

THE HANGING CHAIN: A FORGOTTEN “DISCOVERY” BURIED IN GALILEO’S NOTES ON MOTION

One of the main motives for looking into sources such as notebooks is to date the discoveries of the heroes of science that are documented by their publications. In the case of Galileo’s major discoveries it has thus been established that he found his law of fall around the year 1604 and that, several years later only, he discovered the parabolic shape of the trajectory of projectile motion. We claim that for both discoveries a much earlier dating becomes unavoidable if such sources are interpreted under a different perspective, not under the limited perspective of determining precise dates of isolated pioneering discoveries, but under the perspective of a historical epistemology that does not adhere to such a simple concept of discovery.¹ The dating of Galileo’s achievements is, however, not our primary concern here but rather the context in which his discoveries were made. It will be shown that for Galileo the projectile trajectory was closely related to another curve which he erroneously thought to be much easier to understand. We claim that the alleged identity between the two different curves provided him with a conceptual framework for the interpretation of his famous discoveries on projectile motion which differs from that of classical mechanics, thus undermining the common understanding of these discoveries.

This needs some explanation. Contrary to the agreement about the dating, there is no unanimity among recent historians of science concerning the sources from which Galileo derived his major discoveries. The assumptions about his sources range in fact from pure empirical evidence achieved exclusively by means of careful experimentation, on the one hand, to predominantly theoretical speculation in direct continuation of scholastic traditions, on the other hand. In spite of the wide range of different reconstructions of the discovery process, however, a simple fact has nearly been completely neglected both by the older and the more recent literature: for Galileo, a close connection exists between the parabolic trajectory and, as mentioned above, another curve, and this curve is the catenary, the curve of a hanging chain.

This neglect is all the more astonishing as the connection is explicitly made a subject of discussion in his final word on the matter, the *Discorsi*. In the course of

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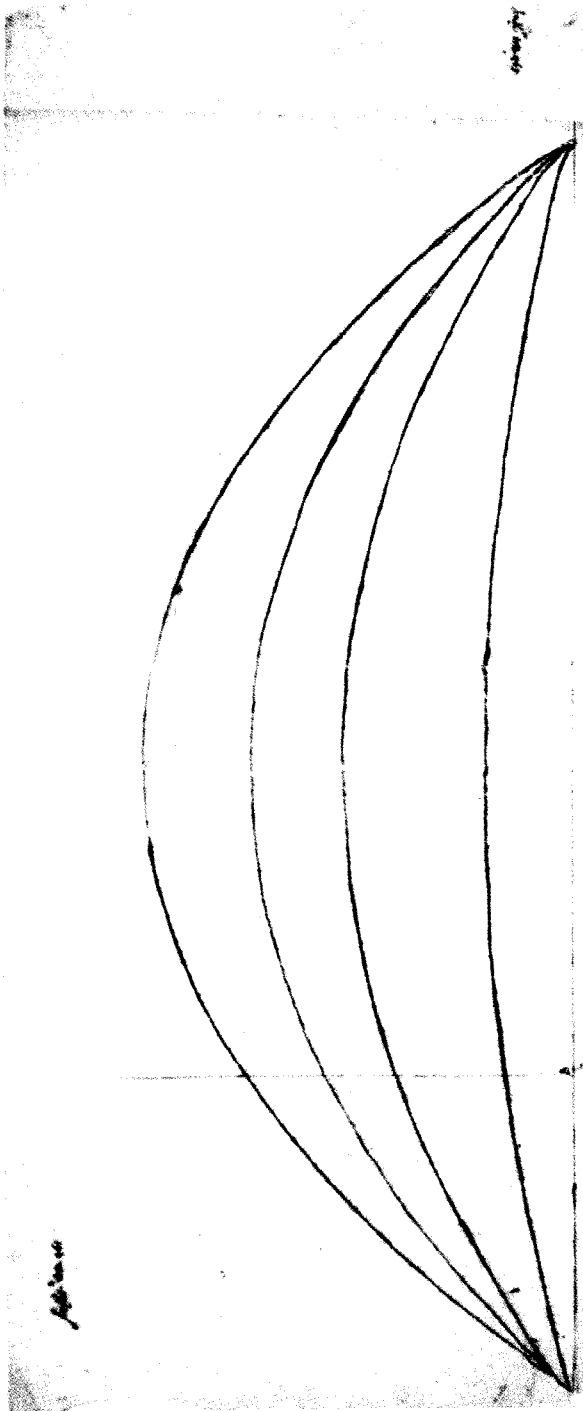


Figure 1. Folio 41/42 of Galileo's notes on motion with curves produced by means of a hanging chain.

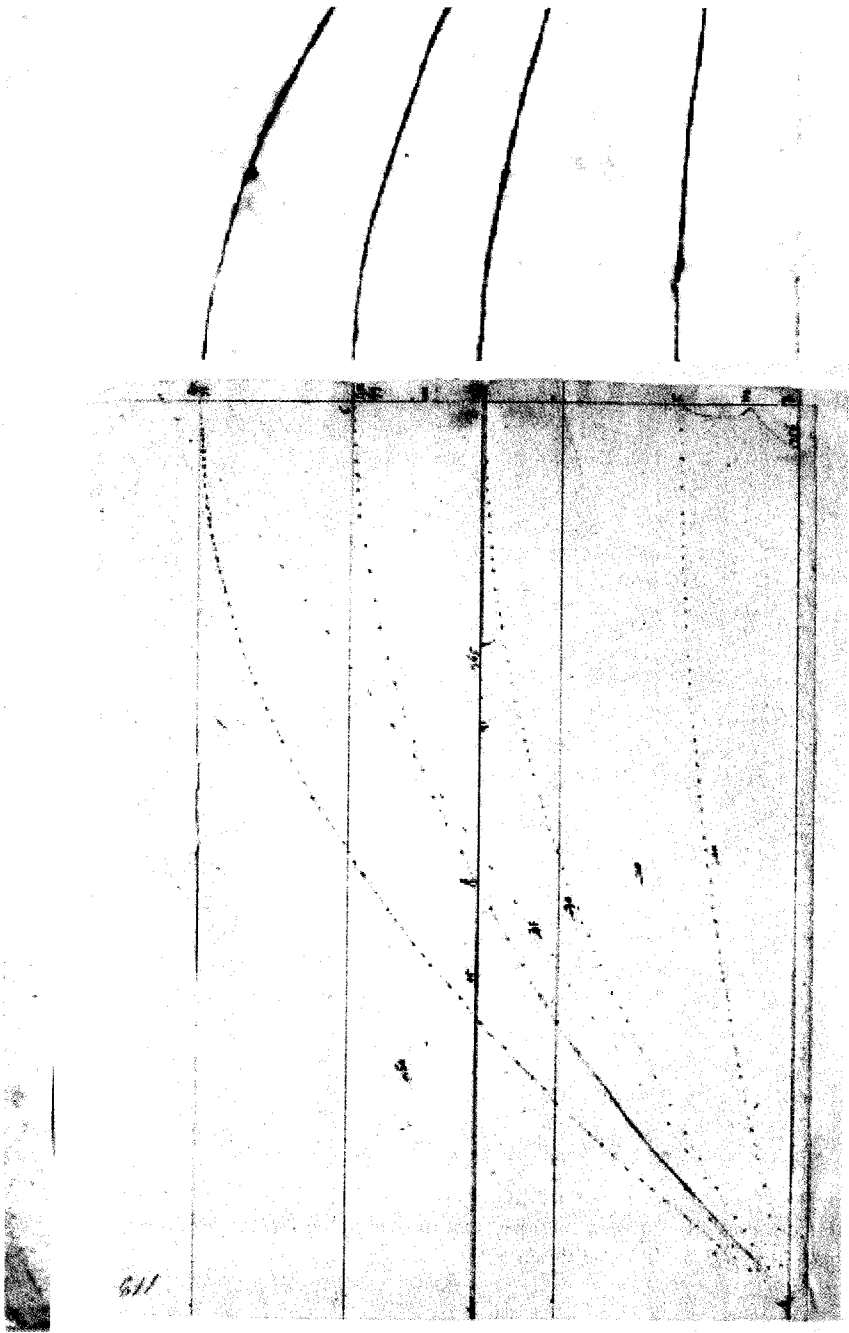


Figure 2. Folio 41/42 of Galileo's notes on motion (at the back) used as a template for drawing projectile trajectories on folio 113 (in front).

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