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Monads and Monadology in Early Modern Philosophy and the Sciences

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Related Topics

Substance · Soul · Metaphysics · Force

Introduction

While the notion of monad has a long tradition from Pythagorean philosophy to modern Platonism, the term "monadology" usually refers to Leibniz's metaphysics of monads, which became the basis for successive discussions of the topic. After a short survey of theories of monads before Leibniz, I will focus on Leibniz's monadology and the different arguments that concern monads in Leibnizian thought. Leibnizian monadology was presented in a summary form and immediately gave rise to interpretative issues. Hence, in the next section, I will present key aspects of the early reception, from Wolff's influent reframing of monadology to materialistic interpretations in the mid-eighteenth century. Next, I examine examples of eighteenth century physical monadologies, which conceived of monads as point-like centers of moving forces and thus allowed of a connection of monadology to Newtonian physics. In the following section, I will focus on Kant's account of monads in criticism, which divorced the metaphysical from the physical meaning of monads. In the last section, I briefly examine the further posterity of monadology.

Monads Before Monadology

The philosophical term "monad" can be traced back to the Pythagorean tradition and its Platonic appropriation. In the early Platonic Academy, as Plato's late investigations and unwritten doctrines on ideas and numbers were developed into a Pythagoreanized version of his doctrine, the μονάς (*monas*) was conceived as the highest principle of Being: Speusippus – in a passage quoted by Proclus – attributed to the Pythagoreans the thesis that the One "is higher than Being and produces it," if only it is connected to the multiplicity of the "Indefinite Dyad." His successor Xenocrates developed these theses: he identified the Monad with the "Intellect" and conceived of Numbers and Ideas as its first products (Dillon 2014, 250–257). Aristotle sharply criticized this mathematized philosophy for its conflation of forms and numbers (*Met.* 1086a6–11), but similar ideas were reprised by later Neo-platonic and pseudo-Pythagorean works and would resurge in the context of Italian Renaissance Platonism (e.g., in Marsilio Ficino) and in the natural philosophy and metaphysics of the sixteenth and seventeenth

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centuries, with the revivals of atomism and mathematical description of nature.

The rethinking of monads, in these contexts, could coincide with a joint elaboration of atoms and indivisibles, as mathematical and physical units were taken as constitutive and generative principles of all reality. Giordano Bruno, in *De monade, numero et figura* (1591), conceived of the "monad or atom" as the indivisible, dimensionless, and self-moving element of all things (Bruno 1879–91, I.2, 137–138; cf. I.3, 140). The mathematical and physical elements of Bruno's philosophy were at the same time parts of a representation of nature as a living being, animated by God or its virtue (Bruno 1879–91, I.4, 101). God was the absolutely simple "monad of monads" (Bruno 1879–91, I.3, 144), which composed all other things as the number one composes all other numbers (Bruno 2002, I, 733).

Seventeenth century Cambridge Platonists would elaborate on the monad in light of the new corpuscular and mechanical philosophy. Henry More's "physical monads," in the *Enchiridion metaphysicum* (1671), were "particles so minute that they cannot be further divided or discerped into parts" (More 1679, II.1: §§1, 3). More originally identified physical monads and atoms, but then decided to replace the term "atom" because of its Epicurean connotation. However, since More considered extension as a necessary attribute of being, this monad was extended: one could conceive of its parts, although their division and separation was impossible (Reid 2012, 50–51). More's physical monads thus belong to the variety of metaphysically indivisible elements that were admitted by both atomists and Newtonians (Holden 2004, 13). More's fellow Platonist in Cambridge, Ralph Cudworth, emphasized the spiritual meaning of the term "monad," writing that "a Thinker, is a Monad, or One substance and not a Heap of Substances" and this substance does not correspond to motion, but to an "internal energy" (Cudworth 1678, I, §5, 830–831).

More's work influenced Anne Conway's metaphysics, where "physical monads" are spiritual principles and extended beings: "The division of things is never in terms of the smallest mathematical term but the smallest physical term. And when concrete matter is so divided that it disperses into *physical* monads, such as it was in the first state of its formation, then it is ready to resume its activity and become spirit" (Conway 1996 [1690], 20). Neo-Platonic ideas were also elaborated by Francis Mercury van Helmont and Christian Knorr von Rosenroth, who connected this tradition with Kabbalistic doctrines. Knorr's "monads" are incorporeal beings that emanate from the divine substance and yet preserve their individuality.

While Aristotelian-Scholastic philosophy shunned the use of the term "monad" with its Pythagorean and Platonic connotation, and accepted the infinite divisibility of extension, late Scholastics would focus on the existence of peculiar indivisibles: the "minima naturalia," i.e., the smallest parts of matter endowed with a peculiar form. This notion was particularly important in the context of seventeenth-century natural philosophy and chemistry, e.g., for the understanding of chemical mixtion in Julius Caesar Scaliger and Daniel Sennert (Clericuzio 2000, 103–148). The intertwining of Neo-Platonism, Kabbalah, and Scholastics, of metaphysical, physical, chemical, and mathematical topics, would provide the background for Leibniz's original reappraisal of monads (Becco 1975; Pasini 1994, 122–131).

Leibniz's Monadology

Leibniz used the term "monad" in his late writings – starting ca. 1694 – in order to define "simple substances," i.e., substances "with no parts" that must exist necessarily as conditions of compound beings. As such, "the monads are the true atoms of nature; in a word, they are the elements of things" (GP 6: 607). The untitled manuscript of 1714 that would become the main source for the understanding of Leibniz' metaphysics of monads was published posthumously in 1720 with the title *Principles of Monadology* (*Lehrsätze über die Monadologie*) and standardly titled *Monadology* in modern editions. The term "monadology" was also used to mean Leibniz's metaphysics in general, as it could be reconstructed on the basis of various texts besides the *Monadology*, such as the

Theodicy. This second meaning of the term is still used by today's scholars, who reconstruct Leibniz's theory on the basis of a larger set of texts (e.g., Garber 2009, 315).

In the *Monadology*, Leibniz argues that monads, since they lack parts that could be augmented, lost or rearranged, "cannot begin except by creation or end except by annihilation" and are characterized by internal qualities and action (hence they do not interact with each other: they have "no windows") (§§6–7, GP 6: 607). Monads are characterized in each moment by a state and an action: "perception" is the "passing state which enfolds and represents a multitude in unity or in the simple substance" (§14, GP 6: 608); "appetition" is "the action of the internal principle which brings about change or the passage from one perception to another" (§15, GP 6: 609). Since the monad is unextended, perception and what follows from it are inexplicable by mechanical causes (as shown by the famous thought–experiment of the mill). While all monads represent external things, only a restricted number of monads – as Leibniz points out in the contemporary *Principes de la nature et de la* grace – have "'apperception', or 'consciousness', or the *reflective cognition of this internal state*" (GP VI: 600). These are capable of rational knowledge and therefore they can discover "necessary and eternal truths" concerning themselves and God (§29, GP 6: 611).

The mutual dependence of monads in the world is explained by a "mutual connection or accommodation" of monadic perceptions, such that every monad "has relations that express all the others," and hence regards the universe from its own "point of view" as a "perpetual living mirror" (§§56–57, GP 6: 616). However, the representation of monads is "confused as to the details of the whole universe." This limitation is reflected in their material dimension. Monads are always associated to bodies, and thus form "living beings" (conscious "souls," in turn, form "animals"). They have more distinct knowledge of their own bodies than of distant ones, hence their limited representation of the universe corresponds to the way the body represents the whole physical world. Since bodies are infinitely divisible into other bodies, and each one is associated to a monad, there are infinite living beings in the smallest particles of matter (§66). Yet the body of an animal has a "dominant" monad, which controls it (§70). Given these metaphysical premises, in the final paragraphs of the *Monadology*, Leibniz expounded his thesis that the "kingdom" of mechanistic causes and the "kingdom" of final causes, the physical and the moral order of the world, coexist as aspects of the same rational order of nature.

To be sure, it was hardly possible to understand what Leibniz had in mind on the basis of the short sentences of the *Monadology*. Bertrand Russell notably wrote that the *Monadology*, on his first reading, struck him as a "kind of fantastic fairy tale" (Russell 1900, xiii). Nevertheless, the hypothesis of monads was supported by different arguments, developed by Leibniz over his philosophical career. First, since the 1670s, Leibniz developed two kinds of arguments concerning the limits of mechanical philosophy and the consequent necessity of admitting "substantial forms." A first set of arguments was based on the need of a principle of *unity* in order to separate a "flock" of animals, a "heap of stones" and similar aggregates from truly unitary beings (G 2: 119, 76). Second, Leibniz argued that we have to admit of a *force* in order to account for physical phenomena such as impenetrability, mass, and conservation laws. This idea first appeared in writings of the late 1670s and the 1680s and eventually led to the exposition of the new science of "dynamics" in the 1690s. In the latter, Leibniz separated active and passive powers of substances which were conceived as primitive and derivative: the former belonged to the proper activity of substances, the latter to its phenomenal side and thus to the domain of mechanics. A third set of arguments was based on the need to define substances by means of complete individual concepts, and hence by their intrinsic properties. This view found an important systematic exposition in the 1686 *Discours de métaphysique* and included consequences such as the principle of indiscernibles and pre-established harmony.

All these arguments, originally applied to "substantial forms" in Aristotelian terms, were

recast in the framework of monadology: monads were true units, endowed with primitive and derivative forces and a complete set of individual qualities (Garber 2009, 330). Among the first expressions of this theory was the *Système nouveau de la nature et de la communication des substances* (1695), where "true," "real unities," or "formal atoms," are presented as conditions of material aggregates. In a correction to his personal copy, Leibniz pointed out that these are different from "mathematical points," which are merely extremities of a given extension; they are rather "real, animated points, as it were, which have to entail something formal and active in order to constitute a complete being" (GP 4: 478). Leibniz also added the adjective "simple" to the qualification of substance, thus forming the notion of monad (GP 4: 479; Fichant 2005, 38–39). On the new theory, the connection of monads to bodies required a hierarchical structure. As Leibniz put it in a 1703 letter to Burchard de Volder, the monad itself results from an "entelechy" or "soul" and a primary matter, or "primitive passive force." Innumerable monads compose a "mass," which the dominating monad turns into "one machine," that is the "animal" or "corporeal substance" (GP II 252).

One of the characteristic aspects of monadology was the connection of action and passion to degrees of clarity of perceptions: "Their [the monad's] action and passion depend on the more or less distinctness of perceptions: Thus *action* is attributed to a monad insofar as it has distinct perceptions, and *passion* insofar as it has confused ones." Hence, the "more perfect" beings "supply a reason *a priori* for what happens in the other" (§§49–50, GP 6: 615). This suggested that matters concerning motion of bodies and their alleged interaction could be reduced to matters of monadic perception. Thus, the phenomenal world of bodies and animals would be reduced to the true reality of monads. This theory has raised lively controversies among scholars. The main interpretative problem is produced by the fact that Leibniz continued to mention both corporeal substances and monads in his late writings. Some have argued that Leibniz, although he kept talking of corporeal substances in some contexts, dropped his earlier theory at some point in his career and embraced monadology, where bodies are mere phenomena, in what can be considered an idealist metaphysics (e.g., Adams 1994); some have maintained that Leibniz continued to admit both monads and corporeal substances: this fact can be explained by the distinction of two different epistemological or ontological levels of the theory (e.g., Rutherford 1995; Garber 2009, in part. 382–388; Arthur 2018) or taken as a sign that Leibniz was working on two competing and incompatible theories (e.g., Hartz and Wilson 2005).

The Early Reception of Monadology

Leibnizian monadology immediately divided interpreters. In general, the problems concerned Leibniz's dual characterization of substances, as endowed with physical properties (such as motive force and organic body) and inner powers (perception and appetition), that is the relation of monad and organic body, the simple and the composed, giving rise to "reinterpretations, amendments, conceptual metamorphoses or rejections" of monadology (Duchesneau 2013, 133). A major issue concerned the presence of monads in space and their relation to composite bodies. In many places, Leibniz insisted that substances, being immaterial, are not properly localized in space, for space is indeed a "phenomenon" of their perception: substances are "not parts," they are "rather grounds of phenomena" (GP 2: 268). Commenting on Newton's thesis that the soul interacts with the body in a place in the brain (the *sensorium*), Leibniz wrote: "To say that it is diffused all over the body is to make it extended and divisible. To say it is, the whole of it, in every part of the body is to make it divided from itself. To fix it to a point, to diffuse it all over many points, are only abusive expressions, *idola tribus*" (GP 7: 365–366). Still Leibniz's words on monads existing in the smallest parts of matter suggested the view that monads are localized in points (Pasini 1994, 115–118; De Risi 2007, 301–314).

Christian Wolff admitted that he was puzzled by Leibniz' claim that all "simples" have to have representative power. Therefore he introduced,

besides perceiving monads, the "elements of bodies," that is nonrepresentative simple substances endowed with force, thus providing a dualist interpretation of Leibnizian substances (Wolff 1733 [1724], §215, 369; Watkins 2006, 275–290; Lamarra 2007). These elements corresponded to "physical points," and although they "fill no space" they produce extension by aggregation (see, e.g., Wolff 1731, §§187, 220–221). This theory was different from Leibniz's monadology, and hardly consistent with the latter's phenomenalism. It was soon questioned by Johann Gottsched (1721, §IV), who wondered how, given the infinite divisibility of space, point-like elements could constitute bodies, and also doubted the soundness of the argument that composite beings entail the existence of simples (§14).

Nevertheless, Wolff's notion of "physical points" was taken as a plausible interpretation of monads by a significant number of interpreters and so was the argument that space and impenetrability could be explained out of point-like monads, however problematic and possibly circular. A notable example was Alexander Baumgarten, who elaborated a rational reconstruction of monads as impenetrable "physical points" in his *Metaphysica* (Baumgarten 1763 [1739[1]], §398–399; Watkins 2006, 290–298). Michael Hansch, in the Latin translation of the *Monadology*, had attributed to Leibniz the picture that a cup of coffee contains infinite monads (Hansch 1728, 135). Similar pictures became popular, and inspired Voltaire for his mockery of monadology in the *Éléments de la philosophie de Newton* of 1748: "Can you really believe that a drop of urine is an infinity of monads, and that each of these has ideas, however obscure, of the universe as a whole?" (Voltaire 1877–1885, XXII, 434).

Controversies on monadology reached a climax in 1745 with the prize essay competition on monads of the Berlin Academy. Leonhard Euler schemed to turn the competition into a fierce attack on monadology and the winner, Johann Heinrich Justi, was indeed a staunch critic of monads, though a mediocre one (see, e.g., the critical remarks in Condillac 1792 [1749], 122–123), whose arguments were similar to Euler's. The latter had already published his own antimonadological arguments before the competition in the anonymous *Gedancken von den Elementen der Cörper* (1746a; see Leduc 2013). Euler's first argument was mathematical: infinitely small beings, conceived as simple elements of bodies, could not constitute a finite extension (Euler 1746a, II, §§65). Infinite divisibility of matter, on the other hand, could not lead to simple beings, which "seems to contradict his [Leibniz's] theory of monads" (ivi, §4, 62). This argument, based on the questionable assumption that Leibniz and Wolff wanted to derive monads from the resolution of the continuum, would be reprised by Euler in the *Lettres à une princesse d'Allemagne*. The second argument was physical: the inertia of matter excluded the attribution of active powers to matter; only immaterial substances were able to modify their own physical states (see, e.g., 1746b, 281–284). This point had a metaphysical implication: Euler wanted to defend the view that the soul is "not material" against a conception that could lead to the infamous doctrine of thinking matter (Ibid., 286). Samuel Formey responded to Euler's untimely attacks questioning the latter's perspective: Euler wanted to "judge of simple beings by pictures, by measures and by other means that are only suitable to bodies or to geometrical abstractions" (Formey 1747, I, 244), and thus entirely missed the metaphysical discourse of monadology, which was based on the intellect. In particular, Euler started from phenomena like extension and force of inertia and ignored their "common source" and the reason of their "substantiality" (I, 328; Rey 2013).

Among the competing essays was Condillac's *Les Monades* (anonymously published in 1758), which did not make a strong case for or against monads, but rather provided a critical exposition which Condillac would reprise in more detail in the *Traité de systèmes* (1749). On the one hand, Condillac emphasized that the conjunction of natural phenomena is realized by monadic representation: he argued that the unity of "phenomena of the universe" can be compared to that of a concert, as different sounds are connected by the listeners (Condillac 1749, VIII, I, §5). On the other hand, he critically remarked that we conceive of monadic "force" by reflecting on bodies, and Leibnizians hardly explain what they mean when they define the force of a simple being, for indeed

they ignore the intrinsic properties of the soul (VIII, II, §§2–3. This had been conceded by Wolff 1731, § 183). Although Condillac considered the original Leibnizian theory to be defective, he maintained that it was "more consistent" than the Wolffian theory, for the latter also lacked any explanation of why some substances have inner perceptual states and some do not (Condillac 1749, VIII, II, §5). In the end, however, Condillac pointed out that physical phenomena are the only contents that we can rely on in order to figure out the meaning of monadology (Duchesneau 2013, 174–179).

Samuel König's essay for the Academy competition propounded a full-fledged phenomenalistic interpretation of monadology: according to Euler's personal notes – which are our only source on the content of the essay – König maintained that extension, bodies and motion are "nothing but phenomena [. . .] The world is nothing else than a great number of simples or monads which represent each other mutually with a certain degree of obscurity" (Euler 1862 [1747], 807–808; cf. De Risi 2007, 546–548). Hence, monads have no place and distance is a phenomenon of the clarity of their representation. In this perspective, since approaching a body entails getting a clearer perception of it, König claimed that the Newtonian mutual attraction of bodies could be conceived as a result of the appetition of monads toward greater perceptual clarity. Euler liked the consistency of this interpretation, however "paradoxical," and suggested its publication as a model for monadists.

Euler's account reflected the suspicion that Leibnizian monadology might provide a fertile ground for materialism, which was raised by Newtonians such as Samuel Clarke (GP VII, 354). Wolffian philosophers, with their physical elements, were more easily struck by this objection and indeed a number of them accepted some materialist claims (Dyck 2016). Wolff's student Georg Friedrich Meier allowed of the possibility of material souls. In this context, Martin Knutzen (1744, 38) was alarmed that the sensibility of monads could provide "weapons" to the materialists. Indeed La Mettrie, in his 1747 *L'homme-Machine* had provokingly remarked that Leibnizians "with their Monads spiritualized matter rather than materializing the soul" (La Mettrie 1987, I, 63). A prominent supporter of a kind of materialistic rethinking of monadology was Pierre-Louis Maupertuis. In his letter "On monads," Maupertuis maintained that the critics (he possibly meant Condillac) had "obliged the monadists to say that monads are invisible beings, representative of everything we see in the Universe, which is in turn nothing else than an assembly of phenomena," while Leibnizian monads may have been originally meant to be the "first elements of matter, possessing perception and force." In other words, Maupertuis separated the conception of monads as material elements from the phenomenalist reading of monadology and claimed that the latter had been developed in order to avoid the consequence that matter is made up of monads, with its possible materialist implications (Maupertuis 1768, II, 262–264). Maupertuis clearly sympathized with the latter view, turning Leibniz's theory into something different, for he attributed the same properties of physical monads to particles or organic molecules. The German editor of Maupertuis' *Essai sur la formation des corps organisés* (1754) recognized this convergence: "The main points seem to be identical with the *Monadology* of Mr. Leibniz" ([s.a] 1761, *Vorbericht* [s.p.]). Ernst Cassirer, on the contrary, underscored the difference between the two theories, arguing harshly that Maupertuis "coarsened Leibniz' spiritualism into an unclear and vague hylozoism" (1932, 118–119). Nevertheless, the role of monadology as an inspiring idea for Maupertuis' organic molecules (or "physiological monads": Duchesneau 2013, 179ff) deserves a subtler account (Wolfe 2010).

Physical Monadologies and Newtonianism

Wolffian elements inspired a number of attempts of reconciling Leibnizian monadology and Newtonian physics. The Jesuit Rudjer Boscovich, in his *Theoria philosophiae naturalis* [1758], presented a "system which is midway that of Leibniz

and that of Newton," by introducing "simple & perfectly non-extended primary elements upon which is founded the theory of Leibniz" and endowing the latter with "mutual forces, which vary as the distances of the points from one another vary, characteristic of the theory of Newton" (Boscovich 1922 (1758), 35). Boscovich's hypothesis was that a single force produced attraction and, within a certain distance, repulsion. Thus Boscovich reduced the phenomena of gravitation and impenetrability to a pure dynamical interplay. His "elements" were actually very different from monads, because they were homogeneous and lacked representation, but they allowed to save phenomena in the light of Leibniz's law of continuity, thus disposing of the Newtonian particles with their postulated extension and hardness. This theory also received materialistic interpretations, notably by Joseph Priestley, arousing Boscovich's horrified reaction (see Heimann and McGuire 1971, 270–273).

Kant's *Monadologia physica* (1756) was a similar attempt at reconciling point-like monads with Newtonian forces. Kant accepted Euler's argument (see above) that point-like monads cannot fill space and argued that they fill space by means of an original repulsive force: impenetrability corresponds to a "sphere of activity" of the monads; hence, infinite divisibility of space could be consistent with the simplicity of substances (AA 1: 480–481). Kant's theory was elaborated against the background of Wolff's and Baumgarten's philosophies. In the same context, Gottsched (1762^{7} [1755^{1}], I: §400) also explained impenetrability with repulsive force. Kant's original step was to introduce attractive force as a second fundamental force, whose interplay with the former would allow to deduce mathematically the volume of material particles (AA 2: 485). With this second fundamental force of monads, Kant also explained the essential gravitation of matter postulated by Newton.

While physical monadology was concerned with material phenomena, Kant took a metaphysical dualism for granted. He separated two "class [es] of simple substances": "physical monads" and "spirits" (AA 1: 477). In the 1760s, however, Kant faced the problem of justifying that the soul is not "of material nature," i.e., it is not "a simple substance of the kind which could be element of matter." He admitted to have no proof that the "thinking being does not exist in space in the way in which a corporeal element exists in space" (AA 2: 293; see Pecere 2016). In the *Träume eines Geistersehers* (1766), he came back to the problem and pointed out that souls and physical elements would be "indistinguishable" because we have "no knowledge whatever" of their "inner properties" (AA 2: 321–322). This raised the worry that – as suggested by the picture of monads in our coffee – "this thinking 'I' [might] be subject to the same fate as material natures" (AA 2: 327). Eventually Kant recognized that Leibniz's original thesis that monads have a representative power might be the only way to avoid this materialistic conclusion. Since the 1770 *Dissertation*, indeed, Kant started to defend a theory of intellectual substances as belonging to a different ontological dimension than material phenomena. The problem of the justification and explanatory power of this theory would be reprised in criticism, leading to a full reconsideration of Leibnizian monadology.

Monadology in Kantian Criticism

Kant's novel interpretation of monadology was connected to his new theory of space as a form of phenomena, which was supposed to replace the Leibnizian–Wolffian theory of space as a result of the confused representation of monads. In the mid-1770s, Kant came to the conclusion that "monadology cannot help in the explanation of phenomena"; it rather serves to "the separation of the intellectual from phenomena in general" (AA 14: 153). This reconsideration of monadology was introduced by different critical arguments. First, in the *Critique of Pure Reason*, Kant pointed out that Leibniz was deceived by a "confusion of the pure object of the understanding with the appearance" and, since he represented substances as *noumena*, he mistakenly made up the world of phenomena of "simple subjects gifted with the powers of representation, in a word, monads" (AA 3: 218). Kant developed this general critique in the section on

cosmological ideas concerning the idea of simples and compounds. Here, he points out that every real being is made up of parts and these parts are substances; hence, he excludes the possibility of finding monads in space, for "monad (in Leibniz' usage) refers only to the simple given immediately of a simple substance (e.g., in self-consciousness) and not as an element of the composite, which one could better call the atom" (AA 3: 301–303, 306). This conclusion was then developed in Kant's "Dynamics" chapter in the *Metaphysische Anfangsgründe der Naturwissenschaft* (1786), where matter is proved to be a "continuum" of infinitely divisible phenomenal substance, which cannot be conceived as an "infinite aggregate of parts," hence point-like monads are excluded as a metaphysical "way out" of the monadist (AA 4: 504, 506). Forces, on this new theory, are deduced by spatiotemporal relations and attached to extended parts of matter rather than points (Pecere 2009, 518–530; Friedman 2013, 143–154).

By these arguments Kant openly rejected all the Wolffian and post-Wolffian "poorly understood monadology" – including his own physical monadology. Now he insisted that monadology was a Platonic theory, concerned with purely intelligible beings. The historical connection of monads to Pythagoras and Plato had been reestablished by Jacob Brucker in his history of philosophy (Brucker 1742–1744, 4B: 402–403). Kant became interested in the connection to Plato when he was campaigning to defend the originality and merits of critical philosophy with respect to Leibnizian–Wolffian philosophy, because it suggested an interpretation of monadology that could be consistent with his idealism. In a passage of a metaphysics lecture (standardly dated 1782–1783), he pointed out that arguments about simple elements as components of bodies were made by Leibniz in his monadology "as well as by materialists from this proposition of Leibniz," and opposed to these mistaken theories his phenomenalistic theory of matter, which excluded the composition by simple elements (AA 29: 930). Since the mid-1780s, Kant started to argue that *Leibniz himself* had defended such a view, arguing that monadology had "nothing to at all to do with the explanation of appearances, but is rather an intrinsically correct *Platonic* concept of the world" and the monad "is merely an object of the understanding, which, however, does underlie the appearances of the sense" (AA 4: 507).

Thereby Kant attributed to Leibniz an entirely different connection of monads and sensible world than the Wolffians: "Leibniz's idea, as far as I comprehend it, was not to explicate space through the order of simple beings next to one another, but was rather to set this order alongside space as corresponding to it, but belonging to a merely intelligible world (unknown to us)." Hence, space was "only the form of our sensible intuition" (AA 4: 507–508). In fact, Kant was presenting criticism as a realization of the original spirit of monadology, which had to "replace" Leibniz's account of sensibility as a confused mode of representation "by another, more suited to his purpose," i.e., the theory of the "Transcendental Aesthetic." This was supposed to be a fatal blow to post-Leibnizian monadologies: "In this way" – he concluded – "the *Critique of Pure Reason* might well be the true apology for Leibniz, even against those of his disciples who heap praises upon him that do him no honor" (AA 8: 248, 250; Pecere 2013).

Returns of the Monad

Monadology continued to be worked out over the nineteenth century by philosophers and scientists, especially in Germany and France, although its influence grew dimmer and dimmer. The Leibnizian and Kantian accounts of monadology provided alternative models, which could be set against each other or partially reconciled. Those who wanted to return to monads as the metaphysical grounds of reality favored the Leibnizian over the Kantian model. For example, Johann Herbart, in his *Allgemeine Metaphysik* (1828), reintroduced simple animated beings, the "reals," as grounds of extension and impenetrability, although he argued, contrary to Leibniz, that these beings interact with each other (VII, 43, 76, 284–5, 299; Beiser 2015). Bernard Bolzano, on the other hand, returned to point-like interacting atoms, some of which were souls (Simons 2015, 1077–1078). Maine de Biran

(1990 [1819], 170) also revived Leibnizian ideas, celebrating the "true and profound idea" of monads as mirrors of the world with their confused perceptions. The French legacy of Leibnizian monadology stretched over the whole of nineteenth-century spiritualism and beyond, from Felix Ravaisson's "nouvelle monadologie" (Dunham 2015) to Charles Renouvier and Henri Bergson's metaphysical account of life and "virtual perception."

Kant's transcendental philosophy was a watershed for neo-Kantian and phenomenological interpretations. Hermann Cohen (1883, §51) argued that Leibniz's monad had a double meaning: as "ground of the real," it expressed the principle of the rational construction of reality. At the same time, Leibniz mistakenly wanted to conceive it as a simple being and an element of the "composition" of reality, thus violating his own principle of continuity, which Cohen takes as the basis of the "whole power of reason" (1883, §55) and its task of constructing objectivity. Cohen's interpretation formulated the historical and theoretical program of merging Leibnizian monadology with transcendental philosophy, which found an important realization in Ernst Cassirer's 1902 monograph on Leibniz. A transcendentally reduced monad was also the background of Husserl's striking statement that "phenomenology leads to the monadology anticipated by Leibniz in ingenious aperçu" (Husserl 1959 [1923/24], 190): this claim was based on the identification of the monad with the transcendental Ego and raised new interest in monadology, from the phenomenological "rewriting" of Dietrich Mahnke's *Neue Monadologie* (1917) to Hermann Weyl's conviction that Leibnizian monadology still provided a key to the foundation of modern mathematical and physical theories.

Cross-References

- ▶ Euler
- ▶ Leibniz, Maupertuis
- ▶ Seat of the Soul
- ▶ Soul
- ▶ Wolff

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