

*Percussion* (1684), had asserted this proposition for the case of direct impact. But by the reasoners of Newton's time, the dynamical proposition, that the motion of the centre of gravity is not altered by the *actual* free motion and impact of bodies, was associated with the statical proposition, that when bodies are in equilibrium, the centre of gravity cannot be made to ascend or descend by the *virtual* motions of the bodies. This latter is a proposition which was assumed as self-evident by Torricelli; but which may more philosophically be proved from elementary statical principles.

This disposition to identify the elementary laws of equilibrium and of motion, led men to think too slightingly of the ancient solid and sufficient foundation of Statics, the doctrine of the lever. When the progress of thought had opened men's minds to a more general view of the subject, it was considered as a blemish in the science to found it on the properties of one particular machine. Descartes says in his Letters, that "it is ridiculous to prove the pulley by means of the lever." And Varignon was led by similar reflections to the project of his *Nouvelle Mécanique*, in which the whole of statics should be founded on the composition of forces. This project was published in 1687; but the work did not appear till 1725, after the death of the author. Though the attempt to reduce the equilibrium of all machines to the composition of forces, is philosophical and meritorious, the attempt to reduce the composition of Pressures to the composition of *Motions*, with which Varignon's work is occupied, was a retrograde step in the subject, so far as the progress of distinct mechanical ideas was concerned.

Thus, at the period at which we have now arrived, the Principles of Elementary Mechanics were generally known and accepted; and there was in the minds of mathematicians a prevalent tendency to reduce them to the most simple and comprehensive form of which they admitted. The execution of this simplification and extension, which we term the generalization of the laws, is so important an event, that though it forms part of the natural sequel of Galileo, we shall treat of it in a separate chapter. But we must first bring up the history of the mechanics of fluids to the corresponding point.