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This is a pre print version of the following article:

Original Citation:

Availability:

This version is available <http://hdl.handle.net/2318/1770144> since 2021-01-30T08:10:30Z

Publisher:

Springer

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Mechanism in Eighteenth-Century German Philosophy



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Related Topics

Clandestine German Philosophy · Early German Enlightenment · Hoffmann · Iatromechanism · Lange · Leibniz · Life Sciences · Materialism · Organism · Spinozism · Stahl · Teleology · Christian Wolff

Introduction

Johann Heinrich Zedler's very successful *Grosses vollständiges Universal-Lexicon aller Wissenschaften und Künste* (1732–1750) presents a clear picture of what “Mechanism” meant to German scientists and philosophers in the first decades of the eighteenth century. Recalling an issue already raised in Johann Georg Walch's earlier *Philosophisches Lexicon* (1726) the article *Mechanismus* in Zedler (Zedler 1739, 23–27) insists on the different meanings the word has assumed, moving from its original context to its current common use. Indeed, the employment of term *Mechanismus* was initially restricted to the realm of artificial machines and only later extended to that of natural things, with the attempt to explain their actions only by means of their

geometrical and physical properties, i.e., dimension, shape, weight, and of the laws of movement:

The usual interpretation is that through Mechanism one understands the essential nature of bodies, by means of which all that is changeable in the world – which occurs naturally, according to the essence of bodies and to their nature, or which occurs according to the laws of motion – can be explained in a comprehensible way through the nature of the bodies and the rules of movement. (Zedler 1739, ad voc. ‘Mechanismus’; the same passage in Walch 1726, ad voc. ‘Mechanismus’)

Both Walch's and Zedler's *Lexica* acknowledge that *Mechanismus* is sometimes meant in the sense of a precise orientation in philosophy, in particular of the so-called *mechanisch philosophieren*, i.e., “the way to explain the actions of natural things from their mechanical structure” (ibid.). This usage represents by far the most interesting intersection between the different occurrences of the idea of mechanism and the philosophical debate of the time. Indeed, the *philosophia mechanica* describes a methodological attitude, which can reflect very different ontological commitments. In order to shed some light on the philosophical ambiguity of the program of a “mechanical philosophy,” which can suit both a materialistic orientation and a dualistic metaphysics, it can be useful to look at one of its clearest definitions, which is provided by Christian Wolff (1679–1754) in the *Annotations* to his *German Metaphysics* (1724). According to Wolff, one can call *philosophia mechanica* the attempt to explain the actions of natural things from their

structure and from the rules of movement. Therefore, one should focus “on the nature of the parts [of those things], on their connection, and on the movements that occur when changes happen” (Wolff 1724, § 224; Meissner 1737, 368).

Mechanism and Fatalism

According to Wolff, mechanical philosophy is not only possible but successful, because – as he states in his *Cosmologia generalis* (1731) – the whole world is a machine (Wolff 1731, § 73) and the bodies in it, both natural and artificial, are machines themselves and, at the same time, gears of that huge mechanism (§ 74). This means that the changes that occur in the world can be explained by means of the interaction of its parts, which is ruled by the laws of movements. Such a claim leads Wolff straight toward a strong form of determinism, in the sense that each state of the world machine must necessarily follow from the previous one, since it is grounded on the structure of the machine and on the mechanical laws that rule its functioning. This assumption – that goes back to Wolff’s earlier *German Metaphysics* (1719) – was immediately perceived as a dangerous form of fatalism, which deprives the world and all of creation of any possible form of freedom. In fact, the mechanical cosmology is at the very center of the accusations initially raised by the pietistic theologian Joachim Lange in the famous anti-Wolffian campaign that led to Wolff’s banishment from Prussia in 1723. In the further development of his polemical attack, Lange stresses the tight connection between Wolff’s *fatum physico-mechanicum* and its materialistic implications (Favaretti Camposampiero 2014). In fact, in Lange’s words, Wolff assumes “the general principle of materialists concerning the world” insofar as he conceives it as “a pure machine, or an automaton” where everything happens according to “purely mechanical laws of movement” and to “the mechanical structure of the universe and of every body” (Lange 1726, 80). In particular, the parallelism between the changes that occur in the physical and in the psychical realm – i.e., the hypothesis of the pre-established

harmony that Leibniz had meant as a way out from the arid opposition between “les [philosophes] materiels” and “les philosophes formalistes” (Leibniz 1698, 85) – made the existence of spiritual beings completely vain. Since everything can be explained by means of the laws of matter, then nothing exists except for matter.

Mechanism and Materialism

By insisting on the materialistic implications of mechanism, Lange was recalling a recent polemical goal of one of the late supporters of Christian Thomasius’ philosophical orientation, Johann Franz Budde (1667–1729), who was himself close to the pietistic milieu and who would side with Lange in the anti-Wolffian campaign. In an early writing which contains a harsh attack against Spinozism, Budde focuses on the connection between mechanism and materialism that he claims to be the very fundamentals of the peculiar form of atheism implied by Spinozistic pantheism. Budde’s argument works as follows: If Nature is God, God is not separate from matter; everything that exists – God and souls included – is nothing but matter, which exists and acts by means of necessary mechanical laws (Budde 1701; see also Budde 1717, III, §§ 1–3; Rumore 2019).

Such a convergence of pantheistic themes and mechanical issues on the basis of a materialistic metaphysics is precisely what was promoted at the turn of the century in the clandestine milieu by German “freethinkers,” among which were Friedrich Wilhelm Stosch, Theodor Ludwig Lau, Gabriel Wagner, Urban Gottfried Bucher, and some others. Leaving aside the question of their effective closeness to Spinozism, it is relevant to notice that they were all supporters of a mechanical cosmology and a mechanical physiology, which goes back to the fundamental ideas of the Cartesian medical tradition. Their claims rest both on the idea that matter – which is passive and doesn’t entail any form of activity in itself – is the only unique substance and that each phenomenon is ruled by the laws of movement. According to Lau, for instance, God is nothing but the

“Motor et director” of the universe, and his relationship to the world is expressed through meaningful metaphors – such as the helmsman of the ship, the charioteer of the chariot, the unstill balance of the clock, the wheel of the machine, the locomotive of the automaton – that reveal the mechanical frame of his reflection (Lau 1717, § XVII).

Such a mechanical cosmology led straight to a mechanical explanation of physiological and even mental phenomena, which explicitly rejects the spiritual nature of the soul and – with very few exceptions – its immortality. Stosch, for instance, reduces the soul – both in its “vital” (*anima*) and in its “rational” part (*mens*) – to the physical realm and describes its operations in terms of mechanical interactions. According to him, life is nothing but the “lawful fermentation of the blood and humours which flow conveniently through uncorrupted canals and produce various operations, both voluntary and involuntary” (Stosch 1692a, § 3), whereas the mind, i.e., the organ of thinking, is reduced to the brain and to the movements of the cerebral organs (Stosch 1692b, 127–128). According to Lau, the man is a machine composed of a twofold matter: a subtle matter, which we call the soul, and a rough matter or the body (Lau 1717, cap. III, §§ V, VI).

This kind of mechanical explanation of each natural phenomenon rests on a form of materialism that rejects the existence of spiritual beings. Mechanism is here the key to grasp the functioning of a materialistic metaphysics, so that the two expressions show a clear overlap. Interestingly enough the *Lexica* of the time report it as follows:

We term it materialism when all the occurrences and operations of natural bodies are derived from the bare properties of matter, i.e., its dimension, shape, weight, confrontation, and mixture, thus not allowing for any other spiritual principle except for souls; but that is exactly what is called mechanism. It is not uncommon in natural science to call the mechanics materialists and to oppose them to the spiritualists, even if the words Mechanismus and Mechanicus are more usual (Walch 1726, ad voc. “Materialismus”; cf. also Zedler 1739, ad voc. “Materialisten”).

Actually, it seems to have been Leibniz that introduced the idea that there is an intimate

connection between materialism and the mechanical explanation of phenomena. In the *Éclaircissement* which he conceives as a reply to Bayle’s criticism of the new explanation of the relationship between mind and body, Leibniz mentions among the very partial explanations of nature “the mechanical explanations of natural phenomena provided by Democritus and by modern philosophers,” who deserve the epithet of “philosophes matériels” *par excellence* (Leibniz 1698, 85). Even a few years later Leibniz – still engaged in the debate with Bayle – refers to *les purs matérialistes*, who are meant to be the advocates of the Democritean mechanical idea according to which the universe and the human being itself are nothing but mere machines, which “are not associated with an immaterial substance or form” (Leibniz 1705?, 99).

Without rejecting mechanism in itself, Leibniz claims that materialism and mechanism turn out to be one and the same thing if one attempts to explain reality focusing only on its phenomenal features. As emerges clearly in his correspondence with Samuel Clarke, materialists such as Democritus, Epicurus, and Hobbes were right in explaining nature by means of mechanical laws, but, from a metaphysical point of view, they should have kept into account that such laws rest on a deeper metaphysical principle, i.e., that of force or power, which confines mechanism to the physical (phenomenal) realm and discredits any absolute materialistic perspective (Leibniz and Clarke 1715, 35). Far from accepting the equivalence between mechanism and materialism, Leibniz praises the clear separation between two different realms: the metaphysical level of substance, which is the level of activity and which excludes any form of mechanism (which shouldn’t be confused with the active form of determinism he accepts), and the level of phenomena, i.e., the physical realm of bodies as aggregates of monads, which is only partially explained by the mechanical model. As correctly argued by Natorp, in Leibniz mechanism taken to its extreme consequences reveals the limits of materialism: “materialism fails exactly at the point where the *mechanical idea* finishes, i.e. in the explanation of thinking and perceiving” (Natorp 1881, 8), which

cannot be explained by means of mechanical laws as clearly illustrated through the notorious mill experiment in the *Monadology* (cf. Duncan 2012; Rozemond 2014; Lodge 2014).

Following Leibniz' distinction now integrated into a Cartesian dualist perspective, Wolff rescues mechanism as the proper way to explain physical phenomena. Rejecting the materialistic claim to reduce the whole reality to the realm of bodies, Wolff praises mechanism as the proper explanation that allows one to rule out from the physical realm entities and forces that cannot be stated through the empirical observation. *Mechanismus* becomes properly what the physicist looks at on the basis of the reciprocal connection of physical entities (Wolff 1726, 236–237). From this point of view, mechanism is no longer a danger in itself; even further, Wolff strives to demonstrate that through *Mechanismus* “the world carries the imprint of God’s wisdom.” He provides this demonstration in order to avoid that “the denial of *Mechanismi* happens to halt progress in the knowledge of nature; but also to avoid that the abuse of it might lead to mistakes which can be discreditable for the knowledge of God” (Wolff 1726, 237; Meissner 1737, *ad voc.* “*Mechanismus*”; Rumore 2016).

Wolff’s claim concerning the contribution of the mechanical approach to the progress of sciences (Wolff 1710, 18–19) discloses the idea that the proper mechanical explanation of phenomena doesn’t leave space for further causes and entities, like the ones introduced in the Neoplatonic tradition or even in Newtonian science. Even the realm of the life sciences, animal and human, takes advantages from the mechanical approach, so that Wolff doesn’t hesitate to support the iatromechanist Friedrich Hoffmann (1660–1742) in his struggle against the vitalistic ideas of Georg Ernst Stahl (1659–1734).

Once the equivalence between mechanism and materialism has been dismissed, mechanism can be adopted as a successful way to explain the origin and functioning of natural phenomena in a world where matter is fundamentally passive and ruled by the laws of movement. The mechanical explanation which moves from the “sufficient reason” of each change in the world – that is from the

efficient cause of the modification and not from its alleged final cause – finds its opponents among the supporters of a vitalistic orientation in life sciences, who didn’t only reject the idea of a purely passive matter but were well disposed to present a teleological explanation of the working of organisms. The epilogue of the successful hegemony of mechanism in natural science and of the attempts to reassess its epistemic validity even in the field of life sciences arrived in 1790 with Kant’s denunciation of the insufficiency of a pure mechanical explanation concerning phenomena that seem to transcend the logic of mechanical causes. Kant’s famous statement on the impossibility of a “Newton of the Blade of Grass” in his *Critique of the Power of Judgment* (§ 75) represents the German contribution to the denunciation of the insufficiency of mechanistic explanations in the realm of livings and at a time the defeat of the mechanical model of organic nature.

Cross-References

- ▶ [Christian Wolff](#)
- ▶ [Materialism](#)
- ▶ [Vitalism](#)

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