AN ELEMENTARY TREATISE ON THE GEOMETRY OF CONICS

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BY

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PREFACE.

THIS work contains elementary proofs of the principal properties of Conics, and is intended for students who proceed to the study of the subject after finishing the first six books of Euclid; the curves have not, therefore, been defined as the sections of a cone, although that method has the sanction of history and antiquity in its favour; and for the same reason, no use has been made of the method of projections.

As regards the arrangement of the subject, I have thought it best to devote separate chapters to the parabola, the ellipse, and the hyperbola. The plan of starting with a chapter on general conics, in which some fundamental propositions are proved by methods applicable to all the three curves, has no doubt the advantage of securing an appearance of brevity. But, I believe, beginners find the subject more intelligible when the properties of the three curves are discussed separately. Besides, in the other method students, and even writers of text-books, are apt to overlook the necessity of modifying an argument on account of the fundamental

difference in the figures of the several curves; see, for instance, Chap. II., Prop. x., and Chap. III., Prop. ix., which are ordinarily proved by identically the same argument. Also, as the properties of the hyperbola are proved, wherever possible, by the same methods as the corresponding properties of the ellipse, it is obvious that this arrangement does not tend to increase the work of the student.

As to the propositions included in each chapter and their sequence, I have not been able to adopt wholly the scheme of any previous writer; but I venture to hope that the book includes all the classical propositions on the subject, arranged in their proper logical order. Every attempt has been made to render the proofs simple and easily intelligible, though I have never sacrificed accuracy to brevity. Thus, for instance, I have not followed the practice of referring to a proposition when the truth of its converse is really assumed—a practice which has, in at least one instance, led to a remarkable error in the treatment of conjugate diameters in a famous text-book. Nor have I attempted to secure a fictitious appearance of conciseness by adding to each proposition a list of corollaries by no means less important than the proposition itself, and freely using them for the purpose of deducing subsequent propositions.

The exercises, of which there are about eight hundred, have been selected with great care; more than six hundred of these are placed under the different propositions from which they may be deduced; they are for the most

part of an elementary character, and have been carefully graduated. Hints and solutions have been liberally added, and these, it is hoped, will prove materially helpful to the student, and render the subject attractive. The attention of the student has also been directed to various methods of graphically describing the curves, including those used in practice by draughtsmen, and some very neat problems have been added from Newton, Book I., Sections iv. and v.

At the end of the table of contents will be found a course of reading suitable for beginners.

CALCUTTA,
19th April, 1893.