

problem is Plato, and the assertion that Joost Bürgi first used a decimal point is altogether too emphatic. In connection with the cubic equation, Cardan's formula is referred to his *Practica arithmeticæ generalis* (1537) instead of the *Ars magna* (1545), an error due to misreading Cantor. Furthermore, not only are the historical references very meager, but they are confined almost exclusively to the German, and even then too exclusively to Cantor. For example, a work that pretends to be at all international might be expected to mention Heath's Diophantos in connection with a note upon the editions of this writer's works, though why these editions should be given at all in a work so barren of more important references, is a question.

A treatise of this kind might also be expected to furnish a good working bibliography, in no sense exhaustive, but suggestive and helpful. The bibliographical notes which Professor Weber has inserted are, however, with slight exception, of no practical value, and are evidently selected with no well defined purpose.

With all due appreciation of the scholarship of the work, and of its helpfulness, it must therefore be a matter of regret to all who have looked forward to its appearance, that the ground covered is not that of elementary mathematics in an international sense, that the historical notes are very ill considered, that no attempt has been made to offer a helpful bibliography, and that the arrangement and general treatment are so far removed from that of the *Repertorium* or the *Burkhardt-Meyer Encyclopädie*.

DAVID EUGENE SMITH.

SHORTER NOTICES.

Mathematical Papers of the late George Green. Edited by N. M. FERRERS and published by Macmillan in 1871. Facsimile reprint. Paris, A. Hermann, 1903.

GREEN's celebrated paper on potential, published at Nottingham in 1828 by private subscription, remained practically unknown for many years. At this period George Green was entirely self-taught and had no more advantages than a provincial town with but few mathematical works of any kind was likely to furnish. He was, however, "discovered" and sent to Cambridge in 1833, taking his degree in 1837 and his fellow-

ship a couple of years later. He died in 1841, but before then had published some ten papers, each of which marked a definite advance. They were mainly applications of the celebrated theorem, known by his name, to various problems in wave motion. His college, feeling that his ability and publications had not met with the recognition they deserved, commissioned Ferrers to collect them in a volume which appeared in 1871. This so thoroughly fulfilled its object that for many years a copy has only been obtainable at second-hand book stores. The present edition is a facsimile reprint by a process reproduction, so that the collection will, owing to the enterprise of A. Hermann, be available to readers and libraries in exactly the original form. Most of the papers appeared in the *Cambridge Philosophical Transactions*, the early volumes of which are not found in a large number of American libraries. As might be expected, the printing has suffered slightly in the reproduction but the defect is in its general appearance; in no case will there be the least trouble from this cause to the reader.

ERNEST W. BROWN.

Problems in Astrophysics. By AGNES M. CLERKE. A. and C. Black, London, 1903.

THIS book has only an indirect bearing on mathematics and thus does not call for an extended notice in the BULLETIN. And yet it is one which the student of mathematical physics cannot altogether afford to neglect, for it contains much material which may be useful to him. Just as in bygone days the celestial motions furnished many problems to mathematicians and were indeed often the means of suggesting those problems, so in modern times the new astronomy has raised a new set of less exact and more difficult questions to be undertaken. As facts accumulate, and the phenomena begin to be grouped, the time comes when theories may be rightly broached, so that the problems enter within the range of the mathematician. He can find enough of them in this volume. The laws of rotation of the sun, the behavior of a mass of fluid or gas under its own attraction, the whole history of stellar development, the various forms of nebulae, are some of them. The problem of the light curve of β Lyræ may perhaps belong to the older astronomy. The well-known work of G. H. Darwin on cosmical origins, and of Johnstone Stoney on atmospheres are instances of the new methods, and Schuster