

*Storia della Geometria Descrittiva dalle Origini sino ai Giorni Nostri.* By Gino Loria. Milano, Ulrico Hoepli, 1921. xxiv + 584 pp.

Descriptive geometry has not been neglected in the histories of mathematics and considerable historical information is to be found in some of the text-books. We have also Poudra's *Histoire de la Perspective Ancienne et Moderne* (1864), Cremona's *Sulla Storia della Prospettiva Antica e Moderna* (1865), and Obenrauch's *Geschichte der darstellenden und projectiven Geometrie* (1897). Nevertheless, there is a place for a book of the present day devoted exclusively to the evolution of descriptive geometry,—especially when it is written by one so well qualified for the task as is Professor Loria.

As the author considers descriptive geometry a branch of pure mathematics, he treats briefly the history before the time of Monge. This is done in the first three chapters, which contain one-sixth of the total number of pages of the text. The next two chapters, which add almost another sixth to the book, deal with Monge and his contemporaries and disciples. The treatment of the material in the first hundred and twenty pages of the text is not new to the reader who is familiar with Professor Loria's article (XXV) in the fourth volume of Cantor's *Vorlesungen über Geschichte der Mathematik*.

The further development of descriptive geometry until about 1885 occupies seven chapters, almost one-half of the text. Six of these follow the history in different countries. In the chapters on Italy, France, Germany, German Switzerland, and Austria-Hungary, a short preliminary statement of conditions is followed by separate sections devoted to critical studies of the writings of the principal men. These chapters are concluded by sections treating the less important writers. The other countries are disposed of in one short chapter. The twelfth chapter deals with a special subject, axonometry, and traces its development from 1820 to the present.

In the last chapter of the book (the development from 1885 onward) the separate sections are entitled: (1) general considerations, (2) old and new methods of representation, (3) plane and space curves, (4) surfaces, (5) illumination of surfaces, (6) descriptive geometry of ruled, of higher, and of non-euclidean spaces, and (7) teaching and history of the subject. In a three-page conclusion the author sets forth the lines along which he predicts that the descriptive geometry of the future can and will develop.

The twelve-page index of proper names is a valuable addition to the text, although there are some misprints. It contains about seven hundred fifty names and one hundred thirty references to Monge. In footnotes scattered throughout the text there are more than a thousand references.

The author has gathered together a large collection of facts. He has arranged them methodically and he has given his sources. And he has done something more, for he has shown an appreciation of relative values by stressing the more important things and subordinating the minor details, he has displayed an insight into the vital relation between his own subject and other branches of learning, and he has created an atmosphere that is likely to inspire the reader with his own enthusiasm for descriptive geometry.

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