

Ben Gerson" for it was known to Albiruni\* and doubtless to other Arabs before his time. The accounts of Regiomontanus and Pacioli which conclude the volume are excellent.

Unfortunately, the quality of the paper and binding is inferior; and there are a number of misprints, among which the following are perhaps worth mentioning: p. 44, in the first equation  $x-1$  should be  $2x-1$ ; p. 124, l. 19, "semidiameters" should be "conjugate semidiameters"; p. 130, l. 14,  $a+b+c$  should be  $a+2b+c$ ; p. 136, l. 13, Thucydides' date should be "a. C."; p. 309, l. 16, "Brahmagupta" should be "Bhascara"; and p. 469, l. 4, "inscribed circle" should be "circumscribed circle."

It is to be hoped that the second volume will soon be published. As will have appeared from what has been said, it is the opinion of the reviewer that this first volume is a valuable addition to the available histories of mathematics, both for its lively and clear style and for its essential reliability in the synopses of the work of the writers cited.

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*Sophus Lie's Gesammelte Abhandlungen (Samlede Avhandlingar)*. Edited by Friedrich Engel and Poul Heegaard. Volume IV. *Abhandlungen zur Theorie der Differentialgleichungen, zweite Abteilung (Avhandlingar til Differentialligningernes Teori, anden Afdeling)*, edited by Friedrich Engel. Leipzig, B. G. Teubner, and Oslo, H. Aschehoug, 1929. xii+684 pp.

The three volumes of Lie's collected memoirs which have already appeared have been reviewed briefly in this Bulletin in the order of their publication, as follows: volume III in vol. 29 (1923), pp. 367-369; volume V in vol. 31 (1925), pp. 559-560; volume VI in vol. 34 (1928), pp. 369-370. The published memoirs of Lie are being gathered together in six volumes while a seventh is to be devoted to the principal works found among his literary remains. The memoirs on geometry are to go into volumes I and II, volume I being the next one promised; the memoirs on differential equations have appeared in volumes III and IV, the latter being the one now before us; while the memoirs on transformation groups are contained in the previously published volumes V and VI.

More than half of the fourth volume (pp. 1-264, with pp. 470-589 of the notes) is required for Lie's great memoirs of 1874-1877, published in the eighth, ninth and eleventh volumes of the *Mathematische Annalen*. These consist of a reworked and in some parts greatly extended presentation of the contents of fifteen earlier papers which are reproduced in volume III of the *Gesammelte Abhandlungen*.

The present volume IV contains altogether a total of eleven papers, printed on pages 1-448, while the notes and remarks (bound in a separate volume) appear on pages 449-684. Besides the three great memoirs already mentioned two other extensive papers are reproduced here, namely, the memoirs of 1895 and 1898 in the *Leipziger Berichte*. The editorial work continues to be done with such patience and care and skill as can be prompted only by devotion to a labor of love.

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\* *Die trigonometrischen Lehren des persischen Astronomen . . . . Al-Biruni*, by Carl Schoy. Hannover, 1927, p. 53.