OUR BOOK SHELF.

The Elements of Geology. By Prof. W. H. Norton. Pp. x+461. (Boston, New York, and London: Ginn and Co., n.d.) Price 6*s.* 6*d.*

THIS is a further addition to the well written and well printed introductions to physical geography and geology which have been produced of late years for American schools. We do not quite agree with the author as to the novelty of the arrangement of his material, but it is certainly effective, and the questions attached to many of the illustrations are such as will draw out the reasoning powers of the pupil. Chemical and mineralogical considerations are kept in the background, and rocks are very broadly dealt with, as when syenite is defined (p. 274) as consisting of "feldspar and mica," and diorite as being "still less siliceous, composed of hornblende and feldspar—the latter mineral being of different variety from the feldspar of granite and syenite."

The book, however, hardly suffers from this, as explanations are brought in at the proper points, and a certain chemical knowledge seems to be presupposed. Zoological definitions are given from time to time in the stratigraphical portion, but we still think that the study of geology is held in too light estimation when it is thus regarded as elementary and independent, and not to be preceded by an outline of other branches of natural history. The geographical study of surface-features may, of course, be linked with geological considerations quite early in the curriculum of a school, and the portion of Prof. Norton's book that deals with the shaping of the earth's surface strikes us as especially admirable. It is confessedly and worthily based on the methods of Prof. W. M. Davis, who contributes a note of introduction.

The illustrations, moreover, are well selected throughout, and, where they have been borrowed, acknowledgment is made in most cases of the source. Mr. Welch's famous pot-hole in Glenariff, which was introduced to geologists in an English work in 1895, does duty here for the fourth or fifth time; but the numerous photographs of American scenery will prove of special interest to readers on this side of the Atlantic. The book is modern and very carefully thought out. On p. 246 volcanic phenomena are "extra illustrated" by the ruins of St. Pierre; on p. 306 the latest views are expressed on the gneisses of the "fundamental" Archæan complex; the Mesozoic reptiles receive attractive treatment on pp. 385–392; while on p. 446 a "restored" head of Pithecanthropus finds a place among relics of primitive man. This last instance errs, however, in showing much that is prophetic of future discoveries. Prof. Norton still translates *roches moutonnées* as "sheep backs," but the mention of this detail is only a tribute to his general accuracy. G. A. J. C.

Letters from the Dead to the Dead. By Oliver Lector. Pp. 101. (London: Bernard Quaritch, 1905.) Price 6*s.* net.

THE fact that the letters attributed to Bacon, Shakespeare, Napier, Henry Briggs, and Guy Fawkes have dates attached to them about the years 1904 and 1905 should convince most readers that the book ought to be regarded in the light of a practical joke, in fact, a "take off" of the antique. As another example we may take the "Notes to Henry Briggs's letter," in particular the supposed proof (p. 75) that Napier's true base is the reciprocal of *e* and not *e* itself. As the difference depends entirely on whether $\log \sin 45^\circ$ has a plus or minus sign attached to it, it is interesting to speculate on how many readers will be deceived by what is, after all, a somewhat clever hoax.

Atlas colorié des Plantes et des Animaux des Côtes de France. By Dr. M. Langeron. Translated and adapted from P. Kuckuck's work. Pp. vii+67; with 24 coloured plates. (Paris: J. B. Baillière et Fils, 1906.) Price 7.50 francs.

THIS attractive publication is an adaptation, so far as the marine flora and fauna of France are concerned, of the well-known work of M. Kuckuck. It consists of three parts, dealing respectively with the phanerogams living in the neighbourhood of the sea, marine algæ, and marine fauna. The book is intended for the use of young students with a love of natural history, and should prove a useful companion during seaside holidays. The plates are instructive and well produced.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Osmotic Pressure.

AT Prof. Armstrong's request, published in NATURE of May 24 (p. 79), I willingly summarise the electrical evidence on which the theory of ionic dissociation seems to me to rest, though a full discussion of that evidence would, I fear, be too long for a letter in this place. Perhaps Prof. Armstrong will allow me to refer him to two papers in which I have written more fully what follows; one paper is in the *Philosophical Magazine* for February, 1903, and the other in the *Electro-Chemist* for July of the same year.

It will, I think, be admitted that we must accept the general view of electrolysis which we owe to Faraday and Kohlrausch, and imagine that opposite parts of the electrolyte move in opposite directions through the liquid. Such a view seems necessary to explain the appearance of the products of chemical change at the electrodes only, and may be verified by direct visual observation, as in the experimental measurements of the velocity with which those parts travel. It need involve no further assumption if, for convenience, we agree to call the moving parts ions. Controversy begins when we attempt to explain how and by what mechanism the ions move. The dissociation theory represents the ions as free from each other (though probably combined with the solvent) during that fraction of their lives in which they are concerned actively in conveying the current. Prof. Armstrong, on the other hand, rejects the idea of any kind of permanent or semi-permanent dissociation, and holds that the electrolyte exists in solution as combined molecules of, let us say, potassium chloride. On the latter theory the mobility of the ions must be secured by some mechanism which involves a series of interchanges between the opposite parts of the molecules. Grotthus pictured the molecules arranged as the links of a chain extending all the distance from one electrode to the other. This particular hypothesis would be exempt from the following criticism, but I suppose it would not be upheld by anyone at the present day. It conflicts too clearly with our knowledge of other phenomena. From our modern kinetic point of view, we should regard the molecules as in continual irregular motion, and suppose the ionic interchanges to occur at the instants when two molecules come within each others' sphere of influence.

Such, I imagine, is the alternative to the theory of ionic dissociation; let us trace its consequences. The greater the frequency with which molecular collisions occur, the more often can ionic interchanges take place, and the faster will the ions work their way through the liquid. Thus the ionic velocities will depend upon and increase with the frequency of collision—a frequency which, on the kinetic theory, varies as the square of the concentration. Thus, on the hypothesis we are considering, the velocities of the ions will increase with the concentration, and be