Galileo's First Science: The Science of Matter

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Abstract

Although Galileo ' s struggle to mathematize the study of nature is well known and oft discussed, less discussed is the form this struggle takes in relation to Galileo ' s first new science, the science of the second day of the Discorsi. This essay argues that Galileo ' s first science ought to be understood as the science of matter—-not, as it is usually understood, the science of the strength of materials. This understanding sheds light on the convoluted structure of the Discorsi ' s first day. It suggests that the day ' s meandering discussions of the continuum, infinity, the vacuum, and condensation and rarefaction establish that a formal treatment of the " eternal and necessary " properties of matter is possible; i.e., that matter as such can be considered mathematically. This would have been a necessary, and indeed revolutionary, preliminary to the mathematical science of the second day because matter itself was thought in the Aristotelian tradition to be responsible for the departure of natural bodies from the unchanging and thus mathematizable character of abstract objects. In addition, the first day establishes that when considered physically, these properties account for matter ' s force of cohesion and resistance to fracture. This essay closes by showing that this dual style of reasoning accords with the conceptual structure of mixed mathematics.

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