

*Plane Analytic Geometry, with introductory chapters on the Differential Calculus.* By Professor MAXIME BÔCHER.

Henry Holt and Company, New York, 1916. vii + 235 pp.

THIS compact and clearly written textbook gives the essential properties of the conic sections and ends with two chapters on the differentiation of algebraic functions with applications.

The lemniscate is the only curve of higher degree which is discussed at any length, but its graph is correct, thereby differing from the representations commonly published. Other curves are barely mentioned, nor has the book an index. Thus the student of engineering especially must wait for a later course to unfold cardioids, catenaries, spirals, and witches.

The preface states that "Analytic geometry, if properly taught, is a difficult subject, and concentration on a few of its important principles is necessary if mastery is the aim," and later, "It is only by degrading it to a course in graphics (curve plotting, numerical problems, etc.), that a course in analytic geometry can be made easy to the average student."

The student will have to be careful to note that in a right-handed system of coordinates, a positive (left-handed) rotation changes the  $OX$  axis into the  $OY$  axis. In a note the author states that "The word 'normal' (in Hesse's normal form of the straight line equation) is here used in the sense of 'standard.' It has nothing to do, as some American textbooks have implied, with the normal to a curve or line."

Throughout the book, curves with no real points are consistently referred to as "no locus," and definitions are so framed as to exclude degenerate cases. The chapter on determination of loci is short but explicit, while that on the general equation of the second degree gives a detailed and complete discussion, ending with the problem of a conic through five points.

For the student proceeding to the calculus, a course in solid analytic geometry must follow this text, but otherwise one who has finished this book will be excellently prepared.

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