

## BRIEFER NOTICES.

HEINRICH HERTZ: *Gesammelte Werke*. Band III: *Die Prinzipien der Mechanik in neuem Zusammenhange dargestellt*. Mit einem Vorworte von H. von HELMHOLTZ. Leipzig, Barth, 1894. 8vo. xxx + 312 pp.

Only the third volume of this edition of the collected works of the late Heinrich Hertz has so far appeared; but the two other volumes were promised for the fall of 1894 and will probably soon be ready.

The first volume will contain the papers written during the years 1879–1884, including the doctor dissertation and the address on light and electricity delivered at the congress of German naturalists at Heidelberg, and also some papers of very recent date. Ph. Lenard, of Bonn, is the editor. Volume II will be a reprint of the papers previously published under the title “*Untersuchungen über die Ausbreitung der elektrischen Kraft*” (Leipzig, Barth, 1892), of which an English translation was recently issued (“*Electric Waves: being researches on the propagation of electric action with finite velocity through space*”; authorized English translation by D. E. Jones, with a preface by Lord Kelvin. London, Macmillan, 1894).

The third volume is also edited by Professor Lenard. It contains an exceedingly interesting and original treatise, or rather memoir, on the principles of theoretical mechanics and mathematical physics which was composed during the last three years of the author’s life. A. Z.

HERMANN GRASSMANN: *Gesammelte mathematische und physikalische Werke*. Auf Veranlassung der mathematisch-physischen Klasse der kgl. sächsischen Akademie der Wissenschaften und unter Mitwirkung der Herren: Jakob Lüroth, Eduard Study, Justus Grassmann, Hermann Grassmann der Jüngere, Georg Scheffers, herausgegeben von Friedrich Engel.—Ersten Bandes erster Theil: *Die Ausdehnungslehre von 1844 und die Geometrische Analyse*. Unter Mitwirkung von Eduard Study herausgegeben von Friedrich Engel. Mit einem Bilde Grassmanns. Leipzig, Teubner, 1894. 8vo. xvi + 436 pp.

The idea of a new and complete edition of Hermann Grassmann’s mathematical works was first suggested by Professor Felix Klein, of Göttingen. After obtaining the consent of Grassmann’s surviving relatives he personally laid the matter before the Saxon Academy of Sciences (in October, 1892), insisting in particular on the desirability of including in the proposed edition all hitherto unpublished papers of any importance. Upon his recommendation the Academy elected a

committee to devise ways and means, and entrusted Professor Engel, of Leipzig, with the chief editorship of the undertaking.

As appears from the title given above and from the preface, Professor Engel has succeeded in securing for his task the active co-operation of some of the ablest mathematicians of Germany. In the volume before us, which constitutes the first half of the first of the three volumes contemplated, the editorial work seems to be done throughout with the utmost care and with an almost philological minuteness. If the same standard be maintained in the remaining portions,—and there is no reason for doubting this,—the present edition, which appears just fifty years after the first *Ausdehnungslehre*, will remain for all time the *editio princeps*.

It was certainly wise to take the liberty of making slight changes here and there in the phraseology of the original and of improving the subdivision into paragraphs. All important changes are clearly indicated; and even the pagination of the original editions is marked in the margin. Over twenty closely-printed pages of notes of an explanatory, critical, and historical nature are added in the present volume by the editors (Engel and Study). A portrait of the author adorns the volume.

The second half of the first volume, containing the *Ausdehnungslehre* of 1862, is promised to be issued early in 1895. The author's son, Hermann Grassmann, Jr., of Halle, will assist Professor Engel in editing this part.

The second volume will contain Grassmann's printed papers, together with some hitherto unpublished articles. Dr. Scheffers, of Leipzig, and Professor Study, of Bonn, will assist in editing the geometrical papers. The articles on mechanics, both published and unpublished, have already been prepared for publication by Professor Lüroth, of Freiburg, author of a valuable "*Grundriss der Mechanik*" (München, Ackermann, 1881), based on Grassmann's ideas.

The thesis on the theory of the tides, written in 1840 and referred to in the preface to the first *Ausdehnungslehre* (p. v), but never published, will appear in the third volume, together with the remaining posthumous papers. Justus Grassmann, of Brandenburg, will edit the memoir on the tides. Professor Engel promises to contribute a biography of Grassmann and a brief connected account and criticism of his scientific work. Finally, Professors Schlegel, of Hagen, and Mehmke, of Darmstadt, are preparing for this last volume a complete bibliography of works having reference to Grassmann's ideas.

It should be noticed that the present edition is not the work of one-sided partisans of Grassmann's methods. Professors Engel and Study, in particular, have on former occasions, while expressing their appreciation of the value of

Grassmann's work, pointed out its necessary limitations (see, for instance, Lie and Engel's "Theorie der Transformationsgruppen," vol. III, Leipzig, Teubner, 1893, p. 534 and p. 748, Study's "Methoden zur Theorie der ternären Formen," Leipzig, Teubner, 1889, p. 202, and Study's "Massbestimmung extensiver Grössen, Wien, 1885). This critical spirit pervades the notes to the present volume and makes them really helpful to the student (see, in particular, the note on pp. 404-406). It is the modern theory of transformation-groups which furnishes the final criterion for a judicious estimate of the Ausdehnungslehre.

A. Z.

*Jahresbericht der Deutschen Mathematiker-Vereinigung.*  
Vol. III (1893). Berlin, Reimer.

While this volume does not seem to have appeared as yet, a brief extract has been sent out which contains the general report on the Munich meeting, the financial report up to the spring of the present year, and the list of members. Besides an obituary of the late E. E. Kummer, by E. LAMPE, the third volume will contain two longer reports, viz.: "On the development of the theory of algebraic functions in the past and up to the present time," by BRILL and NÖTHER, and "On the development and main problems of the theory of girder-frames (einfaches Fachwerk)," by HENNEBERG. Abstracts will also be given of the following papers read at the meeting:

DYCK (Munich): Introductory address on the mathematical exhibition.

HAAS (Vienna): On an apparatus exhibiting precession.

HILBERT (Königsberg): Two new proofs of the possibility of resolving the numbers of a "Körper" into "Primideale."

MEHMKE (Darmstadt): On calculating-machines and similar appliances.

BJERKNES (Christiania): Analogies between physical (in particular electrical and magnetic) and purely mechanical phenomena.

JUKOVSKY (Moscow): Geometrical interpretation of the case discussed by Hess in the motion of a heavy rigid body about a fixed point.

H. WIENER (Halle): Further remarks on the foundations and the systematic development of geometry.

M. SIMON (Strassburg): Proof of the proposition that a Lobachevsky space contains a double infinity of spheres of infinite radius.

PRINGSHEIM (Munich): On Taylor's series.

BRUNN (Munich): Contribution to the *analysis situs*.

BAUSCHINGER (Munich): On the testing of the strength of materials.