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Newton's Principia.
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Borelli's edition of Books V–VII of Apollonius's *Conics*, and Lemma 12 in Newton's *Principia*.
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Book I of the first (1687) edition of the *Principia* contains a “Lemma XII”, “All parallelograms circumscribed about a given ellipse are equal among themselves. The same holds true for the parallelograms of a hyperbola circumscribed about its diameters”, followed “both known from the *Conics*”. In the second edition (1713), it is specified that the touching points have to be the end points of conjugate diameters, which is actually also presupposed by Newton in the first edition when he makes use of the lemma afterwards. In the full form found in the second edition, it coincides with Proposition VII.31 of Apollonius' *Conics*.

The question that is dealt with by the authors (as by others before them, whom they refer to) is what Newton's source for the lemma can be, given that Halley's edition of the seven-book version of the *Conics* was only published in 1710.

The beginning of the article describes the arrival in Europe of Arabic manuscripts of the seven-book text. In 1578, a paraphrase was brought to Rome. Around 1629, two more manuscripts were acquired: one (another paraphrase) was brought from Constantinople by Christian Ravius, the other (the Banu Mūsā translation) by Jacob Golius; this was the one that was to be translated and published by Halley.

The Florentine Grand Duke Cosimo II, exhorted by members of Galileo's circle, managed to get hold of the first manuscript for what is now the Laurenziana Library (whence the name “MS L” given to it by the authors); however, he was not interested in sponsoring an edition. In 1630, Gassendi announced the existence of the Golius manuscript, which Golius promised to translate, without ever doing so before his death in 1667, only taking care that nobody else did so. In 1645, Pell made a translation of Ravius' manuscript, but Golius seems to have obstructed its publication, and it appears to have gone lost. Also, in 1645, the Grand Duke (now Ferdinando II) refused a request to make MS L accessible for translation. In 1656, when Borelli was appointed to the chair of mathematics in Pisa, he renewed the request, which was finally agreed to in 1658. Printing was delayed by a Granducal wish to have Viviani publish a restoration of Book V first, but, in 1661, Borelli's translation of Books V–VII finally appeared. A compendium from his hand based on alternative methods was only published posthumously, in 1679. Edward Bernard, Savilian professor of astronomy, prepared a copy of Golius' manuscript after the latter's death, and also acquired the manuscript itself in 1696, but died before he could make the edition, which eventually fell to Halley.

Newton, as known, was allowed free access to Barrow's library since his early university years, and acquired much of it when it was sold, for which reason the authors also discuss Barrow's encounters with Florentine mathematicians in 1656, including Viviani and probably Borelli. Moreover, beyond Borelli's treatment of *Conics* VII.31 they look at how related matters were dealt with by De Witt, Grégoire de Saint-Vincent, and Philippe de La Hire, and at Newton's proof of the 1687 version of Lemma XII in his copy of De Witt's *Elementa curvarum linearum* (with the same incomplete enunciation). Without being able to trace with certainty the lines of influence the authors point to Borelli mediated by Saint Vincent and La Hire, together with De Witt.

Reviewer: [Jens Høyrup \(Roskilde\)](#)

MSC:

[01A45](#) History of mathematics in the 17th century
[01A20](#) History of mathematics in Ancient Greece and Rome

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Biographic references:

[Newton, Isaac](#); [Borelli, Giovanni Alfonso](#); [Golius, Jacob](#); [De Witt, Jan](#); [Grégoire de Saint-Vincent](#); [de La Hire, Philippe](#)

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