

of the Upper Pebble-beds are more than 1300 feet thick, and that they are highly charged with water. This thickness is altogether without precedent, and Liverpool is to be congratulated upon being built upon so great a thickness of water-bearing Triassic rocks. Mr. Morton, should the work reach another edition, would do well to deal at greater length with the water-supply available from the Triassic strata. Mr. Boulton has tabulated the well-sections, and all students of the geology of Liverpool would do well to examine his valuable tables.

We would call special attention to Mr. Morton's section—unfortunately, the work is not divided into chapters—on the origin of the estuary of the Mersey. While the river has been draining its present watershed from a period far more remote than the Pleistocene age, he holds that the estuarine portion is comparatively modern, dating probably not further back than post-Roman times. It would not, he argues, following Sir James Picton, have been neglected by the Romans, if it had then "presented the copious body of water which it does at the present day." There is no evidence that they did neglect it. The Manchester Ship Canal works have revealed the existence of Roman remains, probably the Veratium of the anonymous geographer of Ravenna, on the banks of the Mersey close to Warrington, and Mancunium (Manchester) is on one of its tributaries. They used it, as they used all the rivers of Britain, for their own ends. Deva (Chester), the great port, and military centre of the north-west, was not far off, and amply sufficient for the western trade at a time when there were no ports in Ireland. The commercial importance of the Mersey is solely due to the trade with the New World. There was no reason why the Romans should have paid special attention to the estuary of the Mersey; and it was outside the system of their roads. Nor can the date, 1279, of the great inroad of the sea over the Stanlow Marshes, by which the Abbey of Stanlow, built upon a rock only 28½ feet above O.D., lost much of its land, be taken as evidence of the modern formation of the estuary. The river swings to and fro at the present time, depositing silt here, and carrying away its banks there. In our opinion, therefore, the post-Roman origin of the Mersey is not proved. It is still less likely that it is the result of a local submergence, which has not affected Warrington and the adjacent area of Chester. As the evidence stands, the date of the estuary of the Mersey belongs to the same remote prehistoric period as the estuary of the Thames and of the Humber—certainly after the time of the boulder clays, and probably long before there were any written records in Britain. All three are later than the time of the submarine forest which, on the west of Britain, afforded shelter, not merely to our Neolithic ancestors, but to their domestic animals, such as the small short-horn (*Bos longifrons*), the goat, and the dog.

W. BOYD DAWKINS.

OUR BOOK SHELF.

Les Microbes, les Ferments, et ses Moisissures. Par le Dr. E. L. Trouessart. Deuxième Edition. Bibliothèque Scientifique Internationale. (Paris, 1891.)

THIS is not only an enlargement but a distinct improvement on the first edition. Chapters i. and ii., as in the

first edition, give an excellent though short account of the morphology and physiology of fungi and of yeast. Although chapter iii. (on bacteria) is enlarged, we do not think it is sufficiently up to date; thus, for instance, on pp. 74 and 75, the author questions the existence of true flagella in bacteria, and states that their motility is essentially different from that of flagellate infusoria. Again, in the section in which putrid decomposition is described no mention is made of the entire tribe of Proteus, the essential microbe of putrefaction.

Chapters iv. and v. (pathogenic bacteria) are considerably enlarged, both as to text and illustrations. The rest of the book, chapters vi.–ix., does not differ in any essential respect from its predecessor.

On the whole, the book is very commendable as a concise text-book, well written and copiously illustrated, and as such deserves a high place in the literature of the subject.

Botanical Wall Diagrams. Size 31½ inches by 24 inches, printed in colours. (London: Society for Promoting Christian Knowledge, 1891.)

A FIRST instalment of six of these diagrams is now published. The plants illustrated so far are: common elder, deadly nightshade, scarlet runner, hop, Virginia tobacco, and wild camomile. We do not know on what principle the selection has been made. It is rather a pity that, out of so small a number, two (deadly nightshade and tobacco) belong to the same natural order, and show no very essential structural differences. In time we hope that all the important orders will be represented. The drawings (executed by Engleder, of Munich) are quite artistic, and the colouring excellent. The diagrams are thus very pleasing as pictures, and at the same time the botanical details are correct.

If the series is continued as well as it has been begun, it ought to be a very useful help in the elementary systematic teaching of botany. D. H. S.

Chambers's Encyclopædia. New Edition. Vol. VII. (London and Edinburgh: W. and R. Chambers, Limited, 1891.)

NO one who has had occasion to refer to the new edition of Chambers's "Encyclopædia" can have failed to appreciate the care and ability with which it is being prepared. The editor has been fortunate enough to secure the co-operation of many eminent writers, and the information given in the various articles, speaking generally, is well up to date and presented in the way most likely to be convenient for students. We are here concerned only with the papers on scientific subjects, and these, in the present as in the preceding volumes, are in every way worthy of the place which has been assigned to them in the scheme of the work as a whole. Prof. P. G. Tait contributes a short but masterly paper on matter, and Dr. Buchan gives a clear and interesting account of meteorology. The essential facts about the Mediterranean are compressed into very small space by Dr. John Murray, who also writes on the Pacific. Prof. James Geikie deals with mountains and palæontology, and Dr. Alfred Daniell has a good popular article on optics, devoted mainly to the history of optical science. In an article on man, Mr. J. Arthur Thomson states very well some of the problems relating to human characteristics, the origin or descent of man, and the antiquity of the race; and the same writer sketches the career of Pasteur, and treats of mammals and parasites. Mimicry forms the subject of an excellent paper by Mr. E. B. Poulton. Of course, no subject is treated exhaustively, but the information given, so far as it goes, is sound, and ample enough for the purposes for which an encyclopædia is usually consulted.