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The Marquise, the Philosopher, and the Mathematician: Debate over Newtonian and Leibnizian Ideas

In the 1730s, the scientific climate in Paris was infused with ideas from two savant groups: Cartesians and Newtonians, i.e., those who followed Descartes theories of motion and those who believed in Newton's natural philosophy (science of motion and universal gravitation). Leibniz had added an additional layer to their debate when he challenged Descartes's conservation law for "quantity of motion." Leibniz also drew a distinction between "dead forces" and "living forces," the latter being conserved universally.

In 1740, Gabrielle Émilie Marquise Du Châtelet published "Physical Institutions" to expound the theories of Newton and Leibniz. An ardent Newtonian, she questioned the idea of forces promoted by Dortous de Mairan, a Cartesian and Secrétaire Perpétuel of the French Academy. He responded with a disparaging essay, starting a public dispute that centered on the concept of les forces vives. In 1741, Du Châtelet asked Euler for support, as neither Maupertuis nor Clairaut (her teachers) had come to her defense. Leonhard Euler, the incomparable Mathematicorum Principi, was the most eminent authority in mechanics.

The Châtelet-Mairan debate occurred during a time when philosophical disagreements, clashing personalities, and confusing terminology clouded the physical understanding of forces and motion. Did mathematical formulations settle the questions the debate had raised?