

Groetsch, C. W. 2017. Hammer and Feather: Some Calculus of Mass and Fall Time. *Mathematics Magazine*. 90: 3-7.

See <https://www.tandfonline.com/doi/abs/10.4169/math.mag.90.1.3> . Accessed 30 March 2023.

The paper opens this way,

“Does a heavy object fall faster than a lighter one? In 1971 NASA astronaut Dave Scott, Commander of the Apollo 15 lunar mission, used a hammer and a falcon feather on the surface of the moon to give a dramatic illustration that this is not so [4]. It seems Aristotle disagreed [1, p. 365]:

“A given weight moves a given distance in a given time; a weight which is as great and more moves the same distance in less time. . .

“In the late sixteenth century a brash twenty-something mathematics professor at the University of Pisa, Galileo Galilei, had the temerity to dispute the great philosopher [3, p. 26]:

“Of those moving bodies which are of the same material, Aristotle said that the larger moves more swiftly. . . . he says that a large piece of gold moves more swiftly than a small piece. . . . But how ridiculous this view is, is clearer than daylight.

“A proper mathematical investigation of the question became possible with Newton’s development of dynamics. Newton’s program shows that, if the only active force is constant gravity, then the time of fall from a given height is independent of the mass.”

Keywords: Galileo, falling object, resistance, Newton, gravity, quadratic resistance, linear resistance