

II. *An Account by Mr. John Eames, F. R. S. of a Book entituled, A Mathematical Treatise, containing a System of Conic-Sections, with the Doctrine of Fluxions and Fluents, applied to various Subjects. By John Muller.*

THE ingenious Author of this Work, observing how much Time is necessarily spent, and Pains taken, in learning these valuable Parts of Mathematics, thought it would be very well worth his while to lessen both, which he hopes he has done considerably, in the following Treatise. He has divided it into three Parts, contained in so many Books.

In the first of these, he considers the Properties of the three Sections of a Cone, as well in, as out of the Cone. And to make this Part of the Work of more Service to the Reader, Mr. *Muller* has not only selected the most considerable Properties of these Curves, that are to be met with in other Writers, both Ancient and Modern; but has added several new ones, which, as he informs us, are inserted in their proper Places. And that such Gentlemen as are desirous to read Sir *Isaac Newton's Principia*, but are at a loss for want of a sufficient Acquaintance with Conic-Sections, may be the more obliged, he has taken particular Care to demonstrate such Properties as Sir *Isaac* presupposes his Reader to be acquainted withal. Accordingly, he has prefix'd a Table of such Propositions, informing him as well where they are to be met with

112

in this Book, as in Sir *Isaac Newton's Principia Mathematica*.

The Proofs made use of in his Demonstrations, are sometimes Algebraical, at other times Geometrical, according as he finds the one to be plainer and shorter than the other.

B O O K II.

The second Book treats of the direct Method of Fluxions. And here he hopes the first Principles of this Method are laid down, not only in a new, but very plain and concise manner. He proceeds to shew the Use of Fluxions in the Solution of the common Problems of finding the *Maxima* and *Minima* of Quantities, the *Radii* of the Evolution of Curves, and the *Radii* of Refraction and Reflection. Under the first of these Heads he tells us, particular Care has been taken to distinguish the *Maximums* from the *Minimums*, a thing which has not been taken Notice of so much as it ought to have been. And whereas some Mathematicians, having made use of what they call infinitely small Quantities, are forced to reject something out of the Equation, for finding the Fluxion of a Rectangle, whose Sides are varying Quantities, Mr. *Muller* uses only finite Quantities; and finds the Fluxion of such a Rectangle after a new manner, without rejecting any Quantity for its Smallness. He does the same in finding the Fluxion of a Power. And to avoid the Use of infinitely small Quantities, introduces a new Principle, *viz.* That a curve Line may be consider'd as generated by the Motion of a Point carried along by two Forces or Motions, one in a Direction always parallel to the Absciss, and the other in a Direction

rection always parallel to the Ordinate. Hence he infers, that the Fluxion of the Ordinate is to the Fluxion of the Abfcifs, as the Ordinate is to the Subtangent of the Curve.

Having likewise proved from the first Supposition, that if the describing Point, when arrived at any Place given, should continue to move onwards, with the Velocity it has there, it would proceed in a Right Line, which would touch the Curve in that Point; he concludes that the Direction of the Force in that Place is in the Tangent to the Curve: Consequently, the three Directions being known in each Place, the Proportion between the Velocities of the urging Forces will be likewise known. So that the Nature of the Curve being given, the Law observ'd by these Velocities may be found; and if the Law of the Velocities be given, the Nature of the Curve may likewise be given.

B O O K III.

In the third and last Book, we have the inverse Method of Fluxions, with its Application to the several Problems solvable by it; such as the superficial and solid Contents of Curvilinear Figures, the Rectification of Curve Lines, Centres of Gravity, Oscillation and Percussion. Here also Mr. *Cotes's* Tables of Fluents are explain'd and illustrated by Examples.

He finishes this Book with a great Variety of Problems, that are of a Physico-Mathematical Nature, several of which are new, and proposed to him by Mr. *Belidor*. Some, indeed, are not so, having been solved by Messieurs *Varignon* and *Parent*; but then he has solved them after a different, and, as he hopes, a more agreeable Manner, the Construction being more simple, and the Process much shorter.