

Some Notable Surveyors and Map-Makers of the Sixteenth, Seventeenth, and Eighteenth Centuries and their Work: a Study in the History of Cartography. By Sir Herbert George Fordham. Pp. xii + 99 + 4 plates. (Cambridge: At the University Press, 1929.) 6s. net.

THIS book has a melancholy interest, as the author, Sir Herbert George Fordham, has died since its publication, only this year. Sir George was a well-known map collector, and, we believe, had one of the finest collection of old maps in England, which he exhibited on several occasions, notably at the Southampton meeting of the British Association. A list of his works on the subject of ancient maps and cartography shows how widely and deeply he had studied the subject. As a historian of maps he will be a great loss.

The present volume begins with a sketch of the Elizabethan surveyors and their methods; gives an account of the French school of cartography in the seventeenth century and its development as an exact science under the influence of the Cassini family. The last part of the book treats of British cartography in the second half of the eighteenth century, and the connexion of the triangulations of England and France, which marks the beginnings of the Ordnance Survey. Specimens of maps of various dates are given, together with a useful list of works of reference. H. L. C.

Mathematical and Physical Sciences.

Quellen und Studien zur Geschichte der Mathematik. Herausgegeben von O. Neugebauer, J. Stenzel, O. Toeplitz. Abteilung B: *Studien*. Band 1, Heft 1. Pp. 112. (Berlin: Julius Springer, 1929.) 12 gold marks.

WE have here the first part of a new series which is to contain sources (Section A) and studies (Section B) of the history of mathematics. The sources are to consist of original texts with translations and all necessary elucidations. No parts of this section are yet to hand; we shall welcome them when received. Three papers in the present part of Section B are on the relation of Plato and Aristotle to certain developments in mathematics; two of them connect themselves with recent efforts to find in one of the principles of Plato's ideanumbers, the 'indefinite dyad', or the 'great and small', groupings after a system of numbers which shall include not only integers but irrationals, after the fashion of G. Cantor and Dedekind.

Of more direct mathematical interest are two papers containing accounts of old Babylonian mathematical texts recently published. One type of problem is the mensuration of parallel-trapezia obtained by cutting a right-angled triangle by one or more straight lines drawn parallel to one of the perpendicular sides. One such problem amounts to finding five unknown quantities from five equations. Certain cases in which there is only one parallel and therefore only one trapezium lead to the equivalent of 'mixed' quadratic equations; and we are assured that another document to be

published in the series will show that the Babylonian solution of such equations was, step for step, equivalent to ours. Some calculations of the heights of segments of circles from their bases and vice versa imply a knowledge (1) of Thales' proposition that the angle in a semicircle is a right angle, and (2) of Pythagoras's theorem of the square on the hypotenuse. Numbers are expressed on the sexagesimal system (but without any sign for zero); the successive sexagesimal fractions are also consistently used. A remarkable fact is that, when the Babylonian wishes to calculate a fractional part of a number, he turns the fraction into a sum of successive sexagesimal fractions and *multiplies*.

It cannot be denied that the publication of these fragments throws new light on the ancient Babylonian mathematics. The authors use the expression "old Babylonian"; but we should welcome the assignment of an approximate date to the documents. T. L. H.

Soap Films: a Study of Molecular Individuality. By A. S. C. Lawrence. Pp. xi + 141 + 17 plates. (London: G. Bell and Sons, Ltd., 1929.) 12s. 6d. net.

NO fuller or more useful book on soap films than Mr. Lawrence's new volume exists, or indeed will be needed until considerable further research has been done. It is extremely thorough, giving a most detailed account of all important work, and much that has hitherto remained unpublished, or buried in hasty description in an obscure corner of an original paper, is here set forth for the first time. Although nothing of any importance seems to have been omitted, and full literature references are given, the book is nevertheless extremely readable. Sufficient of the chemistry and physical chemistry of soaps is given to enable the reader to fix the relation of these films to other branches of knowledge, with which he may perhaps not be fully familiar before reading the book; and any special points of physical theory used in the study of soap films are briefly explained, so that nothing beyond an elementary acquaintance with physics and chemistry is required of the reader.

The book is excellently got up, and Mr. Lawrence is admirably equipped for writing it, for not only has he himself repeated Perrin's most intriguing work on the stratification of soap films under the influence of dyes and light, but he also acted as assistant to Sir James Dewar for some time. When one reads that in the cellars of the Royal Institution a soap film was once kept unbroken for three years, and considers that the ordinary mortal is proud of a soap bubble which lasts a couple of minutes, the discernment of the writer of "Biography for Beginners" (about 1910), when referring to earlier achievements, will be endorsed.

"Sir James Dewar
Is a better man than you are;
None of you asses
Can condense gases."

The book is, however, an independent survey of the subject, and by no means a mere reflection