The Mechanization of Philosophy Between 1300-1700

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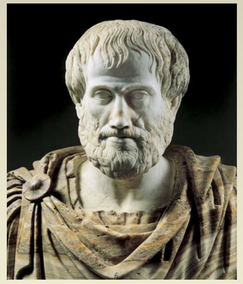
Standard histories of the development of modern science and philosophy has it that the mechanical philosophy was driven by changes in physics that then required a re-conceptualization of the metaphysics of substance. We contest that this view is backwards. The revisions of the metaphysics of substance occurred in the 14th century and it underlined the well-known changes in physics in the 15th and 16th centuries, which gave rise to mechanical philosophy in the 17th century.

Aristotle made substance the center piece of his ontology. This move raised a number of philosophical questions that Aristotle only confronted in a piecemeal fashion. The three most fundamental questions were:

•How does a substance retains it's unity (continuity and identity) through accidental change?
•How does a substance make a thing what it is?
•Where does a substance come from and where does it go when it is destroyed?

Thomas Aquinas (1225-1274), the most famous of Aristotelians, tried to systematize Aristotle's scattered thoughts on these questions. He saw them as involving and as being grounded in the notion of substantial form.

Substantial form is the thing that explains why the thing has the essence it has and why the thing has the powers it has. It is also what grounds the identity or unity of the thing through accidental change, and furthermore it explains substantial change by the final causal relations of substantial forms in mixing and mixtures.



The Aristotelian framework developed by Aquinas was severely criticized and rejected in the early 14th century by William Ockham (1288-1348) and John Buridan (1300-1362). Their criticism pushed in two directions. First was the rejection of any forms, essences, or natures really distinct from the individual substances themselves. Second was the replacing of the Aristotelian/holistic view of substance with a mereological. On this new view substantial forms had parts and were divisible.

Comment: The result of this is that the unity of substance that was so important for Aristotle and Aquinas is lost. This loss was the basis for attempts to reintroduce substantial form in the late 16th and 17th centuries, particularly by Francisco Suarez and G.W.F. Leibniz.

In the commentary tradition on Aristotle's *Physics* after Buridan, thinkers applied this new conception of substance to the problems of identity and continuity through change. A number of concepts in physics has to be restructured in the light of the new concept of substance.

Quantity is elevated from an accident to a quasi-substance, and without substantial forms to account for the essence or nature final causality disappears the is replaced with law like regularities between things or parts of things. Powers are reduced to the interactions of the parts of the substance. The disappearance and reappearance of things are explained by laws of nature.

The culmination of these trends were twofold. First the recognition by Descartes that body is comprised of extension and if theological commitments like the immortality of the soul were to be possible, humans and their rational soul had better be fundamentally distinct from bodily substances, And second the recognition by Locke that primary substances – whether bodily or mental – were simply collections of powers or qualities inhering in and united by a some-thing-we-know-not-what. For what else could substance be once the concept was ontologically reduced to nothing but quantity and powers standing in regular, law-like relationships.

In conclusion: It is our contention that the conceptual shifts in the ontology of substance not only pre-dated the rapid developments in physics and mechanics in the 17th century, but were moreover necessary for those developments that are commonly termed "The Scientific Revolution" and "The Rise of the Mechanical Philosophy." Descartes and Locke were not casting about for a new ontology of substance that the developments in science and physics needed, but rather were synthesizing changes that had already been made and were antecedently necessary for the development of science and physics.