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Mechanical philosophy

The **mechanical philosophy** is a form of natural philosophy which compares the universe to a large-scale mechanism (i.e. a machine). The mechanical philosophy is associated with the scientific revolution of Early Modern Europe. One of the first expositions of universal mechanism is found in the opening passages of *Leviathan* by Hobbes published in 1651.

Some intellectual historians and critical theorists argue that early mechanical philosophy was tied to disenchantment and the rejection of the idea of nature as living or animated by spirits or angels.^[1] Other scholars, however, have noted that early mechanical philosophers nevertheless believed in magic, Christianity and spiritualism.^[2]

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Mechanism and determinism

Some ancient philosophies held that the universe is reducible to completely mechanical principles—that is, the motion and collision of matter. This view was closely linked with materialism and reductionism, especially that of the atomists and to a large extent, stoic physics. Later mechanists believed the achievements of the scientific revolution of the 17th century had shown that all phenomena could eventually be explained in terms of "mechanical laws": natural laws governing the motion and collision of matter that imply a determinism. If all phenomena can be explained entirely through the motion of matter under physical laws, as the gears of a clock determine that it must strike 2:00 an hour after striking 1:00, all phenomena must be completely determined, past, present or future.

Development of the mechanical philosophy

The natural philosophers concerned with developing the mechanical philosophy were largely a French group, together with some of their personal connections. They included Pierre Gassendi, Marin Mersenne and René Descartes. Also involved were the English thinkers Sir Kenelm Digby, Thomas Hobbes and Walter Charleton; and the Dutch natural philosopher Isaac Beeckman.^[3]

Robert Boyle used "mechanical philosophers" to refer both to those with a theory of "corpuscles" or atoms of matter, such as Gassendi and Descartes, and those who did without such a theory. One common factor was the clockwork universe view. His meaning would be problematic in the cases of Hobbes and Galileo Galilei; it would include Nicolas Lemery and Christiaan Huygens, as well as himself. Newton would be a transitional figure. Contemporary usage of "mechanical philosophy" dates back to 1952 and Marie Boas Hall.^[4]

In France the mechanical philosophy spread mostly through private academies and salons; in England in the Royal Society. In England it did not have a large initial impact in universities, which were somewhat more receptive in France, the Netherlands and Germany.^[5]

Hobbes and the mechanical philosophy

One of the first expositions of universal mechanism is found in the opening passages of *Leviathan* (1651) by Hobbes; the book's second chapter invokes the principle of inertia, foundational for the mechanical philosophy.^[6] Boyle did not mention him as one of the group; but at the time they were on opposite sides of a controversy. Richard Westfall deems him a mechanical philosopher.^[7]

Hobbes's major statement of his natural philosophy is in *De Corpore* (1655).^[8] In part II and III of this work he goes a long way towards identifying fundamental physics with geometry; and he freely mixes concepts from the two areas.^[9]

Descartes and the mechanical philosophy

Descartes was also a mechanist. A substance dualist, he argued that reality is composed of two radically different types of substance: extended matter, on the one hand, and immaterial mind, on the other. Descartes argued that one cannot explain the conscious mind in terms of the spatial dynamics of mechanistic bits of matter cannoning off each other. Nevertheless, his understanding of biology was mechanistic in nature:

"I should like you to consider that these functions (including passion, memory, and imagination) follow from the mere arrangement of the machine's organs every bit as naturally as the movements of a clock or other automaton follow from the arrangement of its counter-weights and wheels." (Descartes, *Treatise on Man*, p.108)

His scientific work was based on the traditional mechanistic understanding which maintains that animals and humans are completely mechanistic automata. Descartes' dualism was motivated by the seeming impossibility that mechanical dynamics could yield mental experiences.

Beeckman and the mechanical philosophy

Isaac Beeckman's theory of mechanical philosophy described in his books *Centuria* and *Journal* is grounded in two components: matter and motion. To explain matter, Beeckman relied on atomism philosophy which explains that matter is composed of tiny inseparable particles that interact to create the objects seen in life. To explain motion, he supported the idea of inertia, a theory generated by Isaac Newton.^[10]

Newton's mechanical philosophy

Isaac Newton ushered in a weaker notion of mechanism that tolerated the action at a distance of

gravity. Interpretations of Newton's scientific work in light of his occult research have suggested that he did not properly view the universe as mechanistic, but instead populated by mysterious forces and spirits and constantly sustained by God and angels.^[11] Later generations of philosophers who were influenced by Newton's example were nonetheless often mechanists. Among them were Julien Offray de La Mettrie and Denis Diderot.

The mechanist thesis

The French mechanist and determinist Pierre Simon de Laplace formulated some implications of the mechanist thesis, writing:

We may regard the present state of the universe as the effect of the past and the cause of the future. An intellect which at any given moment knew all of the forces that animate nature and the mutual positions of the beings that compose it, if this intellect were vast enough to submit the data to analysis, could condense into a single formula the movement of the greatest bodies of the universe and that of the lightest atom; for such an intellect nothing could be uncertain and the future just like the past would be present before its eyes.

— Pierre Simon Laplace, *A Philosophical Essay on Probabilities*

See also

- Causality
- French materialism
- Mechanism (philosophy)
- Necessitarianism
- Philosophy of physics

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11. Josephson-Storm (2017), p. 43

External links

- An overview of attempts to define "life" (<http://www.angelfire.com/linux/vjtorley/chapter1finala.html>)
 - "The Problem of Mechanism (<http://www.columbia.edu/cu/augustine/arch/mechanism.htm>)" by David L. Schindler (from *Beyond Mechanism*) - contrasts the Aristotelian and Cartesian views of nature and how the latter engendered the mechanical philosophy
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