All that has no other aim than to make us understand that motion impressed [on a body] through void space where nothing either attracts or resists will be uniform and perpetual; and that, therefrom, we conclude that all motion that is impressed on a body is in itself of that kind; so that in whatever direction you throw a stone, if you suppose that, at the moment in which it leaves the hand, by divine power, everything besides this stone is reduced to nothing, it would result that the stone will continue its motion perpetually and in the same direction in which the hand has directed it. And if it does not do so [in fact], it seems that the cause is the admixion of the perpendicular motion which intervenes because of the attraction of the Earth, which makes it deviate from its path (and does not cease until it arrives at the Earth), just as iron scrapings thrown near a magnet do not move in a straight line but are deviated toward the magnet.

Gassendi, *De motu impresso a motore translato, epistulae duae*, 1642

... why may you not lawfully conjecture that if the Terrestrial Globe were of a superfice exquisitely polite, or smooth as the finest Venice Glass; and another small Globe as polite were placed in any part of its superfice, and but gently impelled any way, it would be moved with constant Uniformity quite round the Earth, according to its first direction; and having rowled once round the Earth, it would. without intermission again begin, or rather continue another Circuit, and so maintain a perpetual Circulation upon the surface of the Earth?

Gassendi, *op. cit.*
tr. Walter Charleton, *Physiologia Epicuro-Gassendi-Charltoniana*, 1654

Galilean Relativity

The motion of bodies among themselves in a given space – e.g. within the hull of a ship – is the same whether that space – that ship – is at rest or moving uniformly straight forward.

"M. Gassendi, always having been curious to seek to justify by experiments the truth of the speculations proposed to him by philosophy and finding himself in Marseilles with his Lordship the Count of Allais in the 1641 demonstrated, on a galley which set out to sea designedly by the order of this Prince... that a stone dropped from the very top of the mast, while the galley is sailing with all the force and speed possible, will not fall in any other spot than it would if this same galley were stopped and immobile. This experiment, carried out in the presence of his Lordship the Count of Allais and a large number of people who attended, seemed to offer something of a paradox to those who did not see it; on this account M. Gassendi wrote a treatise *De motu impresso a motore translato* which came from his pen the same year in the form of a letter written to M. du Puy."

Gassendi's explanation: the stone falling from the mast in fact described a parabola, but it appeared to fall vertically to those on board the ship, for its forward motion was unobservable "because it was common to us and the stone."

(extracted from Dugas, *Mechanics in the Seventeenth Century*, p. 114f)

The Principle of "Inertia"

Direct statement:

> ***Any body, if moving at all, will continue to move at a uniform speed in a straight line unless it is made to deviate from that motion by an external cause.***

Contrapositive statement (stressed by Descartes):

> ***If a body in motion deviates in any way either from rest or from moving at a uniform speed in a straight line, then something external to it has caused this deviation.***

As a conceptual change:

> **Reject the question (which Kepler had posed), *Why does that body continue to move?* with the answer, *Why shouldn't it?***
>
> **Replace it with, *Why does that body not continue to move at a uniform speed in a straight line?*, calling for an answer of the form: *Because of the action on it by something external to it.***
>
> **In other words: *Uniform circular motion is neither natural nor self-sustaining. It requires, at every instant, some external action causing the motion to deviate from a straight line into a circle.***