In making this fundamental work of Cantor readily accessible to a wider range of English readers both the translator and the publishers have rendered a useful service in the development of science.

R. D. CARMICHAEL.

Euclid's Book on Divisions of Figures (περὶ διαιρέσεων βιβλίον), with a restoration based on Woepcke's text and on the Practica Geometriæ of Leonardo Pisano. By RAYMOND CLARE ARCHIBALD. Cambridge, Eng., University Press, 1915. ix+88 pp.

OF the nine works attributed to Euclid the "Elements" is, of course, by far the most important and the most widely known. The "Data" is known to us through the τόπος ἀναλυόμενος of Pappus, as stated in the Commandino edition of 1660, page 241; the "Porisms" was restored by Chasles, and earlier by Robert Simson; the "Optics" was known to earlier scholars through Theon, and has recently appeared in a modern edition through the labors of Heiberg; the "Phænomena" is nearly complete and was edited by Menge; the "Conics" is lost, except as part of it may have been embodied in the works of Apollonius; and the "Pseudaria" and "Surface Loci" are known only through fragments. The ninth work, entitled "On Divisions" (of figures), was for a long time known only through references by Proclus, but in 1570 it appeared in print under the editorship of John Dee and Federico (sometimes printed Federigo) Commandino in Latin translation from the Arabic. In 1851 Woepcke found an Arabic manuscript of the work at Paris, and this was published in translation in the *Journal Asiatique*.

It seems that John Dee, when he visited Commandino at Urbino in 1563, gave to the latter a Latin manuscript of the work as translated into Arabic by one Muhammed Bagdedinus, and this together with an Italian version was published seven years later. An English translation appeared in London in 1660 and again in 1661. David Gregory included the Latin text in his edition of Euclid in 1703 with the statement: "Joannes Dee Londinensis, cum Librum de Divisionibus superficierum, Machometo Bagdedino (qui floruisse creditur seculo Christi decimo) vulgo adscriptum, ex Arabico (uti credo, licet hoc expresse non dicat) in Latinum verteret." As to the conjectured date of "Machometo Bagdedino" it may be said in

passing, that Professor Archibald believes, with Suter, that he was the Muhammed of Bagdad who died in 1141, and hence that he was a scholar of the eleventh and twelfth centuries.

Professor Archibald has, with great perseverance and scholarship, cleared up a number of points in connection with this translation. In the first place he has shown that Suter and Steinschneider have not considered their statements concerning it with their usual care. For example, it has been commonly asserted that Dee probably copied a Latin translation in the Cottonian collection, whereas it is here shown that he did not do so, and that no such translation in complete form was ever in the British Museum. It is very doubtful whether a translation made by Gherardo of Cremona was the one referred to in the Cottonian catalogue made by Smith in 1696. At any rate this particular manuscript was not in Gherardo's handwriting since it was of about the fourteenth century. The fact is that Dee owned a manuscript of the work itself, possibly a copy of Gherardo's translations, and very likely he owned another besides the one which (maybe as a duplicate) he gave to Commandino.

Professor Archibald's plan in editing the work was to translate literally everything in Woepcke's French translation from the Arabic manuscript in the Bibliothèque nationale, to reproduce Fibonacci's proofs and constructions as set forth in his "Practica Geometriæ" of 1220, and to show the correspondence of the Muhammed-Commandino treatise with the Euclid text and with Fibonacci. He has also shown the relation of the "Geometria vel De Triangulis" of Jordanus Nemorarius to the work in question, revealing some interesting and significant facts. It would be well worth the attention of some scholar to consider the "De Numeris Datis" in the same spirit.

Of the work itself this is not the place to speak, further than to say that it has to do with such divisions of plane figures as the separation of a given triangle into two equal parts by a line which passes through a point situated in the interior of the triangle, and to call attention to the fact that this is the source of a number of such problems, some of which played a considerable rôle in the older treatises on surveying. But of the work of editing the text it may be said that it is a perfectly appropriate compliment to pay both to Professor Archibald and to Sir

Thomas Heath to say that the care shown by each, in the editing of the classics to which their names attach, is on a par with that shown by the other. Certainly we have not had any such work done before in this country in the editing of any Greek mathematical text, and the thanks and appreciation of Professor Archibald's colleagues will go out to him in abundant measure for his excellent contribution to the literature of the subject.

Not the least of the commendable features of the edition under review is the bibliography of works relating to the division of figures. How complete this is it is difficult to say, since one would have to go through a large amount of material, as has evidently been done in this case, to determine just where to find points of contact with the "De Divisionibus." At any rate the list is a very helpful one and adds materially to the value of the work.

The publishers have allowed the printing of a copious index of names, and have issued the work in the dignified form which always characterizes the output of the Cambridge University Press.

DAVID EUGENE SMITH.

Analytic Geometry. By H. B. PHILLIPS. New York, John Wiley and Sons, 1915. vii+197 pp.

IN the preface of this book the author expresses the belief that for engineering students "a short course in analytic geometry is essential"; and "he has, therefore, written this text to supply a course that will equip the student for work in calculus and engineering without burdening him with a mass of detail useful only to the student of mathematics for its own sake." At first glance the comparatively small number of pages would seem to promise such a short course. But a closer examination led the present writer to the opinion that the apparent brevity was achieved by condensation, and that it would require as much time to cover these 197 pages as to cover say 300 pages of many other texts. Except for the omission of some of the special properties of the conics, it did not seem quite obvious that the student's burden of a mass of detail was conspicuously lightened.

On the other hand, the author at times assumes a clearness of mathematical vision and a facility in technique on the part of the student which would be eminently desirable, but