

Post-Print of a review which appeared in *The Leibniz Review* – DO NOT CITE

Ohad Nachtomy, *Living Mirrors: Infinity, Unity, and Life in Leibniz's Philosophy*. Oxford University Press, 2019. 232 pp.

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Ohad Nachtomy's new book, *Living Mirrors: Infinity, Unity, and Life in Leibniz's Philosophy*, connects the themes of infinity and life in Leibniz's metaphysics. Recent decades have seen increasing interest in Leibniz's account of living beings, and scholars have been particularly drawn to Leibniz's account of living beings in terms of "natural" or "divine" machines (e.g. Duchesneau 1998; Fichant 2003; Nachtomy 2007a, 2011b; Smith 2011; Arthur 2014). This concept represents one of Leibniz's boldest contributions to the study of nature, and, beginning with its introduction in the *New System* of 1695, plays a crucial role in his account of individual substances. According to Leibniz, such a machine is a "machine to the least of its parts," which, as Nachtomy explains, exhibits a structure in which further machines are nested *ad infinitum* (124). For Leibniz, this concept enables a fully mechanical understanding of vital processes while simultaneously distinguishing living machines from finite products of human art. In his book, Nachtomy takes up the challenge of addressing the many philosophical questions raised by Leibniz's application of the infinite to the nature of living beings.

Nachtomy has made many contributions to our understanding of Leibniz's metaphysics in previously published work. These publications include the book *Possibility, Agency, and Individuality in Leibniz's Metaphysics* (Nachtomy 2007), as well as multiple articles on a variety of topics. To mention just those articles where Nachtomy acknowledges a direct connection with his project in *Living Mirrors*, Nachtomy (2011a) treats Leibniz and Spinoza on the infinite; Nachtomy (2011b) analyzes the distinction between natural and artificial machines; Nachtomy

and Levanon (2014) deals with unity and substance; Nachtomy (2016) investigates the metaphysical status of created beings; and Nachtomy (2018) examines the way monads ground reality. *Living Mirrors* thus represents the fruit of Nachtomy's long engagement with Leibniz's metaphysics and, in particular, Leibniz's accounts of life and infinity.

As Nachtomy shows, living beings are at the core of Leibniz's conception of the natural world. Consider *Monadology* ¶67, which illustrates both the ubiquity of living beings as well their nested relations: "Each portion of matter can be conceived as a garden full of plants, and as a pond full of fish. But each branch of a plant, each limb of an animal, each drop of its humors, is still another such garden or pond" (AG 222; GP VI 618). Not only are there living things contained within each portion of matter, but each of their constituent parts contains further living beings. Indeed, here Nachtomy concurs with Justin E. H. Smith's claim in *Divine Machines: Leibniz and the Life Sciences*, that living beings, not inanimate physical stuff, represent the fundamental ontological level of the Leibnizian natural world (Smith 2011). Thus, for Leibniz, living beings are not rare exceptions within a largely inanimate universe, but rather constitute the entirety of nature. Making sense of Leibniz's views regarding the nature of living beings thus becomes an essential task for any reader of Leibniz's metaphysics, and Nachtomy's book is a valuable resource for this end.

The book's main contribution to this project is in connecting the themes of life and infinity. As Nachtomy argues, Leibniz conceives the nature of living beings as infinite in multiple ways. We have already seen that they exhibit an infinitely nested structure. In virtue of this structure, however, Leibniz argues that living beings are infinite in the sense of being neither generated nor destroyed through natural means. Indeed, they come into existence when the world is first created and last as long as the world as a whole—events such as conception and death are merely

stages along a continuous series of transformations undergone by a living being. Nachtomy also notes that Leibnizian living creatures are infinite in virtue of resembling their creator and in the way that their development is characterized by a single law prescribing an infinity of motions:

Leibniz's definition of created substances as animate, infinite beings has significant consequences in his metaphysics. This definition is particularly pertinent in regard to living beings as natural and divine machines — that is, machines that remain machines in the least of their parts. In seeing created beings as living, Leibniz seeks to introduce teleology into the natural world and thus to avoid the consequences of a purely mechanistic picture of nature, the definition of created beings as infinite also serves to emphasize their likeness to their creator; similarly, it serves their definition as basic unities, since they are united by a single law, informing their development and regulating their changes of state. (197)

A further sense of infinity is captured in the titular image of a living mirror, which Leibniz employs to capture a living substance's representation of each element of the infinitely complex larger world from its own individual perspective (e.g. AG 207; GP VI 599).

The different senses of infinity proper to living beings raise a number of interpretive challenges. For instance, in conceiving living creatures as infinite, Leibniz is an outlier within the wider philosophical tradition, for which creatures are typically conceived of as finite. Thus, Leibniz needs to develop novel theoretical tools to capture the nature of living beings and to distinguish between the respective senses of infinity pertaining to them and to God. Leibniz also needs to account for the way living beings are still inherently limited, for instance in terms of their physical power or moral perfection. Nachtomy thus identifies multiple senses of infinity in Leibniz, arguing that while God is a being absolutely infinite, living creatures are essentially limited yet infinite in their own kind.

In what follows, I first outline the structure of the book and summarize its main themes. I then provide some critical remarks on Nachtomy's account of the machine of nature, challenging his identification of the machine of nature with the living being as a whole. By contrast, I will argue that we should instead understand the machine of nature as representing the extended organic body of a living being, an infinite collection of organs constituting the living being's physical presence in the world.

Outline of the Book

Nachtomy's book features ten chapters that sequentially treat the titular themes of infinity unity, and life in Leibniz. Individually, the chapters are oriented around particular themes or thinkers with which Leibniz engaged, and they roughly trace the course of Leibniz's career. However, rather than proposing a linear narrative of the development of Leibniz's account of living being, the book presents reflections upon a series of related problems, composing a portrait of Leibniz's lifetime of interest in the relationship between living beings and the infinite.

Chapters One, Two, and Three familiarize the reader with Leibniz's views on matters related to the infinite. Chapter One, "Introducing the Main Characters: A Conceptual Outline of Leibniz's Approach to Infinity," analyzes a number of concepts that Nachtomy treats in the book, and does so in abstraction from their historical genesis within Leibniz's career. These concepts include Leibniz's distinction between infinite number and infinite being, his understanding of actual vs. potential infinity, and notions pertaining to living individuals including force and the law of the series. Of especial note is Nachtomy's account of Leibniz's *syncategorematic* approach to infinite terms, which Leibniz developed to account for an

inconsistency he identified in the notion of an infinite number. The latter concept is inconsistent because as soon as one proposes a particular number as the greatest of all numbers, one can immediately identify a larger one. According to Nachtomy, a syncategorematic use of an infinite term avoids this inconsistency by having an indeterminate and variable reference, thereby allowing us to speak of infinitely large or small terms without designating “any whole or fixed quantity” (26). Thus, for Nachtomy, “According to the categorematic position, there would be a largest number and a final term in an infinite series; according to the syncategorematic position, all numbers are finite, and ‘infinite’ means larger (or smaller) than any assignable term” (27). Later in the book, Nachtomy will argue that Leibniz extends this approach beyond the ideal realm of mathematics, applying it to collections of real entities within nature.

Chapters Two and Three adopt the historical perspective eschewed in Chapter One in order to situate Leibniz’s views on the infinite within their wider intellectual context and show how they emerged via his engagement with the thought of several prominent contemporaries. Chapter Two, “Leibniz in Paris: Between Infinite Number and Infinite Being,” focuses on Leibniz’s reception of both Galileo and Descartes during his Paris period of 1672–76. In a mathematical vein, Nachtomy draws our attention to Leibniz’s interest in problems posed by Galileo regarding the idea of an infinite number. These problems lead Leibniz to the conclusion that such an idea is contradictory, and hence impossible, and helped motivate him to develop his above-mentioned *syncategorematic* approach to infinite terms. Metaphysically speaking, Nachtomy highlights Leibniz’s critique of Descartes’s ontological proof for the existence of God based on the idea of an infinite being. Leibniz insists that before the proof gets off the ground, we must establish the possibility of an infinite being possessing all attributes in the highest degree. For Nachtomy, this

concern for the possibility of an infinite being is of a piece with Leibniz's engagement with the possibility of an infinite number.

Chapter Three, "Leibniz Reads Spinoza: Different Senses and Different Degrees of Infinity," examines Leibniz's encounter with Spinoza, whose philosophy features a treatment of the infinite with important similarities to Leibniz's. Nachtomy shows that they both employ multiple non-quantitative metaphysical senses of infinity. However, Nachtomy argues that Leibniz transforms the distinction between these forms of infinity from one of kinds to one of degrees:

[Leibniz] recasts Spinoza's distinction between kinds of infinity, each with a different domain of application, in terms of degrees ('I set in order of degree: *Omnia; Maximum; Infinitium*'). Roughly speaking, between the highest degree of infinity, which Leibniz clearly ascribes to the absolute and necessary being, and the lowest degree of infinity, which he ascribes to *entia rationis* such as numbers and relations, Leibniz invokes a third, intermediate degree of infinity: a maximum in its kind. (79)

Nachtomy develops this point further in Chapter Eight, where he ascribes this intermediate degree of infinity to living beings.

In Chapters Four and Five, Nachtomy connects Leibniz's metaphysical commitments regarding unity and infinity with his theory of living beings. Chapter Four, "Infinity and Unity: Mathematics and Metaphysics" focuses on the connection between mathematical and metaphysical notions of unity. One theme of interest is Leibniz's view that unity is conceptually prior to multiplicity. For instance, commenting on the relations that fractions have to whole numbers for Leibniz, Nachtomy writes: "the main point is that mathematical unity is not resolvable into its constitutive elements because those elements are *conceptually dependent upon unity... a unity is conceptually prior to the infinity of elements it could contain*; but does not

result from combining them” (93). For Nachtomy, the priority of unity over multiplicity has application outside mathematics, and will come to characterize a type of non-divisible unity present in the machine of nature.

Chapter Five, “Infinity and Life: A Sketch of Leibniz’s Development” relates the foregoing discussions of Leibniz’s approach to infinity with his approach to living beings by surveying important developments in Leibniz’s attempts to understand the metaphysical nature of unitary individuals. These developments include his adoption of substantial unities in light of the infinite divisibility of matter, the complete concept theory of the individual according to which God can see each predicate contained within the nature of a substance, and the notions of force and the law of the series which come to the fore in the mid-1690s. Collectively, these concepts pave the way for the introduction of the machine of nature as a machine whose infinite motions follow a unitary law of development and obey God’s preformation: “According to Leibniz, then, a living being is infinite in the sense that it is always active, always developing and changing, and, particularly, with respect to its inner nested structure that develops *ad infinitum*. The infinity and unity of living beings is thus intrinsically related to their infinite creator, and consequently, their being ‘divine machines’” (112).

Chapter Six, “Animate and Inanimate Things, Natural and Artificial Machines,” analyzes Leibniz’s distinction between natural and artificial machines. While Leibniz claims that natural machines have an infinity of parts, Nachtomy argues that this is insufficient to distinguish them from artificial machines. Instead, for Nachtomy, natural machines are distinguished from artificial ones by virtue of possessing an indivisible structural and functional unity, and not by means of their quantity of parts. I return to this point below.

Chapter Seven, “Living Mirrors and Mites: Leibniz and Pascal,” analyzes a brief commentary Leibniz composed on a passage from Pascal during the mid-1690s. The passage in question deals with the way that human nature is situated between the “two infinities” of the infinitely small and the infinitely large in nature. For Pascal, these infinities resist our comprehension, and reflecting on them provokes a sense of existential displacement. By contrast, Nachtomy shows that Leibniz rejects this response, both developing intellectual tools to comprehend the infinite, and viewing it as something that connects us to the rest of nature:

Whereas Pascal exploits the infinite division of the organic world to stress our alienation and incomprehension of the world surrounding us, for Leibniz, infinity serves to bring out a sense of connectedness between individual substances, a sense of harmony, and, for that reason, one might even say, a certain sense of belonging rather than alienation. Indeed, for Leibniz, infinity need not make the world strange and incomprehensible to us. Rather, being made in the image of God, we are infinite as well, and should feel at home in a world in which every aspect bears the mark of an infinite creator. (156)

This chapter highlights the value of interpreting philosophers through the lens of their characteristic intellectual attitudes. Indeed, Leibniz’s or Pascal’s respective arguments on topics such as infinity cannot be separated from their general affective orientations towards existence.

Chapters Eight, Nine, and Ten show how the notions of infinity and the machine of nature shed light on metaphysical themes in the mature Leibniz including the status of individual substances, monads, mechanism, and force. Chapter Eight, “Created Things as Infinite and Limited” contrasts the forms of infinity proper to God and creatures, respectively. While God is absolutely infinite and perfect, creatures are, according to Nachtomy, “limited and infinite” (160). Nachtomy analyzes Leibniz’s attribution of a “hypercategorical” sense of infinity to

God, according to which the divine being is “beyond any determination” (158). By contrast, living substances, beset by forms of moral imperfection and metaphysical privation possess an intermediate degree of infinity.

In Chapter Nine, “Monads at the Bottom, Monads at the Top, Monads all Over,” Nachtomy argues that we can read monads as both constituting nature from the “ground up” as the fundamental and simple building blocks of composite reality, as well as from the “top down” as whole animals. In this case, higher level monads/animals dominate and functionally organize lower level monads serving as constituents of their bodies: “A living being, according to Leibniz, does not merely contain other living beings (as a pond contains fish) but, rather, involves other living beings as part of a well-ordered and functional network, which is captured, I suggest, by Leibniz’s notion of domination” (184). While Nachtomy seems to distinguish between “bottom up” and “top down” directions of grounding, one wonders if these directions are really distinct for Leibniz: perhaps simple substances enter into relations of composition just insofar as they enter into relations of domination.

Chapter Ten, “Life and Force,” examines the distinction between life and mechanical phenomena. Since life and force are, for Leibniz, metaphysical features of reality over and above the mechanical pushing and pulling of extended material objects, Nachtomy concurs with Raphaële Andrault (2014) in distinguishing between life and its phenomenal appearances: “Life presents observable appearances typical to living things, but it cannot be reduced to (or fully expressed in) terms of such appearances; rather, it is something that needs to be presupposed as the basis or the foundation of living phenomena” (196). The latter “phenomena of life” include the empirically observed and mechanical behavior of living bodies such as “locomotion, sensation, self-nourishment, generation, sensation [sic], and so on” (196). While drawing this

distinction, however, Nachtomy cautions against restricting life, by contrast with its phenomena, to the soul which is responsible for perception: “life can be taken to belong to the soul alone. But this would be inadequate, I think. For what Leibniz regards as living is not the soul alone but, rather, the whole individual or animal whose soul it is” (197). In other words, although Leibniz sometimes equates life with perception (e.g. Leibniz 2016, 33–35), Nachtomy insists that life belongs to the whole living being, not just its soul. As I will detail below, Nachtomy argues that this “whole individual” is identified with the machine of nature.

The book also features a brief conclusion, entitled “The Re-Enchantment of Nature,” which emphasizes Leibniz’s position regarding life as one that seeks to reconcile mechanism with vitalism. While Leibniz wants to retain the explanatory power of mechanism and eliminate unnecessary immaterial explanatory principles, he does not accept the type of naturalism espoused by Descartes and Spinoza in which physical events have no larger purpose or goal. Thus,

Leibniz’s view of matter itself as organic, such that the very foundation of nature consists of living beings, makes the need to invoke some extra vital forces or plastic natures (of whatever sort) redundant. Most important, the organic nature of matter comes with built-in activity, teleology, and life—but without animism as such, in that it involves nothing added on top of matter. In brief, this more is what I am calling Leibniz’s ‘re-enchantment of nature’. (202)

This conclusion is helpful in representing both the larger stakes of Leibniz’s position regarding living beings, as well as where he fits into the wider arc of early modern natural philosophy.

Whole Animals or Organic Bodies? A Challenge to Nachtomy's Interpretation of the Machine of Nature

In what follows, I would like to pose a challenge to Nachtomy's identification of the Leibnizian machine of nature with the living being as a whole. As Nachtomy acknowledges, this "whole animal" reading goes against the standard scholarly interpretation of the machine of nature as the organic body of a living being. This standard reading is supported, for instance, by a passage like *Monadology* ¶64, in which Leibniz writes that "each organic body of a living being [*vivant*] is a kind of divine machine or a natural automaton" (AG 221; GP VI 618). Thus, as Nachtomy writes in a footnote after quoting the preceding passage,

Note that Leibniz identifies here the organic body with the natural machine rather than the whole animal. There are enough texts to justify seeing the whole animal or substance as a natural machine. But this is a controversial point. For example, François Duchesneau, Justin Smith, and Richard Arthur tend to prefer a less radical reading in which a natural machine corresponds to the organic body of the whole animal rather than to the animal itself. See Duchesneau (1998); Smith (2011); Arthur (2014). (186)

Nachtomy reiterates this point later on in the body of the text, this time claiming that in addition to textual ambiguities, we have conceptual reasons for adopting the view that the machine of nature indexes the living being as a whole:

Did Leibniz intend the notion of a natural or divine machine to refer to just the body of a living being, or to the whole living being? The texts are ambiguous on this point. Leibniz sometimes says this, sometimes that. In *Divine Machines*, Smith (2011) seems to hold the former. Duchesneau's (1998) position seems to have evolved from the former to the latter. If

Smith and Duchesneau are right that, in the exchange with Stahl, we find a clear articulation of a new concept of life, according to which life is *only* perception, and does not involve the organic body at all, then this position is further corroborated. Still, as we have seen, there are strong reasons, both textual and conceptual, to think that the notion of a natural machine must apply to the whole living being. (186)

As Nachtomy suggests, the way we interpret the reference of the machine of nature has important consequences for its relationship to the concept of life. For Smith and Duchesneau, Leibniz's identification of life with perception means that the organic body is not, strictly speaking, alive. Not only does "organic" seem to mean something closer to "organized" than to "living" during this time period (Cheung 2006; Smith 2009),¹ but perception belongs to the simple soul or monad to which the organic body is united, and not the body itself. If the machine of nature is the organic body of a substance and not the substance as a whole, then no matter how exquisite the body's structure, we should look elsewhere than the machine of nature for the principles of life.

I first reconstruct Nachtomy's motivations, as I understand them, for adopting the "whole animal" as opposed to the "organic body" interpretation of the machine of nature. As we will see, Nachtomy identifies the machine of nature with the substance as a whole as a way of lending coherence to Leibniz's distinction between natural and artificial machines. While Leibniz explicitly poses this distinction in terms of the number of parts present in each type of machine, Nachtomy shifts the focus of the distinction to the form of unity characterizing the machine of nature. I then argue against the "whole animal" interpretation on two grounds: first, I suggest that Nachtomy's reading has difficulty accounting for the composite physical nature of the organic body. Second, I argue that it has difficulty reconciling the contrast Leibniz draws between the

machine of nature and the soul or unitary principle of a substance conceived as a “spiritual automaton.” I claim that this latter concept is both distinct from, and complementary to that of the machine of nature, and that they each represent distinct elements of a substance. On this basis, I affirm the standard interpretation of the machine of nature as the organic body of a substance, and not the substance as a whole.

In Chapter Six, Nachtomy examines Leibniz’s distinction between natural and artificial machines: “In a number of texts, Leibniz offers the following distinguishing mark between these two kinds of machines: while a natural machine is infinite, an artificial machine is finite. In the ‘New System,’ Leibniz states that ‘the machines of nature have a truly infinite number of organs, and are so well supplied and so resistant to all accidents that it is impossible to destroy them’ (GP IV 482; AG 142)” (122). For Nachtomy, this distinction raises a number of difficulties. For one, there is the possibility that both natural and artificial machines consist of infinitely many organs insofar as they both derive their reality from living substances containing further living substances *ad infinitum*:

We know that, for Leibniz, the individual sheep has natural and substantial unity, which the herd, the army, or the clock does not. But the picture is more complicated, in two respects. On the one hand, an artificial machine, too, has substance-like, sheep like constituents. It is, in brief, an aggregate of *substances*. On the other hand, each sheep or a natural unity itself consists of other sheeplike, substance-like, creatures. The challenge, then is to distinguish between an artificial machine and a natural machine, both seemingly consisting of infinitely many natural machines. (121–22)

Moreover, Nachtomy worries that one cannot derive the unity and indestructibility proper to a living being from an infinity of organs alone: “a mere infinity of organs does not provide unity

but, if anything, has multiplicity and infinite divisibility” (122–3). Finally, even Leibniz’s claim that a natural machine has an “infinite number” of organs poses a difficulty since Leibniz “rejects the notion of an infinite number as a contradictory notion” (123).

To address these difficulties, Nachtomy turns to the structural and functional relationships obtaining between the infinitely many organs of the natural machine. Both his structural and functional accounts emphasize the unity present in the natural machine, such that “what extends to infinity is not the *number* of organs or machines but, rather, the whole *structure* of a natural machine” (124). From a structural perspective, the natural machine extends to infinity, such that all of its nested machines are unified within a single plan. As Nachtomy writes:

My suggestion here is that the structure of a natural machine, with its intricate relation between the machines nested in it, develops *ad infinitum*, while that of an artificial machine does not. It is in this sense, I suggest, that an artificial machine does not remain a machine to the least of its parts. While the number of machines within this structure [of the natural machine] is *clearly not finite*, we cannot also say that it involves an infinite number of machines (which would be a contradiction, according to Leibniz), but that the machine’s structure extends to infinity. (124)

Nachtomy associates this infinite structure with the “law of the series,” according to which a substance is characterized by a single law determining its states: such a law is capable of governing an infinity of organs. From a functional perspective, each organ nested within the structure of the natural machine plays a specific role within the operations of the machine as a whole, and these functional relationships extend *ad infinitum*. In other words, just as the heart plays a distinct functional role within the body, so too do the constituents of the heart, and their constituents, etc. Artificial machines lack this feature, as the parts of their parts at some point

stop being functionally related to the whole. As Leibniz explains in *Monadology* ¶64: “The tooth of a brass wheel has parts or fragments which, for us, are no longer artificial things, and no longer have any marks to indicate the machine for whose use the wheel was intended” (AG 221; GP VI 618). According to Nachtomy, these structural and functional accounts complement one another insofar as the internal law governing the structure of the machine of nature supplies the constituent nested machines with their functional ends.

Nachtomy thus concludes that what is essential to the natural machine is not that it contains infinitely many physical organs, but rather that it represents a single structural unity that collects these organs together. For Nachtomy, this conclusion explains the unitary and indestructible character of the machine of nature, justifies Leibniz’s distinction between natural and artificial machines, and avoids ascribing an infinite *number* of organs to the machine of nature. Indeed, he argues that, while an artificial machine is an aggregate or collection of material parts, the natural machine is not an aggregate at all: “If this is correct, the distinction between artificial and natural machines turns, strictly speaking, on the question of unity, or more precisely, it turns on the appropriate conjunction of unity and infinity.... On this reading, a natural machine turns out to be one *thing*, while an artificial machine, being an aggregate, turns out to be a compositional product, or a collection of many things” (127). In making this point, Nachtomy recalls his earlier discussion of Leibniz’s account of fractions in Chapter Four: for Nachtomy, a natural machine is characterized by a nondivisible unity which is prior to—and indeed not decomposed by—its division into an infinite profusion of organs (133).

This account provides a subtle reading of the machine of nature that potentially makes sense of a number of Leibniz’s claims. It also supports Nachtomy’s whole animal interpretation of the machine of nature since it treats the machine of nature as a unity organizing and encompassing

all of the substance's bodily organs. The difficulty, however, is that we still need to account for the collection of organs themselves. While the organs are unified by an internal principle of life and order, they remain, considered apart from this principle, a collection of individual machines corresponding to distinct material masses. These material masses are extended in physical space and are themselves collections of substances. Moreover, for Leibniz, one and the same organic body is continuously recomposed with respect to its constituent parts, "for all bodies are in a perpetual flux, like rivers, and parts enter into them and depart from them continually" (AG 222; GP VI 619). Thus, even if the overall structure of an organized body is metaphysically prior to its diversity, the body in and of itself is an extended physical machine built of a changing collection of infinitely many organs.

Nachtomy's account of the machine of nature avoids identifying it with this composite body by insisting that the machine of nature corresponds is a unity corresponding to the substance as a whole. However, it is unclear that Leibniz associates the machine of nature with the explanatory principle giving rise to the substance's unity. Indeed, as Nachtomy indicates, as of Leibniz's mature period, the soul or entelechy of a substance represents the principle of life of a living being: "to be living and active turns out to be a prerequisite for being a real entity. In other words, Leibniz comes to associate being with being animate, or activated by some soul-like thing— *anima*, entelechy, or substantial form, as he variously terms the source of activity and life in living beings" (99). Furthermore, insofar as the unity of a living substance is determined by an underlying "law of the series," note that Leibniz associates this law with the soul in the correspondence with De Volder (DeV 75; GP II 171). If this is correct, then the perceptions of the soul or entelechy that provides for the unity of the living being, which is then expressed, in extended and composite physical form, by its organic body.

It bears noting at this stage that Leibniz actually characterizes the soul and organic body as two distinct types of self-moving automata. Indeed, Leibniz employs a conception of the soul as a “spiritual,” “formal,” or “immaterial” automaton whose perceptions correspond to the motions of the organic body or natural machine. As we have seen above, in *Monadology* ¶64, Leibniz identifies the organic body as a “divine machine or a natural automaton.” This description of the body as an “automaton” echoes *Monadology* ¶18 where Leibniz earlier characterized monadic entelechies as “incorporeal automata” in explaining the doctrine of monadic spontaneity. According to this doctrine, monads produce all of their perceptions through their own power and without external influence, such that “[simple substances or created monads] have a sufficiency that makes them the sources of their internal actions, and, so to speak, incorporeal automata” (AG 215; GP VI 609–610). In thus variously characterizing the extended organic body and the monadic entelechy as automata, it seems that Leibniz considers each of them to be conceptually distinct self-moving beings. Indeed, prior to characterizing the organic body as a “natural automaton,” Leibniz distinguishes body and soul as separate constituents of a living being in *Monadology* ¶63: “The body belonging to a monad (which is the entelechy or soul of that body) together with an entelechy constitutes what may be called a *living being*” (AG 221; GP VI 617–618).

The concept of the “incorporeal automaton” is present as early as the *New System*, where Leibniz first introduced the corporeal machine of nature. Here, with respect to the hypothesis of harmony between soul and body, Leibniz writes:

This hypothesis is certainly possible. For why could not God give to a substance at the outset a nature or internal force which could produce in it in an orderly way (as in a spiritual or formal automaton; but a free one, in the case of a substance which is endowed with a share of

reason) everything that is going to happen to it, that is to say, all the appearances or expressions it is going to have, and all without the help of any created thing? (WFN 18–19; GP IV 485)

In clarifying this claim in subsequent debate with Pierre Bayle, Leibniz argues that, despite its non-mechanical, unitary, and simple nature, the soul is analogous to a physical machine in that it produces its perceptions in an orderly way (WFN 83–84; GP IV 522; Noble 2019). Thus, in the *New System*, as in the later *Monadology*, it seems that Leibniz recognizes two distinct forms of automata corresponding to distinct dimensions of a substance.² On the one hand, there is the machine of nature with an infinity of organs, and, on the other, there is the simple perceiving soul or “spiritual automaton.” On the reading I suggest, the organic body or machine of nature is, in and of itself, an aggregate, and it is this soul or entelechy, that provides the metaphysical unity present in the animal.

In sum, in several texts where Leibniz discusses the machine of nature, he contrasts it with the soul or monad conceived as a “spiritual automaton.” The living being as a whole thus appears to involve two distinct “automata:” a machine of nature or bodily automaton and the soul or monad constituting a spiritual automaton, with the latter accounting for the substance’s metaphysical unity. While the machine of nature is a literal machine or collection of functionally organized material parts, the “spiritual automaton” is a figurative machine whose perceptions unfold according to a “law of the series” which orders and unifies all the elements of a substance. If all of this is correct, then the machine of nature does not represent the living being as a whole, but rather its extended organic body.

While I thus disagree with several of Nachtomy’s core claims in *Living Mirrors*, the book constitutes a valuable contribution to Leibniz studies. In connecting Leibniz’s discussions of

infinity and life, Nachtomy's book helpfully reconsiders Leibniz's metaphysics in light of the recent progress scholars have made in understanding Leibniz's views on the nature of life and vital processes. *Living Mirrors* will therefore benefit and provide much food for thought for all readers of Leibniz.

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Notes

¹ For pushback against this reading of “organic” in Leibniz, see Arthur 2018, 139–141.

² Leibniz also clearly contrasts between bodily and spiritual automata at *Theodicy* 403 (T ¶403; GP VI 356).