system of teaching mathematics, not only in colleges, but also in schools, where antiquated methods are still too prevalent.

There is one omission in the book which is regrettable; the authors do not discuss the theory of *dimensions*. This is a much more important matter than it might be thought, especially when the student works geometrical exercises with numerical coefficients, so that the dimensions are partly latent. Far too often even an honours student fails to note that his answer must be wrong, because it does not satisfy the test of dimensions; and it is needless to emphasise the value of the theory in physics.

Typographically the book is all that could be desired, except that we should have preferred old-face figures in the tables. The diagrams are numerous, attractive, and well printed.

(2) The new edition of Dr. Askwith's elegant work differs from its predecessor mainly in defining the conic sections in the Greek way as sections of a cone. The earlier chapters (i.–viii.) on the triangle, circle, cross-ratios, etc., make this method easy, with one notable exception; unless we discuss complex points and lines by a purely geometrical method (such as that of v. Staudt), we are not justified in treating every figure consisting of a conic and a line as being projectively equivalent to a figure consisting of a circle and a line. This is the weak point of Dr. Askwith's book; it is not clear whether he is appealing, in the last resort, to algebra, or relying upon the exploded "principle of continuity." In other respects the treatise fully deserves the favourable reception which it has obtained.

G. B. M.

OUR BOOKSHELF.

Association: A Story of Man for Boys and Girls. By Edward B. Cumberland. Pp. 32. (Published by the author at "Le Chalet," Penn, Bucks., 1918.) Price 2*s*.

FOR nearly thirty years Mr. Cumberland has been headmaster of William Ellis School at Gospel Oak, and in convinced obedience to the founder's testament has been (since 1889) teaching "social science" to boys of ages from eight to eighteen—a remarkable record of pioneer work on lines which are sure to be widely followed in the near future. In other ways, too, with its early physics laboratory (1890) and its specially built geography room, the school has been in the front line, and we would heartily congratulate Mr. Cumberland on what he has achieved in spite of conditions often far from encouraging. He has expressed some of his ideals in an interesting little book which he calls "Association." The title refers to the author's reasoned belief that one of the factors of human progress has been association, co-ordination, the multiplying of inter-relations. He illustrates this in a retrospect of the ascent of man, and by showing how the individual finds himself and realises himself, both in body and mind, as an active social person.

The booklet seems to us better suited for adults than for boys and girls, for it is very tersely written. We cannot even refer to the many wise things that are said about home and school, work and play, town and country, civics and Nature-study; but the two dominant ideas are: (1) that "knowledge of Earth and its story helps to make man fitter for life on it, and also to raise him above it"; and (2) that the open secret of progress is to enter into more and more complex associations for noble ends, rising from school and family to community and city, and from nation to humanity. The booklet is an intensely personal document, revealing a fine purpose. There is a tiny fly in the ointment in the suggestion (on page 9) that "creatures that crawl" should be regarded with disgust.

Memoir of John Michell, M.A., B.D., F.R.S. By Sir Archibald Geikie. Pp. 107. (Cambridge: At the University Press, 1918.)

SIR ARCHIBALD GEIKIE has done a further service to British science in reviving the memory of John Michell, and in directing attention to his work in various fields. Geologists are familiar with Michell's name in connection with Jurassic strata, and especially with the "Lyas" that he traced from Somerset to Lincolnshire. It is unfortunate that this ancient quarryman's term should suggest, in its modern form, a pseudo-classical origin. Michell, after his retirement from the rectory of St. Botolph's, Cambridge, and from his brief tenure of the Woodwardian professorship of geology, continued, as rector of Thornhill, "those important investigations in physics and astronomy with which his name will always be associated." He died in 1793, before the experiment that he had designed for determining the earth's density could be carried out; but his apparatus came, through Wollaston, into the hands of his friend and correspondent Cavendish, who improved it in detail, and ungrudgingly acknowledged Michell as its originator. A long and interesting letter from Michell to Cavendish on the strata near Grantham is here published for the first time. In his frequent journeys from Thornhill to London he made observations at his halting-places, such as Greetham on the old North Road, and one feels that he would have hailed the work of his successor, William Smith, as confirming much that he had seen. In 1760, while still at Cambridge, he contributed a paper on earthquakes to the Royal Society, in which he urged that the initial shock is propagated by wave-motion through the earth.

This admirably printed and attractive work raises pleasant memories of the times when the "learned leisure" of our country clergy was often devoted to scientific culture. The divorce of clerical duties from collegiate fellowships, however desirable on both sides, has undoubtedly reduced the endowments of research. G. A. J. C.