chief accompaniment of work, while destruction of tissue took place chiefly during rest. In this work consciousness is regarded as an epiphenomenon which in no way interferes with biological determinism. The author assumes the existence of a molecular consciousness which arises from atomic consciousness, and, by a process of fusion, passes

into plastidular consciousness, or that of the lowest living organic element. The consciousness of man or of the higher animals is regarded as the sum of the individual consciousness of the neurons of which the nervous system is composed, and is dependent on the arrangement of the neurons. Starting from these assumptions, the author adopts the views of Duval and Ramon y Cayal, and explains such modifications of consciousness as sleep and altered personality by differences in the relations of the neurons to one another.

*Report of Observations of Injurious Insects and Common Farm Pests during the year 1896, with Methods of Prevention and Remedy.* By Eleanor A. Ormerod, F.E.S., F.R.Met.Soc., &c. Pp. 160. (London: Simpkin, Marshall, Hamilton, Kent, and Co. Ltd., 1897.)

MISS ORMEROD'S reports are so well known among economic entomologists, that it is almost unnecessary to state that the latest of her valuable volumes (the twentieth) furnishes interesting and serviceable information upon the insect pests prominent in 1896. One of the worst insect attacks of the season was that of various kinds of caterpillars to leafage of forest and fruit trees. In various localities in Kent, Sussex, Surrey, Hampshire, and other counties, in May last, hundreds of trees were stripped of their leaves by caterpillars of the Oak-leaf Roller Moth, the Mottled Umber Moth, and of the Winter Moth. Miss Ormerod describes the life-histories of these pests, and the measures used to prevent the attacks. A very important account is given of the occurrence of "Onion-sickness," arising from the presence in the bulbs, of the Stem Eelworm, known in this country as causing "Tulip-rot" in Oat-plants, and "Stem-sickness" in Clover. Among other insect pests described, with the means of exterminating them, are the Codlin Moth—one of the yearly troubles of the fruit-grower; Beet Carrion Beetle, which has taken to feed on potato leafage; White Cabbage Butterflies, German Cockroach, Common Earwig, Caddis Worms, Pear and Cherry Sawfly, and Surface Caterpillars.

Miss Ormerod pays an affectionate tribute to the memory of her sister, whose death last August deprived her of a constant companion ever ready to assist her in the investigation and illustration of the life-histories of injurious insects.

*Grasses of North America.* By W. J. Beal. Vol. ii. Pp. 706. (New York: H. Holt and Co., 1896.)

THE first volume of Dr. Beal's "*Grasses of North America*" was published in 1887, and was a work intended more especially for farmers and students, comprising chapters on the physiology, composition, selection, improving, and cultivation of grasses and clovers. The present volume may be regarded as a separate work. It is confined to the Gramineæ, and constitutes a monograph of the North American grasses, native and introduced, with an illustration of each genus. Some idea of the magnitude of the task may be gathered from the fact that the native grasses alone of North America number about 1275 species, included in about 140 genera; while in Europe there are only 47 genera and 570 species. The author brings to his subject a wide practical knowledge, which will make the work of great value to systematic botanists. There is a useful chapter on the geographical distribution of North American grasses, and a copious bibliography is appended.

*The Culture of Vegetables for Prizes, Pleasure, and Profit.* By E. Kemp Toogood, F.R.H.S. Pp. 127. (Ulverston: William Holmes, 1897.)

COTTAGE gardeners will find in this little volume many useful hints on varieties of alimentary plants, soil-working, rotation, manures, garden pests, and vegetable culture generally. The book is a trustworthy and practical guide, dealing with methods alone, little attention being given to the principles underlying them.