

*Il Passato ed il Presente delli Principali Teorie geometriche. Terza Edizione accresciuta di uno Sguardo allo Sviluppo della Geometria in quest'ultimo Decennio.* By GINO LORIA. Turin, C. Clausen, 1907. xxiii + 475 pp.

LORIA's well known history of modern geometrical theories originally appeared serially in the *Memorie della R. Accademia delle Scienze di Torino*. Ten years later, in 1896, a second edition was published in book form, and a German translation by Sturm made the work more accessible. The present third edition, a volume of almost five hundred pages, is especially valuable on account of the appended sketch of the development of geometry during the last decade, which occupies over a hundred pages.

The first chapter of the book gives a rapid survey of the origin and development of geometry up to the middle of the nineteenth century. (An English translation by Halsted appeared in the *Monist* for October, 1902.) Then follow separate chapters on the principal modern theories: plane algebraic curves, algebraic surfaces, twisted curves, differential geometry, analysis situs and configurations, line geometry, correspondences and transformations, enumerative geometry, non-euclidean geometry, hyperspaces. The final chapter is devoted to miscellaneous topics ranging from kinematical and constructive geometry to quaternions and vector analysis.

The appendix is divided into sections numbered and named in accordance with the chapters enumerated above. After a few introductory paragraphs on each topic, most of the space is devoted to the bibliographies. In some cases these extend up to 1907, in others only to 1904. Of course no attempt is made to give complete lists. In the entire work, estimating from the excellent index, references are given to perhaps 5,000 memoirs by 1,500 authors. Considerable space is saved by giving in each case only the number of the volume and the date of publication, without the page numbers.

In a bibliographical work of this kind more energy might have been devoted to the proofreading; the misspelling of proper names is somewhat annoying. Fortunately hardly any of the errors are likely to mislead the reader.

It is interesting to compare the material gathered under the title non-euclidean geometry in the appendix with the corresponding chapter devoted to the literature up to 1897. The latter deals exclusively with the elliptic and hyperbolic geom-