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The Riccioli-Borelli-Angeli controversy and the deviation of free falling bodies

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The controversy between the Jesuit Giovanni Battista Riccioli and the Galileans, Giovanni Alfonso Borelli and Stefano degli Angeli is part of the broader question of the opposition to the Copernican system on the part of Catholic orthodoxy. However, it had a fundamental role in highlighting an unresolved crucial question of Galilean dynamics: the "true" or "absolute" motion of falling bodies distinct from the apparent motion with respect to the rotating Earth. The starting point of the controversy was the proof of the immobility of the Earth, sustained by Riccioli in his *Almagestum Novum* (1651) and reaffirmed in the *Astronomia Reformata* (1665), which criticized Galileo's hypothesis of a semicircular trajectory, travelled with uniform motion. Riccioli's argument was based on the impact of a falling body on the ground, which varied with height. Borelli in *De vi percussionis liber* (1667) affirmed that the trajectory could be neither circular nor spiral, but opposed Riccioli's objection since this was based on the uniformity of the absolute motion while the variation of the impetus concerned the relative motion. A few months later, Angeli intervened against both Riccioli's demonstration and Borelli's arguments and the controversy developed into a long series of cross replicas (1666-1669). All the participants in the controversy were convinced that the trajectory should arrive at the center of the Earth, but, at a certain point within the debate, the consideration of a deviation emerged. It was Angeli, who, believing that the angular velocity was conserved during the fall, highlighted the consequence of Borelli's hypothesis, namely, that by maintaining the transverse velocity constant, the body would fall east of the vertical. The deviation of a falling body later became the experimental proof in favor of the rotation of the Earth, and the trajectory of a body in absolute space the theme of the famous correspondence exchanged between Newton and Hooke (1679-1680).

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