

lessly outmoded. No special sympathy is offered to those who would justify arithmetic on a contentless axiomatic basis. The tone of the discussion is not adjusted to the level of anyone so naïve as to suppose that therefore the theorems of arithmetic are not assumed as logically derivable from a suitable system of postulates such as that framed by Hilbert himself.

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*Lezioni di Geometria Analitica e Proiettiva.* By Annibale Comessatti. Padova, Casa editrice A. Milani, 1930. xv+462 pp.

The present volume, most of which had been used repeatedly by the author in mimeograph form previously, represents the work done in algebraic and projective geometry by the Italian university students during the first and second years. Probably no other country adheres so closely to the old Greek methods, nor guards so jealously the rich and varied traditions of its past. And in the present case, without forfeiting anything of this heritage, the book is decidedly down to date, not only in content, but also in method.

The subject is introduced as in our own elementary texts in plane analytic geometry, with numerous figures, and many examples left for the student, but presented at a much more rapid pace. Determinants are used freely from the beginning, and projective (affine) coordinate systems precede metrical ones. Properties of lines, planes, conics and quadric surfaces are derived in the first chapter of about 60 pages. This is followed by one on algebraic vector analysis in two and three dimensions, with a skillful blending of the method and results of the first chapter with those of the second.

Chapter three introduces projective geometry in the usual way, with the immediate extension to infinite points, lines and planes. After establishing the foundations synthetically, coordinates are employed: point coordinates, plane coordinates, line coordinates (Plücker), including complexes, congruences and ruled surfaces. Then follows a generous appendix on complex geometry.

A large chapter on curves and surfaces introduces the calculus and employs it to get metrical properties of plane algebraic and transcendental curves, of surfaces and of space curves, including an extensive treatment of quadric surfaces, reguli, asymptotic cones, etc.

The work is written in the peculiar limpid style of Comessatti, and is printed on thin opaque paper, making a convenient volume. One objection is that the exercises are printed in small type—pages of them at a time—and contain a wealth of valuable material that one can not afford to overlook.

This book would not be a suitable text for beginners in either analytic or projective geometry, according to the American methods of instruction, but is particularly valuable for reference and comparison after one has reached the maturity necessary to appreciate it. It is an eloquent commentary on the intense instruction given to the precocious Italian youth.

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