for those of a liquid are greater than the attractions———' p. 142; 'zinc has a greater affinity for oxygen than copper,' p. 386; 'the bond uniting the hydrogen to the acid radical SO_4 will be ruptured,' p. 388; 'an electrolyte capable of a reaction with one of the conductors,' p. 388, should be retained in a modern text-book. Exception must be taken also to the use of the word 'molecule' on p. 237 without any explanation; to the phrase 'mechanical equivalent at 15° C.,' on p. 264; to the explanation of what is meant by a 'reversible' cycle on p. 269; to the definition of the 'ampere;' to the use of the expression 'stationary waves;' and to the expression 'it is assumed that the current enters.'

Certain explanations are undoubtedly erroneous, such as those of electrolysis, scintillation and the theory of 'angle of contact' in capiliarity; while others are not rigid or not definite, such as those of the simple pendulum, the barometer, Röntgen rays, iridescence.

There are several slight mistakes throughout the book, such as the incomplete statement of Döppler's principle, the use of R instead of R_o in the two formulæ of Van't Hoff on pages 236 and 240, the statement on page 263 that there are discrepancies between the values of the mechanical equivalent as found by the two methods.

As a text-book of the character evidently planned by its authors this treatise must, however, be considered most successful. It is a book to which every student would have occasion to refer from time to time, and which contains within its covers much more matter than any existing book of its class. The style is pleasant, attractive and definite, and every laboratory and library would do well to purchase the book.

J. S. AMES.

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The Principles of Stratigraphical Geology. By J. E. MARR. Cambridge Natural Science Manuals, Geological Series. Cambridge, University Press; New York, The Macmillan Co. 1898. Pp. 304.

Here is a book on a single department of geological science which is the type of many another. Written to give students some idea of the methods and scope of stratigraphical geology, it combines a digest of the contents of larger standard manuals, with an elaboration of some points according to the author's views, and requires for its full understanding a familiarity with structural and dynamical geology, the nomenclature of paleontology, and a minute acquaintance with the local nomenclature of English geography.

The omissions in the earlier chapters imply that the student is preparing for field work after having read Lyell's Principles and Geikie's or some other text-book, while the substance of the chapters reads like lectures given to a class of beginners.

The second half of the book is by far the more valuable, in that it gives a brief, but clear and well-written summary of the stratigraphy of Great Britain, with here and there references to the more conspicuous points of stratigraphical classification in other countries. The stratigraphy of England, Wales and Scotland is described with just enough detail to bring out the differences of sedimentation in separate regions for each period, and shows the growth of the island during geological time.

A fuller treatment of this element of stratigraphy is given in Jukes-Brown's 'Building of the British Isles.'

Some of the author's peculiarities are seen in his classification and use of terms.

Lapworth's term Ordovician is adopted. In his list of systems are included Permo-Carboniferous and Permian, in addition to the Carboniferous.

The grounds of this usage are 'primarily' the recognition of an unconformity between the Carboniferous and Permian in England; and secondly, the correlation of a portion of the Salt Range strata of India as intermediate between these two 'systems' of the English column.

In the Cenozoic six 'systems' are cited, viz: Eocene, Oligocene, Miocene, Pliocene, Pleistocene and Recent; but we are told in the text that these are hardly systems in the sense in which the term is used in the case of the older rocks. Further on, the chapters describing these formations are headed as follows: 'The Eocene Rocks,' 'Oligocene and Miocene

Periods,' 'Pliocene Beds,' 'Pleistocene Accumulations,' 'The Steppe Period,' etc.

The abysmal origin of the black shales of the Ordovician, with graptolites, is defended on the following grounds: The persistence of lithological characters over wide areas; their replacement by much greater thickness of normal sediments along ancient coast lines; the frequent occurrence together of blind trilobites and those with abnormally large eyes, and the interstratification of the black shales with radiolarian cherts similar to the modern abysmal radiolarian oozes.

The glacial origin of the boulder beds of the Talchin stage of the Indian series, proposed by W. T. Blanford, is accepted; and confirmatory evidence is cited in the cases of the similar signs of glaciation in beds of a corresponding age in Australia, South Africa and southern Brazil.

As a digest of the general facts of British geology in its special nomeclature the book will be of value to those who have not access to the fuller treatises.

HENRY S. WILLIAMS.

The Examination of Water (Chemical and Bacteriological). By WILLIAM P. MASON. New York, John Wiley & Sons. 1899. Pp. 135.

The progress that has been made during the last decade in methods of sanitary water analysis, and especially in the interpretation of the results of such analysis, amply justifies an attempt at the marshalling of the new data and the revaluation of the old. To both students and practical workers the need of a really modern treatise in the English language has become imperative, and Professor Mason's little book will, on this ground, be cordially received. It will be a fact regretted by many, however, that the present work is so limited in scope. While the author correctly insists upon the paramount importance of a complete knowledge of the source of a sample of water and of the conditions under which the sample is collected, and rightly emphasizes the futility of 'standards' of purity, he has evidently not intended to include in this book any discussion of some of the other and most vital problems of water analysis.

The various methods for the determination of chlorine, nitrites, nitrates, free ammonia, albuminoid ammonia, etc., and the other significant chemical tests are described in the second chapter, and the author's selection of recommended methods will, on the whole, meet with general approval. The useful 'normal chlorine' maps, prepared respectively by the Massachusetts and Connecticut State Boards of Health, are reproduced and the hope is expressed that the task of the water-analyst will, in the future be made still easier through the preparation of similar charts by other Commonwealths.

Some analysts will consider that more stress might have been profitably laid upon the Hehner method for the determination of 'permanent hardness,' especially in view of the fact that this method has been found greatly superior to the 'soap test' in dealing with the waters in some parts of the United States. In this chapter, too, it will occasion some surprise to find no reference whatever to the Kjeldahl method for determining organic nitrogen.

In the chapter upon bacteriological examination the author seems to be treading on less familiar ground than in the preceding section. In his description of the method of preparation of sugar bouillon the importance of the preliminary removal of muscle-sugar is overlooked, as is the fact that the indol test may be vitiated by the presence of muscle-sugar in the broth. Miquel's method of examination and his theory of 'auto-infection' of waters are given a much more important place than would be accorded them by most bacteriologists. The author's statement on p. 117 that 'great cold is not fatal to germ-life' certainly needs some revision.

EDWIN O. JORDAN.

A Monograph of the North American Potentilleae. By PER AXEL RYDBERG. Memiors from the Department of Botany of Columbia University. Volume II. Issued November 25, 1898. 4to. Pp. 223. 112 plates.

Some years ago Dr. Per Axel Rydberg, a Scandinavian botanist educated in America, became interested in the group of the Rose Family which contains the *Cinquefoils*, and which have been known as the Potentilleae. Finding in the great collections of Columbia University (now transferred to the New York