"Laws of Nature"

A claim that holds universally of all matter in the universe at all times, and that itself has no further basis than the fact that this is the way God chose to create the world.

***Issue*: Why didn't this notion show up with Kepler and Galileo?**

***Answer*: Because, as the title to Part II ("Of the Principles of Material Objects") shows, Descartes is engaged in a different project from them, namely to lay out the basic requirements and forms for all physical explanation, replacing the four "causes" of Aristotle – i.e. "the rules [*regulae*] or laws [*leges*] of nature, which are the secondary and particular causes of the diverse movements which we notice in individual bodies."**

***Problem*: How can one establish fundamental claims of such generality?**

First Law of Nature:

Each thing, provided that it is simple and undivided, always remains in same state as far as in its power **[i.e. *quantum in se est*], *and never changes except by external causes.***

The version in *Le Monde*:

Each individual part of matter always continues to remain in the same state unless collision with others forces it to change that state.

Explanation in the *Principia*:

"If it is at rest, we do not believe that it will ever begin to move unless driven to do so by some external cause. Nor, if it is moving, is there any significant reason to think that it will ever cease to move of its own accord and without some other thing which impedes it.... For there is no other reason why things which have been thrown should continue to move for some time after they have left the hand which threw them except that, having once begun to move, they continue to do so until they are slowed down by encounter with other bodies."

Second Law of Nature:

Each part of matter, considered individually, tends to continue its movement only along straight lines, and never along curved ones.

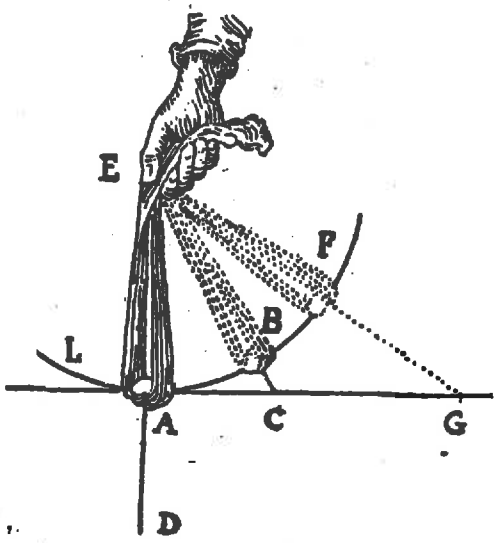
The version in *Le Monde*:

When a body is moving, even if its motion most often takes place along a curved line and can never take place along any line that is not in some way circular, nevertheless each of its individual parts tends always to continue its motion along a straight line. And thus their action, i.e. the inclination they have to move, is different from their motion.

Explanation in the *Principia*:

"This rule, like the preceding one, results from the immutability and simplicity of the operation by which God maintains movement in matter; for He only maintains it precisely as it is at the very moment at which He is maintaining it, and not as it may perhaps have been at some earlier time. Of course, no movement is accomplished in an instant; yet it is obvious that every moving body, at any given moment in the course of its movement, is inclined to continue that movement in some direction in a straight line, and never in a curved one."

Empirical explanation in the *Principia*:



"When the stone A is rotated in the sling EA and describes the circle ABF; at the instant at which it is at point A, it is inclined [*determinatus*] to move along the tangent of the circle toward C. We cannot conceive that it is inclined [*determinatum*] to any circular movement; for although it will have previously come from L to A along a curved line, none of this circular movement can be understood to remain in it when it is at point A. Moreover, this is confirmed by experience, because if the stone leaves the sling, it will continue to move, not toward B, but toward C. From this it follows that any body which is moving in a circle constantly tends [*tendere*] to move away from the center of the circle which it is describing. Indeed, our hand can even feel this while we are turning the stone in the sling {for it pulls and stretches the rope in an attempt to move away from our hand in a straight line}. This consideration {is of such importance, and} will be so frequently used in what follows, that it must be very carefully noticed here; I shall explain it more fully later."