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Émilie Du Châtelet's Newton

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Abstract. This paper discusses the first French translator of Isaac Newton's *Principia Mathematica*, Émilie Du Châtelet (1706-1749). It shows how her reputation suffered because as a woman her intellectual capabilities and her attainment in mathematics were not taken seriously and she was overshadowed by Voltaire, although he was no match for her expertise in mathematics. However, her extensive correspondence shows that in her lifetime she had an active intellectual life and was well-connected with the leading *savants* of her day. The letters shed light on the development of her interest in Newton – and indeed on the reception of Newton in eighteenth-century France. The paper concludes with an account of her Newton translation and the circumstances of its posthumous publication in 1759.



Figure 1. Portrait of Émilie Du Châtelet by Maurice Quentin de la Tour. Source: Public Domain via Wikimedia Commons.

Long remembered only as the mistress of Voltaire, Gabrielle-Émilie le Tonnelier de Breteuil, Marquise du Châtelet (1706–1749: see figure 1) was a *philosophe* in her own right.¹ Work on Du Châtelet since

¹ For further information and bibliography, see the pages dedicated to her on the Project Vox website: <https://projectvox.org/du-chatelet-1706-1749/>

the tercentenary of her birth has largely focused on her *Institutions de Physique* (figure 2), now being translated into English by Katherine Brading. But recently an edition of her translation of Newton's *Principia mathematica* has been prepared by Michel Toulmonde.²

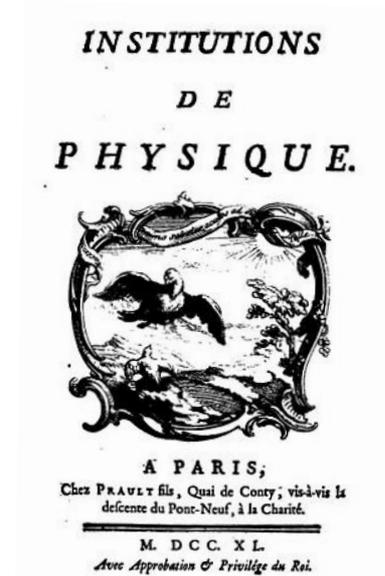


Figure 2. Émilie Du Châtelet, *Institutions de physique*, first edition 1740. Title page. Source: Public Domain via Wikimedia Commons.

It has been the lot of women thinkers of the past such as Du Châtelet to be dismissed as a ‘fashionable lady scientist’, ‘help meet’, or ‘mere translator’. Although these labels may apply superficially to Du Châtelet, none is appropriate.

- ‘Fashionable Lady Scientist’? Contemporary portraiture depicts several fashionably dressed Lady Scientists, Du Châtelet among them. But this is not enough to explain her Newton.
- ‘Help meet’? Voltaire (figure 3) acknowledged her assistance in writing his *Éléments de la philosophie de Neuton*. Indeed, as far as Du Châtelet’s interest in Newton is concerned, it used to be thought that she owed everything to Voltaire.



Figure 3. Voltaire, Portrait engraving from his *Éléments de la philosophie de Neuton*, 1738. Source: Public Domain via Wikimedia Commons.

² Isaac Newton and Émilie Du Châtelet, *Principes mathématiques de la philosophie naturelle*, ed. Michel Toulmonde (Ferney-Voltaire. Centre de l’étude du XVIIIe siècle, 2015). This printed the 1759 published text along with the original manuscript, BnF MSS fr. 12266 and 12267).

While it is likely that it was Voltaire who introduced her to the work of Newton, it is now recognised that she had a scientific life of her own and that this was separate from and even in competition with Voltaire. A case in point is her *Dissertation sur la nature et propagation du feu* which she submitted anonymously for an essay competition at the Paris Académie Royale des Sciences in 1737. Although it did not win the prize, it was published by the Académie with other submissions the following year and again in 1744 (figure 4). It is possible that when she first met Voltaire, her knowledge of Newtonian science was limited. But she soon outstripped him and he had to acknowledge her superior grasp – particularly since her mathematical literacy and capability far exceeded his.

- **‘Mere translator’?** Nothing about Du Châtelet’s *Principia* translation is the work of a jobbing translator. It required a high level of expertise in mathematics and understanding of the science involved – so much so that at one time it was supposed no woman could have achieved it, so it was believed to have been the work of others, principally the man who corrected it for publication, Alexis Claude Clairault.

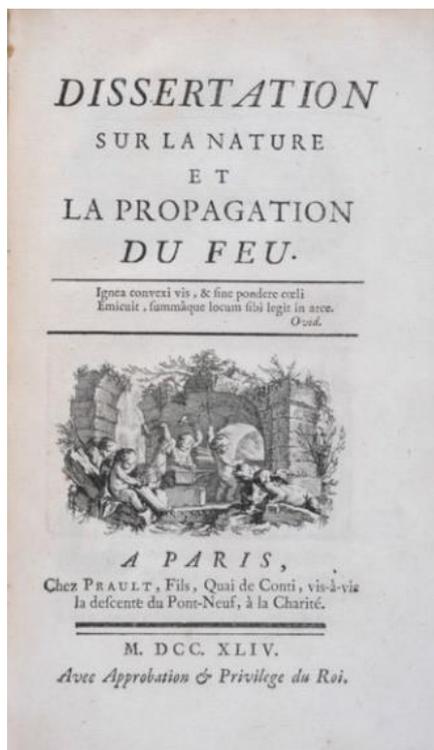


Figure 4. Émilie Du Châtelet, *Dissertation sur la nature et la propagation du feu*. Paris 1744. Source: Public Domain via Wikimedia Commons.

Du Châtelet’s Newton was not that of Voltaire (exemplified by his *Éléments*) or for that matter Francesco Algarotti’s (as in his *Neutonianismo per le dame*). Unlike these popular accounts for general readers hers was Newton of the *Principia*, ‘herissée de calculs’.

There is more to Madame Du Châtelet’s engagement with Newton than her translation. Her extant letters covering the period 1733 until her death in 1749 (edited by Theodore Besterman with more being edited even now) have much to tell about the context of her interest in and knowledge of Newtonianism. Incomplete as they are, these letters

- give a general intellectual milieu for her interest in Newton: her correspondents included Pierre Louis Maupertuis, Clairaut, Jean II Bernoulli, Christian Wolff, Leonhard Euler, James Jurin,

François Jacquier and Pieter van Musschenbroek. She also had a very public exchange of letters with Dortous de Mairan. Visitors to her château at Cirey included Francesco Algarotti (1712-1764) and Père Jacquier. Claude-Adrien Helvétius (1762-1827) dedicated his *Epiître sur l'amour d'étude* to 'la sublime Émilie'.

- Shed light on the genesis and publication of her *Institutions de Physique*.
- Record the development of her own personal interest in Newtonianism, thereby enabling the charting of her individual study of Newton's physics, documenting an education in Newtonianism. Her efforts to acquire the *Principia* in 1738 are witnessed. (She apparently also owned a copy of the 1726 edition which had belonged to Jean I Bernoulli and been given to her by Jean II Bernoulli in 1745.) From the letters it is known that Madame Du Châtelet was also well read in the literature of Newtonianism, including Henry Pemberton, Willem 's Gravesande and the Leibniz-Clarke correspondence, as well as an abridged French translation by Nicolas Fréret, *Abregé de la Chronologie de M. le chevalier Isaac Newton, fait par lui meme, et traduit sur le manuscrit Anglois* (Paris, 1725). She did not just own these books: she read them. In 1738 she told Maupertuis 'je sais presque par coeur l'optique de M. Newton'. She also took steps to obtain a copy of Newton's *Chronology of Ancient Kingdoms Amended*, and she seems to have read his *Observations upon the Prophecies of Daniel and St John* (1733) (which she thought a waste of his energies).
- As a *side-line* commentary on the reception of Newtonianism in France, the letters are something of a barometer of the changing fortunes of Newtonian physics in 18th-century France. They bear out the particular significance of the year 1738 for the impact of the Cirey circle on Newton's European reception. For it was in that year, against a background of enormous hostility from academicians and others in France, that Voltaire's *Éléments de la Philosophie de Newton* and Algarotti's *Newtonianismo per le dame* were published. Madame Du Châtelet contributed to the same Newtonian offensive as a tireless champion of Newtonianism, fully persuaded that Newton had rendered Cartesianism obsolete.

Madame Du Châtelet's letters therefore make it possible to reconstruct the context for the preparation, publication and content of her translation of the *Principia Mathematica* (figure 5).

However, one of the great mysteries which they do not help to solve is why she chose to undertake the translation in the first place, especially since she was not an uncritical admirer of Newton: her *Institutions* offers a critical appraisal of Newtonian ideas. *Inter alia*, she disagreed with Newton on space and time, and rejected universal gravitation in favour of *vis viva*.

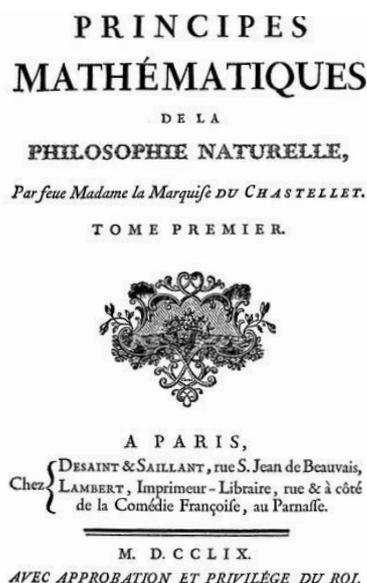


Figure 5. *Principes mathématiques de la philosophie naturelle* (Paris 1759). Émilie Du Châtelet's translation of Newton's *Principia mathematica philosophia naturalis*. Source: Public Domain via Wikimedia Commons

Du Châtelet's *Principes mathématiques de la philosophie naturelle* is a book with a complicated history, largely because of the circumstances of its completion and publication. Probably begun in 1744 it was completed just before her death in 1749 after giving birth to a daughter. But it was not published until 1756. These unfortunate circumstances have impacted on its bibliographical features (e.g. absence of Newton's name on the title page) leading Bernard Cohen to remark that the printed version is 'compounded of mysteries' – and it is he initially who did most to unravel those mysteries.

Du Châtelet's translation of the *Principia* bespeaks an advanced level of mathematical attainment, as do the accompanying pieces which she wrote for it: *Exposition Abregée du système du Monde*; *Explications des Principaux Phénomènes astronomiques tirées des Principes de M. Newton*; *Solution analytique des principaux problèmes qui concernent le système du monde*.

Voltaire complimented her on having rendered the mysteries of the *Principia* more intelligible than the original. She confronted the difficulties of Newton's style by rendering Newton's abrupt Latin in fluent, humanistic prose. She adopted a simple grandeur of style and expression appropriate to the sublimity of her subject matter. This says something about her high regard for Newton. Du Châtelet's Newton was certainly a *grand homme*.

A last unknown about Du Châtelet's translation is the extent of its influence. It was of course the only translation of the *Principia* in French – as such Du Châtelet's Newton was the French Newton. But its readership is something yet to be investigated. Denis Diderot was probably one of her readers since he mentions Du Châtelet in the *Encyclopédie* as one of the figures who made Newton accessible to the French. However, those knowledgeable enough to be able to understand it could probably have read it in Latin – most likely in the edition edited by François Jacquier and Thomas Le Seur (Geneva, 1739–1742).