

The *New System* and Leibniz's Transformation Theory of Animal Generation

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1. Mechanism and Panorganicism

Leibniz's earliest ideas about animal generation are formulated within the context of a mechanistic view of natural phenomena—a view, in which metaphysical considerations must not play an explanatory role. For example, in a letter to Arnauld (1671), Leibniz plans to apply the model of elastic force analogically to explain natural phenomena (A II, 1, 178), and in a letter to Conring (1678), he considers it demonstrated that “everything happens mechanically in nature” (A II, 1, 386). In 1677, he proposes that “composite-looking bodies like plants or animals be reduced to simple-looking bodies, like flesh, tendons, glands, blood” (A VI, 4, 1972). In particular, he suggested that biological research should use a hypothetical method leading to physiological models formulated in terms of combinations of elementary components that may be geometrically represented. According to such a research program, the complexity of living beings is reduced to combinations of components that do not display observable complexity. However, in a slightly later piece (1678–1681?), Leibniz also claims that even in seemingly inorganic portions of matter there are organic beings (A VI, 4, 1398). Panorganicism, thus, calls for physiological explanations that go beyond purely combinatorial models.

Duchesneau argues that, under the influence of panorganicism, mostly after the publication of the *New System* (1695), Leibniz's theory of living beings underwent major changes (see Duchesneau 1998, 315–372). As Duchesneau puts it, in Leibniz's later metaphysics, “every true body is organic, since it possesses a formal *raison d'être*, irreducible to the physical order” (Duchesneau 2003, 392). According to Leibniz's later view, because each part of the body of a living being itself is organic, living beings not only display a high degree of complexity, they display an infinite degree of complexity. Duchesneau describes the connection between the metaphysical notion of form and the nested structure of organisms as follows: “Leibniz works out a concept of living being that links formal units with organic structures which, at the phenomenal level, are formed of minute machines

nested within each other ad infinitum.” Due to this connection between the notion of form and the nested structure of organism, Duchesneau holds that for physiological models to be adequate they must spell out the geometric-mechanical structure of organic automata while expressing their connection to a manifold of formal units underlying phenomenal sequences (Duchesneau 2003, 399–400). As he acknowledges, “[n]one of this fits a *standard* mechanistic view” (Duchesneau 2003, 398).

Due to his panorganicism, Leibniz holds that the generation of a living being is the development or “unfolding” of such pre-existing organic beings not only in some observable cases of such transformation but also in all other cases (see GP VI, 533). Explicitly, he relates this claim to the work of microscopists such as Leeuwenhoek, Swammerdam, and Malpighi, who held closely analogous views about the pre-existence of organic beings everywhere in nature (see Wilson 1997). However, the observations that matter is organic in some small parts and that some living beings are generated out of other living beings obviously does not entail that matter is organic *everywhere* and that *each* living being is generated out of a pre-existing living being. Leibniz’s transformation theory of animal generation must have a stronger argumentative foundation if it is to avoid this wide argumentative gap. I suggest that at least part of this foundation is to be sought in an aspect of Leibniz’s metaphysics that usually has not been connected by commentators with the issue of animal generation—his adaptation of the scholastic doctrine of soul and body as incomplete entities according to which both souls and bodies could not exist without each other. Adams has suggested that adapting this theory most fully expresses Leibniz’s attempt to integrate an Scholastic theory of corporeal substance into his philosophy (Adams 1994, 272–285). In what follows, I argue that in the period of the *New System* as well as in later discussions relating to the *New System*, Leibniz also uses the doctrine of incomplete entities to support his transformation theory of animal generation.

2. Incomplete Entities and the Transformation Theory of Animal Generation

Leibniz makes explicit use of the doctrine of incomplete entities rather late in his philosophical career, in a response from 1698 to a review in the *Journal des Scavans* of the first edition of Lamy’s *De la Connoissance de soi-même*, as well as in some subsequent writings. However, the way he applies this doctrine to the problem of composite substances as well as the problem of biological reproduction is already present in the *New System*. At first glance, the text of the *New System* seems to confirm the claim that Leibniz’s views on animal generation to a large extent depend on the result of microscopy. Leibniz writes: “[T]he *transformation*

noted by MM. Swammerdam, Malpighi, and Leeuwenhoek ... have helped me, and have led me to accept more readily that no animal or other organized substance begins when we think it does, and that its apparent generation is only a development, or a kind of augmentation” (WF, p. 13). However, a bit earlier in the text he connects the transformation theory of animal generation also with the scholastic theory of real unities. “I saw that these forms and souls had to be indivisible, like our minds, and indeed I remembered that this was the opinion of St. Thomas about the souls of animals” (WF, p. 12). Moreover, already in a piece written probably in 1688, he makes clear that the real, indivisible unities he has in mind include not only soul-like entities but also composite substances constituted by a soul-like entity and an organic body: “[N]ot to say anything about the other corporeal substances (in which there seems to be some degree of perception and appetite), if at least in beasts there are souls to be found, it follows from our principles that even beasts are immortal” (A VI, 4, 1623–1624). Accordingly, in the *New System*, Leibniz applies the theory of the persistence of real unities to the persistence of composite or “corporeal” substances (see WF, p. 15). Read from the perspective of the text from 1688, Leibniz’s application of the scholastic theory of real unities to the problem of animal generation suggests that at this stage he regards the transformation theory of animal generation as a consequence of his views about the persistence of corporeal substances. This becomes even more apparent in the draft version of the *New System*. There, Leibniz puts the point thus:

As for the beginning and end of these forms, souls, or substantial principles, it must be said that they could only ever have their origin in creation, and their end in annihilation expressly brought about by the supreme power of God ... Substantial principles do not fly about outside substances. The soul is never naturally without a body. So instead of believing in the transmigration of souls, we should believe in the transformation of one and the same animal (WF, p. 24).

This passage suggests that what, in Leibniz’s view, justifies the transformation theory of animal generation is the persistence of substantial forms, together with the idea that souls according to the order of nature are never without a body.

In the period of the *New System*, the claim that according to the order of nature souls cannot exist separated from an organic body is tied to the idea of the constitutive role of bodily traces for the perceptions in the soul. I suggest calling this the “constitutivity thesis”. Although in Leibniz’s later metaphysics this constitutive role is not seen as one of causal influence, it nevertheless is seen as one of existential dependence. Thus, although there are no external relations

between the states of the soul and the states of its organic body, there are internal relations: the states of the soul could not exist and could not have the content they have without the states of the body, and vice versa. This is why Leibniz takes up a concept prominent in scholastic theories of composite unities, the concept of incomplete entities. For example, Suarez defines the notion of an incomplete substance as follows: “In a physical sense, a substance is called incomplete, which is a physical part, or a substantial mode, or the goal of a substance, concurring in some way to its complement” (*Disputationes Metaphysicae* 33, 1, 6). Interestingly, Suarez subsequently treats form and matter only as one of several examples of physically incomplete substances (see Blank 2003). He writes:

[E]ven when [a soul] is separated, it is a part according to its positive aptitude and nature, and not only by means of non-resistance. This is because it is not an integral part but an essential part, and has an incomplete essence that by its nature has the constitution to complete another essence, and thus it is always an incomplete substance (*Disputationes Metaphysicae* 33, 1, 11).

Hence, because soul and body have incomplete essences that complement each other, they form a whole that is more than a sum of mereological parts. Similarly, Leibniz writes in his response to Lamy, “The opinion of the Scholastics that soul and matter have something incomplete is not as absurd as one thinks. Because matter without souls and forms or entelechies is nothing but passive, and souls without matter would be nothing but active . . .” (GP IV, 572). He explicates that soul and body, according to the system of pre-established harmony, are causally independent from each other; nevertheless, he holds that “each of them is incomplete without the other, because naturally the one is never without the other” (GP IV, 573). Likewise, in a letter to de Volder dating from 1703, Leibniz writes:

[T]here never arises a natural organic mechanism that is new because it always possesses infinite organs, so that it may express the whole universe in its way; indeed, it always involves all past and present time. This is the most certain nature of every substance. And we know that what is expressed in the soul is also expressed in the body; hence the soul as well as the machine animated by it, and the animal itself, are as indestructible as the very universe. . . . Nor can any primitive entelechy ever come into being or be extinguished naturally or ever lack an organic body (GP II, 251).

In the *New Essays on Human Understanding*, Leibniz applies the insight that naturally souls cannot occur without bodies to the problem of animal

generation. Locke's spokesperson, Philalèthe, claims: "One has only to think about the separation of the soul from the body by death to become convinced of the motion of the soul." Leibniz responds in the person of Théophile:

The soul could stop operating in this visible body; and if it could stop thinking altogether, as our author earlier maintained, it could be separated from this body without being united with another; and so this separation would not involve motion. My own view is that the soul always thinks and feels, is always united with some body, and indeed never suddenly and totally leaves the body with which it is united (A VI, 6, 221).

With the role of the doctrine of incomplete entities as an argument for the union of soul and body in mind, it is evident why Leibniz not only thought substantial forms but also animals to be imperishable. Animals are imperishable (and their generation only a matter of the change of pre-existing organic unities) because they have a structure analogous to their imperishable organic constituents—as Leibniz calls them, "these infinite replications of organic bodies, which are in an animal" (A VI, 6, 328–329). Thus, both the view that there is an infinity of organic bodies within the body of an animal and the view that animal generation amounts to the development of pre-existing and imperishable organic unities are supported by Leibniz's metaphysical considerations about the persistence of substantial forms and the incompleteness of souls and bodies.

3. Incomplete Entities and Animal Generation in Leibniz's Later Years

Leibniz's claim that soul and body are incomplete without each other can be seen as a clarification and extension of ideas that were present very early on in his philosophical development. This makes it difficult to understand why he did not make more use of this strategy in the writings of his last years. One possible explanation may be that he, at some time, gave up the view that pre-established harmony is sufficient as an explanation of the metaphysical union of soul and body (see Rozemond 1997; Woolhouse 2000). Famously, in a piece written in 1706—his response to objections by de Tournemine—he admits that pre-established harmony does not bring about a "true union" or "metaphysical union" but only gives a natural explanation for the phenomena (GP VI, 595–596). Accordingly, in the correspondence with des Bosses, from 1712 on he explores a stronger theory of metaphysical union involving a *vinculum substantiale*. Nevertheless, there is a significant line of thought that has close affinities to his earlier account of the role of the incompleteness of soul and body for the structure of composite unities and

the generation of animals. In a letter to Rémond dating from 1715, he argues that the transition of a soul from one organic body to another would be incompatible with the order of nature, which requires intelligible explanations and excludes leaps—two criteria that are violated by the theory of metempsychosis. He also outlines his alternative view of the generation of living beings: “Because one can conceive only the development and change of matter, the machine which constitutes the body of a spermatic animal can become a machine of the sort required to form the organic body of a human being ...” (GP III, 635). Thus, even at this late stage of Leibniz’s philosophical career, animal generation is seen as involving the development of pre-existent and genuinely composite entities. Moreover, in one of the last letters to Rémond, dated 4 November 1715, the issue of composite substances is explicitly brought together with the notions of *per se* unities and incomplete entities:

I believe to have proven that each substance is active, and the soul above all ... But pure *primary matter*, taken without souls or lives that are united to it, is purely passive: moreover, to speak properly, it is not a substance, but something incomplete. And *secondary matter* (such as, e.g., the organic body) is not a substance, but for another reason; namely, that it is a collection of several substances, like a pond full of fishes, or like a herd of sheep, and consequently it is what one calls an *Unum per accidens*, in a word, a phenomenon. A true substance (such as an animal) is composed of an immaterial soul and an organic body, and it is the composite of both that one calls an *Unum per se* (GP III, 657).

This view of the constitution of composite substances has close parallels to Leibniz’s discussion of animal generation in his response to Desmaizeaux, dated 8 July 1711. In a discussion note concerning the analogy that Leibniz draws in the *New System* between the transformation theory of animal generation and the views about the persistence of living beings in the Pseudo-Hippocratic *Diet* (see WF, p. 15), Desmaizeaux argues that Leibniz over-interprets the notion of a living being in ancient accounts of the persistence of the elements (see WF, pp. 228–238). In his response, Leibniz clarifies his own view as follows: “I grant an existence as old as the world, not only to the souls of animals, but generally to all *monads*, or simple substances, from which compound phenomena result. And I hold that each soul, or monad, is always accompanied by an organic body ...” (WF, p. 239). This implies that the natural world results from organic unities that themselves persist for an indefinitely long time: “[I]f there are living organic bodies in nature other than those of animals ... these bodies too will have their simple substances, or *monads*, which give them life ... It would appear that there are infinite degrees of

perception, and hence of *living things*. But these living things will be for ever indestructible, not only in respect of the simple substance, but also because it will always retain some organic body” (WF, p. 239). This said, Leibniz addresses the historical questions concerning living beings:

As for the ancients, I admit that their usual views do not get so far as mine about the *inextinction* of animals. Their *indestructibility* ordinarily extends only as far as matter, or as far as atoms at the very most; and so it can be said that according to the theory of those who admit neither atoms nor entelechies, no substance is conserved. However, in all the variety of ancient thought there may have been some whose opinions get close to mine ... And although the conservation of the animal is supported by the microscope, minute bodies had been recognized before its invention; and so minute animals could also easily have been predicted ... (WF, p. 239–240).

Leibniz, then, holds on to the claim there is a substantive analogy between his view of animal generation and that of the Pseudo-Hippocratic *Diet*. In particular, he continues to believe that animal generation involves the development of genuinely organic unities *because* there are simple substances without an associated organic body. Leibniz closes his response as follows: “I accept part of the doctrine of the Cartesians. But my view on the commerce between the soul and the body has foundations which were generally accepted before the advent of Cartesianism” (WF, p. 240). It seems to me that he could hardly have made the relevance of the scholastic doctrine of incomplete entities for his views on the union of soul and body and his transformation theory of animal generation more salient than by this remark.

4. Conclusion

In this paper, I explored some aspects of the argumentative background of Leibniz’s account of animal generation. I argued that Leibniz regards the discovery of animalcula as an empirical confirmation of his views on the organic nature of the ultimate constituents of reality. However, although the existence of very small animals contributed to a shift in the boundary of what was seen as organic and what was seen as inorganic, it is insufficient to justify Leibniz’s panorganicism. Reading his account of animal generation as a transformation of pre-existing organic unities from the perspective of the results of microscopy alone leaves us with this argumentative gap. I suggested that Leibniz’s adaptation of the complementary scholastic notions of *per se* unities and incomplete entities

contributes to closing this argumentative gap. Leibniz argues that, due to the constitutive function of bodily traces for the perceptions in souls, souls cannot exist without organic bodies. According to him, the connection between bodily traces and perceptions accounts for the *per se* unity of composite substances. His views about souls and bodies as incomplete entities take up this line of argument. Moreover, he holds that the view that matter is organic everywhere as well as the transformation theory of animal generation follow from the persistence of substantial forms and the incompleteness of souls and bodies. This argumentative strategy suggests that his later biological views are supported by his metaphysics of incomplete entities. It is his metaphysics of incomplete entities, not microscopy that provides an argument for why the pre-existence of organic unities in nature as well as their infinite complexity should be taken as the facts to be explained in physiological accounts of animal generation.

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