Santorio and Leibniz on Natural Immortality: The Question of Emergence and the Question of Emanative Causation

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**1. Introduction**

In his early metaphysics, Leibniz interprets the results of Santorio’s quantitative methods as supporting the possibility of the natural immortality of human beings. Unlike thinkers in the Neoplatonic tradition, what Leibniz has in mind is not just the immortality of human souls[[1]](#endnote-1) but rather the immortality of the composite of body and soul. Leibniz aware that the practice of cannibalism challenges the idea that the *entire* body could be a subject of resurrection (because some parts will be incorporated in two different bodies at different times); and in response, Leibniz develops his “kernel of substance” doctrine, according to which a much smaller portion of the organic body is the subject of resurrection. The relevant passage from a letter to his patron, Duke Johann Friedrich of Hanover of 1671 has, as far as I know, never been translated into English, so it might be useful to begin by citing it at length:

I am almost of the opinion that each body, of humans, animals, plants and minerals alike, has a kernel of substance that differs from the *caput mortuum*, as the chymists call it, consisting of *terra damnata* and phlegm. This kernel is so subtle that it remains in the ashes of burnt things, and can contract itself, as it were, into an invisible center. As one can, to a certain measure, use the ashes of plants as seeds, and as in the fetus or fruit of animals the *punctum saliens* already comprises the kernel of the whole body. Now, I moreover believe that this kernel of substance does not decrease nor increase, although its dress and cover is in perpetual flow and sometimes fumes away, sometimes increases from air and food. Hence, when one human devours another human, the kernel of each remains what it has been, and thus the substance of the one is never nourished by the substance of the other. When it happens to someone that a body part is cut away, this kernel of substance withdraws to its fountain head and retains in a certain measure the motion, as if the body part were still there. As it is the case when people who have lost an arm say that it seems to them that they still have their arm and feel all fingers, which comes from the remaining spirits or kernel of substance. If this can take place when a body part is cut off, then it also can take place when all body parts dissolve and decay; then the kernel of the whole body will no less contract itself into such a subtlety that neither fire nor water nor any visible force can damage it. When this kernel of substance, which is located in a physical point (the proximate instrument and, as it were, vehicle of the soul, which is located in a mathematical point) always remains, it does not matter much whether or not all gross matter is attached us; it is in constant change anyway, and either fumes away every day, or where it stays in place, coagulates into dirt that has to be washed away. In particular, it is clear that these effluvia probably are entirely new almost every year, especially when one looks a bit closer at Santorio’s experiments that he has described in *Medicina Statica*. If we can replace them in this life while retaining the identity of our body, how much less will the spiritualized bodies be bound to them.[[2]](#endnote-2)

This passage is complex and touches upon more issues than can be dealt with in a single article. The comparison with supposed cases of palingenesis—the regeneration of living beings from their ashes—is a prominent topic in other early modern natural philosophers such as Joseph Du Chesne (1544-1609) and Daniel Sennert (1572-1637), and I have dealt with it in a previous article.[[3]](#endnote-3) The issue of phantom pain is a point I will come back to a bit later in the present article. Here I would like to focus upon Leibniz’s relation to Santorio. In an obvious sense, using Santorio’s experiments in the way Leibniz does expresses a profound misunderstanding of Santorio’s natural philosophy. A closer look into Santorio’s more theoretically oriented medical writings reveals that he vehemently rejected the idea of natural immortality. In this sense, the relation between Santorio and Leibniz cannot be informatively characterized in terms of “influence.”[[4]](#endnote-4) Still, it may be interesting to ask what the theoretical differences between the natural philosophies of Santorio and the early Leibniz are that could explain their diverging attitudes toward the possibility of natural immortality. Taking such a comparative perspective may be a useful way to get a grip on some features of their natural philosophies whose relevance for the question of natural immortality might go unnoticed otherwise. I will argue for two claims:

(1) Santorio but not the early Leibniz, makes use of emergentist ideas along lines developed by Alexander of Aphrodisias and Galen.[[5]](#endnote-5) The central idea that ancient accounts of emergence have in common with contemporary debates about emergence is the view that when material composites have reached a certain level of complexity, then causal powers arise that cannot be analyzed as sums of the causal powers of the constituents of the composites.[[6]](#endnote-6) Unlike some of his contemporaries, Santorio does not hold that emergent properties arise through the emergence of new substantial forms such as the forms of elements and the souls of living beings; nevertheless, he holds that new causal powers emerge from the temperament of elementary qualities.[[7]](#endnote-7) The early Leibniz, too, is opposed to having recourse to substantial forms in explaining the phenomena of the material world. But unlike Santorio, Leibniz rejects the view that new causal properties could arise from material composites.

(2) Consequently, the early Leibniz takes souls and their powers to be non-emergent phenomena and describes the dependence between matter and soul in a way that differs significantly from Santorio’s views. The early Leibniz, but not Santorio, uses the concept of emanative causation to characterize the relation between the soul and its potencies. Souls in the early Leibniz do not originate from matter and, therefore, have a kind of activity of their own, although they depend upon matter in the sense that the initial information upon which they can perform mental operations is sensory input. For the early Leibniz, the persistence of souls is therefore not bound to the persistence of any macroscopic body structures. By contrast, for Santorio, all natural powers, including vegetative, sensitive and rational powers, emerge immediately from “similar” parts[[8]](#endnote-8)—parts that contain constituents of the same nature and that are the building blocks of “dissimilar” parts such as organs. This is why he rejects the concept of emanative causation and holds that the persistence of these powers depends on the persistence of the temperaments of similar parts.

**2.** **Natural Immortality and the Question of Emergence**

All of Santorio’s emergentist considerations are connected with his analysis of the notion of temperament. As he characterizes Avicenna’s concept in his *Commentaria in primam Fen primi libri Canonis Avicennae* (1625), “the temperament is a simple quality, which results from the aggregate of four primary qualities, such that the four primary ones are not corrupted but preserved in the mixture and in the temperament itself.”[[9]](#endnote-9) This interpretation is plausible only if one leaves aside, as Santorio does, all of Avicenna’s considerations concerning the role of divine emanative causation in the origin of substantial forms and the qualities arising from them.[[10]](#endnote-10) In defense of Santorio it can be pointed out that Avicenna is not very explicit about his emanationist cosmology in the first *Fen* of the first book of the *Canon* on which Santorio is commenting, which opens the way for productive reinterpretations.

In any case, Santorio adopts Avicenna’s account of the material conditions that have to be met in order for the temperament to arise. According to Avicenna, it is the characteristic of natural mixture that there is not only a mutual action and passion between the primary qualities but also a previous division of matter into natural *minima*; moreover, these *minima* must “touch each other for the most part.”[[11]](#endnote-11) The purpose of this last condition is clear: genuine mixture requires mutual action and passion between all ingredients.[[12]](#endnote-12) But what could be the sense of enigmatic expression “to touch each other for the most part”? As Santorio notes with respect to the quantity of substance, this cannot take place if one assumes that *minima* of elements have different sizes. For instance, if out of a minimum of water more than ten minima of air can arise, then a minimum of air is just too small to touch a minimum of water “for the most part.”[[13]](#endnote-13) Therefore, Santorio conjectures that Avicenna must have meant “touch” by means of quality, not by means of quantity of substance:

[A] minimum touches the largest part of another minimum under the condition of mutual action and passion between contrary qualities, through which quality is multiplied, because by means of qualities always a new quality can be educed from the potency of matter, and … this is the new, fifth quality, while the other four remain intact.[[14]](#endnote-14)

Santorio uses observations made with artificial mixtures to support the view that this is the right analysis of the concept of temperament. For instance, he points out that in the mixture of iron and gold a greater harness arises than can be found in each metal alone; likewise, in bones a high degree of hardness arises out of materials that by themselves are not hard at all.[[15]](#endnote-15) Likewise, the temperament of opium shows a heightened power of cooling the body although elementary coldness has been diminished through the process of mixture; analogously, *cantarides*shows a heightened power of heating the body although elementary heat has been diminished through the process of mixture.[[16]](#endnote-16) In all of these cases, Santorio suggests, a new quality arises in an artificial mixture that is entirely different from the primary qualities.[[17]](#endnote-17) As he argues, if new qualities arise in artificial mixtures, where parts are juxtaposed without being divided into natural minima, then such qualities can even more easily arise in natural mixtures, whose parts are divided into natural minima and, therefore, can act upon each other “for the most part” much more easily.[[18]](#endnote-18)

Santorio puts his view of temperament into historical context when he approvingly paraphrases a passage from Alexander of Aphrodisias’s *De mixtione*: “The struggle between elements proceeds to the point where, once the contrariety of exceeding qualities has been abolished, a new quality results.”[[19]](#endnote-19) By accepting this view, Santorio places his own account of the temperament into the context of one of the clearest examples of ancient emergentism. At the same time, it is significant that he quotes a passage from *De mixtione*, which deals with a new quality that results from the struggle between elements, and not the more prominent passage from *De anima*, where the soul is described as an emergent phenomenon. According to Alexander, the soul “is the power and form that supervenes upon the blend of bodies in a particular proportion, not the proportion or composition of the blend … The soul … is not a balance, but the power [that supervenes] upon the balance: it cannot be without this balance, but is not [the same] as it.”[[20]](#endnote-20) As Victor Caston has argued, the use of “to supervene” should here be understood as amounting to the claim that mental states cannot change without a change of bodily states, thereby exactly matching the contemporary concept of supervenience.[[21]](#endnote-21) Moreover, Caston emphasizes that, for Alexander, the soul possesses causal power that is more than an aggregate of the causal powers of the elements.[[22]](#endnote-22)

In his *Methodi vitandorum errorum omnium qui in arte medica contingunt libri XV* (1603), Santorio points out that his view favours Aristotle more than Democritus:

[W]e concede that under rare and dense quantity, and under other differences of position, forms are hidden that are substances, and that emerge from matter by means of dispositions; and we say that matter receives its dispositions from the eight differences of position, from whence various rarities and densities, and innumerable hot and cold, rough and smooth qualities arise, which in turn lead to various interstices; and according to the variety of all these qualities, also an infinite variety of forms comes about, which Democritus did not admit.[[23]](#endnote-23)

However, unlike Alexander, Santorio holds that “powers do not follow from substance, or emanate by themselves from substance, but from the proportion and harmony of parts, namely from their figure, position and interstices.”[[24]](#endnote-24) Accordingly, he gives a deflationary account of the notion of form. As to similar parts, he holds that the temperament functions as a simple form.[[25]](#endnote-25) As to dissimilar parts, he holds that no single quality arises but rather as many qualities as there are similar parts that constitute dissimilar parts.[[26]](#endnote-26) Therefore, he regards the form of dissimilar parts as nothing other than the composition of similar parts.[[27]](#endnote-27) This must be so, he argues, because all actions of organic parts derive from temperament of similar parts, while the other parts only provide assistance. For example, vision originates from the temperament of the retina, but presupposes the proper functioning of the other parts of the eye.[[28]](#endnote-28)

Santorio’s treatment of emergent qualities marks a departure from Alexander and his early modern followers, such as Santorio’s teacher Jacopo Zabarella,[[29]](#endnote-29) in two respects: (1) Santorio does not regard new qualities as deriving from substantial forms that emerge from mixtures. In support, he points out that one can observe that transparent minerals lose their transparency when they are ground to powder, without any loss of substance.[[30]](#endnote-30) Also, the ability to jump or to sing does not depend on the substance of the soul but rather on the constitution of similar body parts.[[31]](#endnote-31) If these qualities would depend immediately on substance, Santorio argues, they would have to remain the same as long as the substance remains the same.[[32]](#endnote-32) (2) Santorio does not restrict the qualities from which new qualities emerge to primary qualities. Rather, he holds that new dispositions emerge in matter on the basis of changes in position, from which there arise changes in rarity and density, from which there are changes in heat and coldness, the degree of cohesion, and the occurrence of interstices.[[33]](#endnote-33) In particular, he emphasizes that such new powers can arise only through a new spatial arrangement of parts, without any change on the level of primary qualities. For instance, laying a red piece of glass over a blue piece of glass produces a purple color. Similarly, chemical compounds undergo changes in color without any observable change in heat or coldness.[[34]](#endnote-34) Also, it seems implausible to assume that the killing power of opium emerges from any change on the level of elementary coldness, since substances that are much colder do not have such powers.[[35]](#endnote-35) Likewise, in what we now would classify as allergic reactions, the exhalation of a cat carries a “new quality” without any observable change of primary qualities.[[36]](#endnote-36) As Santorio surmises, the great variety of such “new qualities” is due to the infinite variety of the positions of internal parts.[[37]](#endnote-37) And while he concedes that it would be stupid to assume that the powers of a living being directly result from primary qualities, he also believes that it is not necessary to refer these powers to something substantial.

In particular, Santorio conjectures that the differences in the position of internal parts will turn out to offer sufficient explanatory resources for the powers of living beings.[[38]](#endnote-38) Both in his *Commentaries to Avicenna’s ‘Canon’* and in his *De remediorum inventione* (1629), he distinguishes four kinds of temperament in an animal: (1) innate temperament (*temperamentum innatum*) that originates from the origin of the animal;[[39]](#endnote-39) (2) inflowing temperament (*temperamentum influens*) that originates from the heart and the brain; as he clarifies, this is not the form of parts, but rather the temperament of matter that functions as food for innate heat (an entity which I will come back to presently);[[40]](#endnote-40) (3) the mixed temperament (*temperamentum mixtum*) that arises out of the mixture of innate and inflowing temperament: “from which there results a new being, or a new form that is called the form of the whole part of the living being;”[[41]](#endnote-41) and finally (4) the total temperament (*temperamentum totale*) of a whole inner organ and the whole individual.[[42]](#endnote-42) He holds that the temperament of similar parts has to be distinguished from innate, inflowing and total temperament, thereby suggesting that we identify the temperament of similar parts with the mixed temperament. His central thesis is that “this mixed temperament brings forth immediately and completely all operations.”[[43]](#endnote-43) Consequently, he regards all new causal powers in animals as originating from the temperament of similar parts.[[44]](#endnote-44)

In spite of their divergence regarding the analysis of the emergence relation, Zabarella and Santorio converge on rejecting natural immortality. Zabarella holds that the death of animal souls, including the souls of humans, is a “necessary byproduct” (*necessaria sequela*) of the decay of the body.[[45]](#endnote-45) Similarly, for Santorio the death of an animal results from the decay of an entity that plays an influential but somewhat enigmatic role in the medical tradition, the innate heat (*calor nativus*/*calor innatus*).[[46]](#endnote-46) With respect to his interpretation of innate heat in Avicenna, Santorio’s considerations pose the problem of historical accuracy. As Michael Stolberg has argued, Avicenna’s own views on the supra-elementary powers of innate heat can best be understood in the framework of his emanationist cosmology[[47]](#endnote-47)—a point entirely missed by Santorio. Santorio interprets Avicenna very much from the perspective of his reading of Galen. In his *Commentaria in artem medicinalem Galeni* (1612), Santorio points out that, in Galen, one finds various identifications of innate heat: (1) with temperament;[[48]](#endnote-48) (2) with whole substance;[[49]](#endnote-49) (3) with nature;[[50]](#endnote-50) (4) with the substance of powers;[[51]](#endnote-51) and (5) with the essence of the soul.[[52]](#endnote-52) This series of identifications suggests that innate heat differs both from celestial heat and from elementary heat.

Santorio develops his conception of innate heat in his commentary on the Hippocratic *Aphorisms* (1629). As he claims, when innate heat “is generated, it is generated through a real change of elements, in such a way that a new power arises, which differs formally from the elements.”[[53]](#endnote-53) As he explains, the power is new in the sense that it brings forth operations that differ from its principles and that are sometimes even contrary to them.[[54]](#endnote-54) The new power can be said to be “formally different” in the sense that it changes “a whole into a whole.” This somewhat opaque expression presumably signalizes that the causal power cannot be resolved into the sum of the causal powers of the constituents but rather is a power of the whole similar part. Such a reading at least is suggested when Santorio’s discusses the relation between innate heat and another enigmatic entity, first-born heat (*calor achigonon*/*calor primigenium*). As Santorio points out, according to Galen the first-born heat is generated out of seed and menstrual blood.[[55]](#endnote-55) Moreover, Santorio notes that Avicenna ascribes two functions to first-born heat: (1) it changes the seed into nerves, membranes and other similar parts, and thereby gives temperament; (2) in the already formed organism, it persists but does not give to temperament but to composition (figures, positions, numbers, channels).[[56]](#endnote-56) Santorio surmises that first-born and innate heat are of the same kind.[[57]](#endnote-57) Given the identification of innate heat with temperament that Santorio accepts, this idea suggests that also the first-born heat can be understood as a kind of temperament, but it is not the temperament of body parts but rather the temperament of mixtures of seminal matter and menstrual blood that play a causal role in the generation of similar parts of living beings that have their own temperament. This is why, according to Santorio, innate heat relates to first-born heat as an offspring relates to parents.[[58]](#endnote-58) And he remarks that “the constitution generated by first-born heat is the whole being of similar parts.”[[59]](#endnote-59)

Santorio explicates the sense in which he speaks of the “whole being” of similar parts in three respects: (1) The temperament is in every minimal part of a similar part; hence, the sameness of temperament explicates the sense in which a similar part is composed of minimal parts of the same nature.[[60]](#endnote-60) (2) All operations of the similar part depend on the temperament.[[61]](#endnote-61) (3) The temperament is not a body but rather the essence of the similar part.[[62]](#endnote-62) This is why, according to Santorio, Galen in such cases spoke of “actions of the whole substance.”[[63]](#endnote-63) Thereby, Santorio offers an alternative to two influential interpretations of Galen. According to one interpretation, such actions result from the sum of the causal powers of the primary qualities of the constituents of a composite. According to a rival interpretation, such actions are due to a substantial form that informs the composite.[[64]](#endnote-64) Santorio stands out because he deviates from the first—reductionist—option but also does not fall into the second option that binds emergentism to the ontology of substantial forms. Rather, what he has in mind is an ontology of emergent properties—an ontology that he applies to mixtures as well as to the similar parts of living beings, including humans. Such a reading is confirmed by the treatment of qualities of the whole substance in the *Methodus vitandorum errorum*. After having put forth the claim that all occult and manifest qualities depend on the three-dimensional structure of parts, he goes on to explain:

[O]ccult qualities are called by Galen qualities of the whole substance, because this ultimate degree does not depend upon a single quality of the substance but on all of them, for instance, on such-and-such spatial order, rarity and density of part, such-and-such a number, figure and magnitude, or such-and-such a heat, coldness, dryness and humidity, such that there is no single determinate quality of this substance that does not contribute to the production of this occult quality …; for each degree of this quality can bring about a new, unknowable power, if it is a mixture with the other quality of this substance.[[65]](#endnote-65)

This is the theoretical framework in which Santorio analyses aging and natural death. In his *Commentaries to Avicenna’s* ‘*Canon’*, he takes up Avicenna’s insight that in the temperament of the elderly not only the quantity, but also the quality of innate heat changes.[[66]](#endnote-66) This change is described in terms of the lamp metaphor: As the flame consumes the oil in a lamp, the innate heat is an active principle that uses up a passive principle, called “radical moisture” (*humidum radicale*).[[67]](#endnote-67) On first sight, the metaphor seems to indicate that the innate heat could remain fully intact as long as the radical moisture is replenished.[[68]](#endnote-68) However, Santorio conjectures that radical moisture is nourished itself by vital spirits; hence if vital spirits become hot due to passions, the nourishment of radical moisture also makes what is nourished dry and hot.[[69]](#endnote-69) As Santorio notes, this explains why Avicenna thought that not only innate heat and radical moisture but also nutritive powers decrease over time.[[70]](#endnote-70) If the fuel of innate heat itself becomes too hot and dry, then a chain of effects takes place: the intestines become fatigued; fatigued intestines do not concoct well; impaired concoction brings it about that parts that are lost are not sufficiently replaced; and organs whose parts are not sufficiently replaced lose their power of expulsion such that they become full of excrements.[[71]](#endnote-71) In particular, the experiments of the *Medicina statica* have shown that earthy parts do not fly away as the other parts. This is why with increasing age there is an increase of earthy parts like salt; death results because all powers are grounded in a symmetry between the four elements; where the symmetry is disturbed, also the functions that originate from the temperament cease.[[72]](#endnote-72)

This implies that, for Santorio, the continuation of life is not bound to the preservation of any particular portion of matter. Rather, life depends of the continuation of the temperament of similar parts, which can emerge from continuously changing material constituents. On the contrary, it is the persistence of material parts that, in his view, presents an obstacle to the continuation of life because it is exactly the material parts that cannot be divided or expelled that threaten the harmony of qualities underlying the temperament. If the harmony is disturbed to such an extent that innate heat can no longer emerge from it, natural death occurs. In this way, Santorio’s mortalist position can be understood as a consequence of his emergentist analysis of vital powers.

The contrast with Leibniz’s early analysis of material changes will now be easy to see. At the time when he was reading Santorio, Leibniz embraced a theory of a material *pneuma* or ether whose motion he used for various explanatory purposes:

My hypothesis consists in the circulation of the ether with the light or sun around the earth, opposite to the circulation of the earth, from which I derive gravity and elasticity, and magnetic attraction, and from these all the antipathies and sympathies of things, and solutions, and precipitations, and fermentations, and reactions ... [[73]](#endnote-73)

He clearly regards the ether as material since he compares it with Kenelm Digby’s concepts of fire and spirit[[74]](#endnote-74)—both of which are described in unambiguously corpuscular terms.[[75]](#endnote-75) Leibniz uses this hypothesis in a conciliatory manner that is meant to fuse some intuitions of mechanistic philosophy with some intuitions stemming from ancient and medieval philosophy. As he recounts, at the beginning of his philosophical career, he agreed with the corpuscularian philosophers that, in order to explain corporeal phenomena, one should not without necessity have recourse to God nor to *incorporeal* forms and qualities.[[76]](#endnote-76) However, starting from the definition of body as what is in space, he realized that from this definition no explanation for the determinate figure, magnitude, motion and cohesion of bodies can be derived.[[77]](#endnote-77) For this reason, he came to the hypothesis of an incorporeal being as an origin of motion; due to the harmony among the motions of bodies, he was led to surmise that there is only a single such being; moreover, since otherwise no sufficient reason for the determinate figure, magnitude and motion of bodies could be given, he was led to the assumption that this single being is intelligent.[[78]](#endnote-78)

This conception of the nature of matter and the origin of motion has far-reaching consequences for the notion of form, which still occurs in Leibniz’s early natural philosophy. First, Leibniz argues that the concept of matter as what is in space implies that matter, very much as spatial extension, has “interminate quantity.”[[79]](#endnote-79) Second, he argues that the only kind of form that motion can give rise to is nothing other than figure.[[80]](#endnote-80) If these premises are taken together, it becomes clear why forms arise through splitting up the continuity of matter: “For since figure is the boundary of body, what is required for introducing form into matter is boundary. Hence, in order for various boundaries to arise, what is required is discontinuity of parts.”[[81]](#endnote-81) Moreover, if one does not want to assume the existence of a vacuum (as the early Leibniz is reluctant to do), then one has to assume that forms arise through motion.[[82]](#endnote-82) This is why the natural philosophy of the early Leibniz is resolutely anti-emergentist. In fact, he takes up emergentist terminology only to give it an entirely different meaning: “We say that forms arise out of the potentially of matter, not by producing anything new, but only by taking away something old …”[[83]](#endnote-83) This, of course, sounds puzzling, and both the negative and the positive claim need some comment. As to the negative claim, qualifying the emergentist terminology of “arising out of the potentiality of matter” by saying that nothing new arises denies the central claim of the theory of emergent properties—the claim that what arises out of the potentiality of matter has new causal powers. As to the positive claim, what Leibniz seems to have in mind is that motion takes away the continuity that is characteristic of matter without motion. Motion thereby produces boundaries between material objects, and continuous matter had the potentiality for being split up in this way. But forms, understood in this way, are nothing but shapes, and shapes by themselves do not have any active powers. It is perhaps no coincidence that this anti-emergentist claim is made in the context of Leibniz’s early revival of aspects of Stoic physics—it is exactly the Stoic theory of a material *pneuma* that is the target of the criticism of Alexander of Aphrodisias’s *De mixtione*, whose account of temperament Santorio accepts.

Thus, one reason for why the early Leibniz maintains that minds could continue to be alive and active is that they are not bound to an intact material basis of emergence such as the structure of similar parts. It is exactly because he rejects the view that from material changes any new qualities could arise that he describes the material portion (or “kernel of substance”) conjoined with the mind after death as “subtle matter” or “spirit”—that is, matter of a kind that, in Santorio’s view, would be an inadequate material substrate for vital or cognitive powers. The view that no new causal powers can arise from material changes and that *a fortiori* no vital and cognitive powers can arise from matter is the first crucial aspect in which the metaphysics of the early Leibniz diverges from the natural philosophy implicit in Santorio’s medical writings.

**3.** **Natural Immortality and the Question of Emanative Causation**

A second crucial difference between Santorio and Leibniz derives from their diverging causal explanations of the power of reflection. Santorio analyses this power as an emergent quality that is already present in the sensitive powers of brutes, while Leibniz holds that the power of reflection is an immanent quality that arises from the mind through emanative causation. This is why their different attitudes toward the question of emanative causation turn out to be relevant for their different attitudes toward the question of natural immortality.

To get a grip on the early modern understanding of emanation, a brief look into Rudolph Goclenius’s *Lexicon philosophicum* (1613) will be helpful here. Goclenius characterizes emanative causation as follows:

To emanate is to accompany immediately the essence, albeit without any respect to existence, and before existence, without any respect to an external cause. In the proper sense, it is to flow from something else, or to exist due to the principles of the essence of the subject, or to arise out of the essence of something by means of an indissoluble nexus and connection.[[84]](#endnote-84)

One of the examples that Goclenius gives is the relation between the essence of a thing and its real properties.[[85]](#endnote-85) In particular, he applies the concept of emanation to the relation between the soul and its potencies.[[86]](#endnote-86) Moreover, he describes the relation between rational souls and their intellectual potencies as an instance of immanent action:

Immanent action … in the most proper sense has one and the same proximate principle that is both active and receptive. It remains in the same substrate, and in the same potency, from which it is brought forth, such as thought and appetition. Here belong the emanations or results of the spiritual properties of the soul, such that intellect and will arise proximately from the soul and are in the soul.[[87]](#endnote-87)

As Goclenius explains, an action is either immanent (*immanens*), in the sense that it is an action of an agent within the agent itself (*actio … agentis intra se*); or it is transitive (*transiens*), in the sense that it is an action of an agent outside of the agent itself (*actio … agentis extra se*); or it is “in the middle between immanent and transitive” (*media inter immanentem et transeuntem*).[[88]](#endnote-88) But in which sense can an action be “in the middle” between immanent and transitive action? A few lines later, Goclenius recognizes an intermediary kind of action that is immanent and transitive at the same time. This kind of action relates to the agency of vegetative and sensitive souls: “Natural life remains immanent in the soul, from which it emanates, and is received in the body.”[[89]](#endnote-89) Goclenius here observes that the potencies of the souls that convey life to organic bodies involve both immanent and transitive action. Moreover, he describes both types of action as instances of emanative causation. In particular, emanative causation allows him to claim that natural life remains immanent in the soul while at the same time also inhering in the body. Goclenius describes this kind of action as immanent and transitive at the same time because it is immanent with respect to the soul and transitive with respect to the body.

This, then, is the concept that Santorio rejects and Leibniz adopts. Since Santorio believes that new powers do *not* depend immediately on substantial forms, he rejects the view, defended by his teacher Jacopo Zabarella, according to which powers result from substantial forms through emanative causation.[[90]](#endnote-90) In particular, Santorio analyses cognitive powers as emergent qualities; most notably this holds for the power of reflection which plays a central role in Leibniz’s views concerning natural immortality. To begin with, Santorio argues that the power of reflection is present in non-human animals. For instance, he points out that when a dog with hanging ears hears something, he lifts up his ears; this indicates that he notices that he hears something. Generally, this points to the conclusion that sensation always involves being aware of sensation (*animadvertere se sentire*).[[91]](#endnote-91) This task, as Santorio goes on to argue, cannot be performed by the sensory organs themselves, for it is impossible that an organic power can reflect upon itself. Otherwise, they would have to be able to sense what takes place in them; for example, the eye would have to see the colors that are in it, and the organ of touch would have to sense qualities that are in it.[[92]](#endnote-92) From the observation that the processes in the sensory organs are not part of the contents of experience, Santorio infers that in every animal there must be an additional power, similar to the estimative and cogitative powers.[[93]](#endnote-93)

This is why he holds that sensation is not well described as a genus under which two different species—inner sensation and outer sensation—fall:

[B]ecause it is in fact not a univocal genus but comprised within a single power: since as a comprehensive power, it is in the first place said about the internal power, and in the second place about the external sensitive power that is perceived by the internal powers … [W]hen the mind is injured, humans neither see nor sense nor smell nor have any feeling of touch, nor can they imagine something rightly.[[94]](#endnote-94)

Santorio describes the difference between sensation as it is found in simple animals, the power of estimation that is found in higher animals and humans, and the powers for discourse that is found in humans as a gradual difference. It is a difference between whatever degree of apprehension that is found in all brutes and a more complete apprehension that is found in the beings capable of estimation or discourse.[[95]](#endnote-95) Although Santorio does not work out the details, this suggests a view according to which more complete forms of awareness characteristic of higher animals and humans develop out of more rudimentary forms of awareness characteristic of all kinds of animals. If the difference between reflection in humans and reflection in non-human animals is a matter of degree, then the forms of reflection specific to humans is understood as much as an emergent quality as the awareness characteristic of any act of sensation. This implies that these powers can remain intact only as long as the similar parts of the brain remain intact. This is why, from a medical point of view, Santorio holds that curing impaired higher cognitive functions, such as the estimative power, requires healing the similar parts in which cognitive functions such as imagination and memory inhere, on which the higher cognitive functions depend.[[96]](#endnote-96)

By contrast, Leibniz develops an interpretation of the sense in which emanative causation remains internal to the being from which effects originate that is not bound to the theory that the ultimate constituents of matter are natural *minima*. That Leibniz regards the relation between mind-like entities and the operations of the organic bodies that they individuate as an emanation relation is suggested when, in the letter to Duke Johann Friedrich of May 1671, Leibniz says that the passive principle in a corporeal substance “is diffused” by the mind and that the mind acts “without being diminished.”[[97]](#endnote-97) To judge from what Goclenius says on this issue, the view that the mind emanates activities into the organic body without itself being diminished seems to characterize the relation between minds and the organic bodies animated by them as involving transitive emanation.

The relation between mind and body is also central for the question of diachronic identity. As Leibniz points out, in bodies themselves there is no sufficient principle of individuation: “For since we have said that a body is actually divided into parts, each of which is agitated with a different motion, and since for the same reason each part is again divided, then certainly if we consider matter alone, no point will be assignable that will remain together with another, nor a moment at which a body will remain identical with itself ...”[[98]](#endnote-98) This is why Leibniz believes that only together with a soul can a body constitute a living being with diachronic identity.[[99]](#endnote-99) At the same time, Leibniz claims that created minds are never without a body:

A mind is either separate or united to a body. Separate, such as God; united, such as *our soul*. There are also other *minds*, which are called *Angelic*, more perfect than ours, which nevertheless the ancients believed to be united to some bodies, which are much subtler; so that, if it were true, we could see that also our soul, being incorporeal in itself, gives up only the more gross body in death. And no creature would be destitute of an associated body.[[100]](#endnote-100)

As we have seen in the passage from Leibniz’s letter to Duke Johann Friedrich, one of the reasons why Leibniz introduces the kernel of substance hypothesis seems to be some facts about perception that are felt as if they were located in organs that no longer exist. Leibniz’s explanation of phantom pain seems to be that the vital spirits, which caused sensations while the body part was still in place, are still extant after the destruction of the body part, albeit in an invisibly small magnitude and at a different location. Moreover, these spirits continue to cause sensations that feel as if they were located in the place where the spirits were located originally. The connection between natural immortality, the physiological function of “subtle matter” and perception is also confirmed in the following passage:

It should be known that in each thing there is some seminal center that distributes itself, like containing a tincture and serving the specific motion of the thing. That this is the case is obvious from the regeneration of plants … through seeds, from the plastic force of the sperm in the uterus, from the essences of the chymists. Similarly, hence, there is hidden in bones, in our flesh … a subtler part concentrated in spirits … This is obvious from the experience that those who have lost a hand or a foot often sense them …: For no other reason than that this subtle spirit in which the substance of the member was contained remains and exerts now the same motions.[[101]](#endnote-101)

Thus, for Leibniz subtle matter functions as the instrument by means of which the soul has sensations. In this sense, the activities of the soul depend on information provided by subtle matter. This dependence of activities of the soul on motions of subtle matter explains why Leibniz maintains that souls are never entirely separated from matter.

Activity dependence, however, does not amount to emergence. This is why Leibniz regards reflection as a kind of activity that is purely immanent to the soul. The issue of reflection is a prominent theme in his Paris years, connected with the issue of diachronic identity of souls and with the analysis of sensation.[[102]](#endnote-102) Already in the *Outline of the Catholic Demonstrations* (1668-1669?), Leibniz outlines the plan for several chapters of the second part, which would contain a “proof of the immortality and incorporeal nature of the soul.” The first chapter would prove the immortality “from the immediate sense of thought”; the second chapter “from the infinite repeatability of reflection, such that all sensation is an enduring reaction […]”[[103]](#endnote-103) Likewise, according to *On Memory and the Reflection of the Mind on Itself* (April[?] 1676), “the perception of perception to infinity is what is perpetually in the soul, and is what constitutes the *per se* existence of a mind and the necessity of its continuation.”[[104]](#endnote-104) Leibniz is clear that becoming aware of the reflexive structure of sensation is what gives rise to the consciousness of the mind’s diachronic identity:

In our mind there is a perception or sense of itself, as of a certain particular thing. This is always in us, for as often as we use a word, we recognize that immediately. As often as we wish, we recognize that we perceive our thoughts; that is, we recognize that we thought a short time ago. Therefore, intellectual memory consists in this: not *what* we have perceived, but *that* we have perceived—that we are those who have sensed. And this is what we commonly call “the same,” this faculty in us which is independent of external things.[[105]](#endnote-105)

As Leibniz adds, he does not see “how the mind could die or be extinguished while these reflections last.”[[106]](#endnote-106) Thus, what matters for the immortality of the soul is the capacity of performing immanent activities, and in Leibniz’s view this capacity does not depend on the body. Due to the immanent character of their activities, minds are not only naturally indestructible; they also can be associated with bodies of no matter what size. This is why, according to Leibniz, humans can persist as long as the subtle matter persists that constitutes the “kernel of substance.”

**4. Conclusion**

Leibniz’s strategy of using the results of Santorio’s experiments in support of his thesis of natural immortality can best be understood against the background of metaphysical assumptions that diverge from Santorio’s metaphysical assumptions. Read in the context of Leibniz’s early metaphysics, Santorio’s experiments in fact could lend support to the view that diachronic identity is not bound to the continued presence of the largest part of our body. Together with the assumption that no new causal powers can emerge from the potencies of matter and the assumption that souls are immaterial beings that emanate their own powers, Leibniz can radically reinterpret these experiments as confirming his conjecture that the continued identity of a human being can be secured through the presence of a portion of matter that is not bound to the limits that minimism imposes on natural particulars. By contrast, Santorio’s view that all natural powers, including vital, sensitive and intellectual powers are nothing but powers of the temperament of similar body parts leads to the view that these powers depend for their existence on the continued existence of natural minima whose essence is constituted by the temperament. In his view, this is so because the emergence of new causal powers depends on the persistence of natural particulars of a minimal size. Leibniz’s interpretation of Santorio’s experiments is innovative because he reads them from the standpoint of theoretical assumptions that are contrary to Santorio’s. In this sense, the relation between Santorio’s and Leibniz’s views could be characterized as an instance of innovative appropriation of Santorio’s experiments. Both Santorio and Leibniz took it as an implication of the quantitative analysis of exhalation that some material parts remain in the body throughout a human lifetime. But while Santorio regards this very fact as an explanation of natural mortality of humans, Leibniz regards it as an experimental support for the possibility of natural immortality.

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1. As for example in Marsilio Ficino; see Paul Oskar Kristeller, “The Theory of Immortality in Marsilio Ficino,” *Journal of the History of Ideas* 1 (1940): 299-319. On Leibniz’s relation to Neoplatonic accounts of immortality, see Stuart Brown, “Soul, Body and Natural Immortality,” *The Monist* 81 (1998): 573-90. [↑](#endnote-ref-1)
2. Leibniz to Duke Johann Friedrich of Hannover, 21. May 1671, in Gottfried Wilhelm Leibniz, *Sämtliche Schriften und Briefe* (Berlin: Akademie-Verlag, 1923) [henceforth: A], II, 1, 175-176: “Nemblich ich bin fast der meinung, daß ein ieder leib, so wohl der Menschen alß Thiere, Kräutter undt mineralien einen Kern seiner substantz habe, der von dem Capite mortuo, so wie eß die Chymici nennen ex terra damnata et phlegmate bestehet, unterschieden. Dieser kern ist so subtil, daß er auch in der asche der verbrandten dinge ubrig bleibt, undt gleichsamb in ein unsichtbarliches Centrum sich zusammen ziehen kann. Wie mann dann auff gewisse maase sich der asche der gewächse zum saamen gebrauchen kann, undt in dem foetu oder frucht der Thiere, das punctum saliens den Kern des gantzen Cörperß bereits in sich begreifft. Nun glaub ich ferner, daß dieser Kern der substantz in einem Menschen weder ab noch zu nehme, obgleich sein Kleidt undt Decke in stetem fluß begriffen undt bald weg raucht, bald wiederumb auß der lufft oder speise sich vermehrt. Daher wann ein Mensch vom andern verzehrt wirdt, bleibt der Kern eineß jeden wer undt wie er gewesen, undt wirdt also niemahlß die substantz deß einen durch die substantz deß andern ernehrt. Wirdt nun einem Menschen ein gliedt abgeschnitten, so ziehet sich dieser Kern der substantz zurück zu seinem brunnquell undt behält auff gewisse maase die bewegung, alß wann das gliedt noch da wäre. Wie dann Leute denen [ein] arm abgehawen, sagen, daß ihnen offt düncke sie hätten ihren arm noch undt fühleten alle finger, welches von den zurück bliebenen spiritibus, oder Kern der substantz herrühren muß. Kann nun das geschehen wann ein Gliedt abgeschnitten wirdt, so kann eß auch geschehen wann sie alle gelöset undt zerstöret werden, dann sich nichtß desto minder der Kern deß gantzen Cörperß in eine solche subtilität zusammen ziehen wirdt, daß ihm weder fewer noch wasser noch einige sichtbahre gewalt schaden könne. Wann nun dieser Kern der substantz in puncto physico consistens (proximum instrumentum et velut vehiculum Animae in puncto mathematico constitutae) allezeit bleibt, so ist ja wenig ahn gelegen, ob alle grobe materie so ahn unß ist, die doch ohne das in steter veränderung, undt täglich entweder außrauchet, oder wo sie sitzen bleibt, in sordes so mann abspülen muß, coagulirt wirdt, ubrig bleibe: Maasen clar, daß solche exuviae wohl fast alle Jahr gantz new sein, sonderlich wann mann Sanctorii experimenta so er in *medicina statica* beschrieben, etwaß genauer ahnsiehet. Können wir sie nun in diesem Leben salva identitate corporis nostri verändern, viel weniger werden die verklärte leiber darann gebunden sein.“ The reference is to Santorio Santori’s *Ars de statica medicina* (1614). In what follows, references are to Santorio Santori, *Opera Omnia*, edited by Francesco Brogiolo, 4 vols (Venice: Brogiolo, 1660), except for references to Santori Santori, *Commentaria in artem medicinalem Galeni* (Venice: Somaschus, 1612). Unless where otherwise noted, translations are my own. [↑](#endnote-ref-2)
3. Andreas Blank, “Sennert and Leibniz on Animate Atoms,” in *Machines of Nature and Composite Substances in Leibniz*, edited by Justin E. H. Smith and Ohad Nachtomy, 115–130 (Dordrecht: Springer, 2011), 117-121. [↑](#endnote-ref-3)
4. The same holds for Robert Boyle, who a few years later, in his *Physico-Theological Considerations on the Possibility of the Resurrection* (London: H. Herringman,1675) makes a similar interpretation of Santorio’s experiments—of which, as Leibniz’s reading notes on Boyle’s text indicate, Leibniz was aware; see A VI, 3, 238. On Boyle’s conception of natural immortality, see Udo Thiel, *The Early Modern Subject. Self-Consciousness and Personal Identity from Descartes to Hume* (Oxford: Oxford University Press, 2011), 87-89. [↑](#endnote-ref-4)
5. On emergentism in Alexander of Aphrodisias and Galen, see Victor Caston, “Epiphenomenalisms, Ancient and Modern,” *Philosophical Review* 106 (1997): 309–363. On the early modern reception of these ideas, see Andreas Blank, “Daniel Sennert and the Late Aristotelian Controversy over the Natural Origin of Animal Souls,” in *Animals. New Essays*, edited by Andreas Blank, 75–99 (Munich: Philosophia, 2016); id., “The Question of Emergence in Protestant Natural Philosophy, 1540–1610,” *Hungarian Philosophiical Review* 61 (2017): 7–22; id., “Antonio Ponce de Santacruz on Nutrition and the Question of Emergence,” in *Nutrition and Nutritive Powers in Aristotle and the Aristotelian Tradition*, edited by Giouli Korobili and Roberto Lo Presti (Berlin and New York: De Gruyter, forthcoming). [↑](#endnote-ref-5)
6. For an overview of contemporary approaches to this notion, see Cynthia Macdonald and Graham Macdonald, “Introduction,” in *Emergence in Mind*, edited by Cynthia Macdonald and Graham Macdonald, 1-21 (Oxford: Oxford University Press, 2010). [↑](#endnote-ref-6)
7. See, e.g., *Commentaria in artem medicinalem Galeni*, col. 241-42. [↑](#endnote-ref-7)
8. See, e.g., *Commentaria in primam Fen*, cols. 237, 967. [↑](#endnote-ref-8)
9. *Commentaria in primam Fen*, col. 245: “temperatura sit quinta simplex qualitas, quae resultat ex aggregato quatuor primarm qualitatum, ita ut quatuor primae non corrumpantur, sed in mixto, & in ipsa temperatura conserventur.” See *Commentaria in artem medicinalem Galeni*, col. 135. [↑](#endnote-ref-9)
10. See Abraham D. Stone, “Avicenna’s Theory of Primary Mixture,” *Arabic Sciences and Philosophy* 18 (2008): 99-119. [↑](#endnote-ref-10)
11. *Commentaria in primam Fen*, col. 233. On Santorio’s marginalia concerning this point, see Fabrizio Bigotti “A Previously Unknown Path to Corpuscularism in the Seventeenth Century: Santorio’s *Marginalia* to the *Commentaria in Primam Fen Primi Libri Canonis Avicennae* (1625),” *Ambix* 64 (2017): 29–42 (40-1). [↑](#endnote-ref-11)
12. *Commentaria in primam Fen*, col. 234. [↑](#endnote-ref-12)
13. Ibid., cols. 235-236. [↑](#endnote-ref-13)
14. Ibid., col. 236: “minimum tangere plurimum alterius minimi supposita mutua actione, & passione contrariarum qualitatum, in qua multiplicatur qualitas, quia semper aliqua nova temperatura virtute qualitatum educi potest e potentia materiae, & haec nova ex Avicenna est quinta qualitas: aliis quatuor non corruptis.” [↑](#endnote-ref-14)
15. Ibid., col. 247. [↑](#endnote-ref-15)
16. Ibid. [↑](#endnote-ref-16)
17. Ibid. [↑](#endnote-ref-17)
18. Ibid. [↑](#endnote-ref-18)
19. Ibid., col. 252: “Pugna elementorum eo usque progredi donec abiectis contrarietatum excessibus una qualitas resultat.” See Robert B. Todd, *Alexander of Aphrodisias on Stoic Physics. A Study of the De Mixtione with Preliminary Essays, Text, Translation, and Commentary* (Leiden: Brill, 1976), 158 (*De mixtione* 233.2–5). [↑](#endnote-ref-19)
20. Alexander of Aphrodisias, *De l’âme*, edited and translated by M. Bergeron and R. Dufour (Paris: Vrin, 2008), 104 [*De anima* 25.2-8]. Alexander of Aphrodisias, *On the Soul. Part I: Soul as the Form of Body, Parts of the Soul, Nourishment and Perception*, trans. Victor Caston (London: Bloomsbury, 2012), 51. [↑](#endnote-ref-20)
21. Caston, “Epiphenomenalisms,” 348-9; see Donald Davidson, “Mental Events,” in his *Essays on Actions and Events*, 207-225 (Oxford: Clarendon Press, 1980). [↑](#endnote-ref-21)
22. Caston, “Epiphenomenalisms,” 349-50. [↑](#endnote-ref-22)
23. *Methodus vitandorum errorum*, 418: “[A]dmittimus, sub quantiate rara, & densa, & sub aliis situs differentiis formas delitescere, quae sunt substantiae, quaeque a materia emergunt dispositionum opificio; dicimusque disponi materiam ab octo differentiis positionis, unde raritates, & densitates variae, unde caliditates, & frigiditates, asperitates, & lenitates innumerabiles finunt, unde meatus varii; pro infinita horum omnium varietate variae, & infinitae formae enascuntur, quas Democritus non admittebat.” [↑](#endnote-ref-23)
24. Ibid., 410: “potentias non insequi substantiam, vel emanare per se a substania, sed a proportione & harmonia partium, scilicet ab earum figura, situ, & meatibus ...” [↑](#endnote-ref-24)
25. *Commentaria in primam Fen*, col. 238; see *Commentaria in artem medicinalem Galeni*, col. 136. [↑](#endnote-ref-25)
26. *Commentaria in primam Fen*, col. 238; see *Commentaria in artem medicinalem Galeni*, col. 136. [↑](#endnote-ref-26)
27. *Commentaria in primam Fen*, col. 238; see *Commentaria in artem medicinalem Galeni*, col. 136. [↑](#endnote-ref-27)
28. *Commentaria in primam Fen*, cols. 237, 967. [↑](#endnote-ref-28)
29. On Zabarella’s views concerning the emergence of substantial forms, see Andreas Blank, “Zabarella and the Early Leibniz on the Diachronic Identity of Living Beings,” *Studia Leibnitiana* 47 (2015): 86–102 (89-95). [↑](#endnote-ref-29)
30. *Methodus vitandorum errorum*, 410. [↑](#endnote-ref-30)
31. Ibid. [↑](#endnote-ref-31)
32. Ibid. [↑](#endnote-ref-32)
33. Ibid., 420. [↑](#endnote-ref-33)
34. Ibid., 421. [↑](#endnote-ref-34)
35. Ibid. [↑](#endnote-ref-35)
36. Ibid. [↑](#endnote-ref-36)
37. Ibid., 422. [↑](#endnote-ref-37)
38. Ibid. [↑](#endnote-ref-38)
39. *De remediorum inventione*, 11; *Commentaria in primam Fen*, col. 238. [↑](#endnote-ref-39)
40. *De remediorum inventione*, 11; *Commentaria in primam Fen*, col. 238. [↑](#endnote-ref-40)
41. *De remediorum inventione*, 11: “unde resultat novum esse, seu nova forma quae dicitur forma totius partis viventis …”; see *Commentaria in primam Fen*, col. 238. [↑](#endnote-ref-41)
42. *Commentaria in primam Fen*, col. 238. [↑](#endnote-ref-42)
43. *De remediorum inventione*, 11: “hoc temperamentum mixtum immediate, & complete edit omnes operationes”; see *Commentaria in primam Fen*, col. 237. [↑](#endnote-ref-43)
44. *De remediorum inventione*, 11; *Commentaria in primam Fen*, col. 237. [↑](#endnote-ref-44)
45. Giacomo Zabarella, *Libri de rebus naturalibus XXX* (Cologne: Ciotti, 1590), 231-232. On Zabarella’s mortalism, see Branko Mitrovic, “Defending Alexander of Aphrodisias in the Age of the Counter-Reformation: Iacopo Zabarella on the Mortality of the Soul according to Aristotle,” *Archiv für Geschichte der Philosophie* 91 (2009): 330–54. [↑](#endnote-ref-45)
46. On innate heat in ancient and medieval medicine, see Peter H. Niebyl, “Old Age, Fever, and the Lamp Metaphor,” *Journal of the History of Medicine* 26 (1971): 351-68; Michael McVaugh, “The *humidum radicale* in Thirteenth-Century Medicine,” *Traditio* 30 (1974): 259-83. On the reception of Avicenna’s views on mortality in his late medieval commentators, see Karine van ’t Land, “Long Life, Natural Death. The Learned Ideal of Dying in Late Medieval Commentaries on Avicenna’s Canon,” *Early Science and Medicine* 19 (2014): 558-83. [↑](#endnote-ref-46)
47. Michael Stolberg, “Die Lehre vom ‘calor innatus’ im lateinischen Canon medicinae des Avicenna,” *Sudhoffs Archiv* 77 (1993): 33-53. On Avicenna’s emanationist views on the origin of souls, see Herbert A. Davidson, *Alfarabi, Avicenna and Averroes on Intellect: Their Cosmologies, Theories of the Active Intellect, and Theories of Human Intellect* (New York and Oxford: Oxford University Press, 1992), Ch. 4; Michael Marmura, “Some Questions Regarding Avicenna’s Theory of Temporal Origination of the Human Rational Souls,” *Arabic Sciences and Philosophy* 18 (2008): 121-38. [↑](#endnote-ref-47)
48. *Commentaria in artem medicinalem Galeni*, col. 175. [↑](#endnote-ref-48)
49. Ibid. [↑](#endnote-ref-49)
50. Ibid. [↑](#endnote-ref-50)
51. Ibid., col. 176. [↑](#endnote-ref-51)
52. Ibid. [↑](#endnote-ref-52)
53. *In Decimumquartum Aphorismorum*, col. 324: “dum generatur, generatur per veram elementorum transmutationem, ita ut resultet virtus nova, & ab elementis formaliter diversa.” [↑](#endnote-ref-53)
54. Ibid., col. 330. [↑](#endnote-ref-54)
55. Ibid., col. 317. [↑](#endnote-ref-55)
56. Ibid. [↑](#endnote-ref-56)
57. Ibid., col. 338. [↑](#endnote-ref-57)
58. Ibid., col 318. [↑](#endnote-ref-58)
59. Ibid., col. 333: “quae constitutio est totum esse partium similarium.” [↑](#endnote-ref-59)
60. Ibid., col. 335. [↑](#endnote-ref-60)
61. Ibid., col. 336. [↑](#endnote-ref-61)
62. Ibid., col. 340. [↑](#endnote-ref-62)
63. Ibid., col. 336. For a comprehensive list of occurrences of this concept in Galen’s writings, see Brian P. Copenhaver, “A Tale of Two Fishes: Magical Objects in Natural History from Antiquity through the Scientific Revolution,” *Journal of the History of Ideas* 52 (1991): 373-92, note 25. [↑](#endnote-ref-63)
64. On these two interpretations, see Andreas Blank, “Sixteenth-Century Pharmacology and the Controversy between Reductionism and Emergentism,” *Perspectives on Science* 26 (2018): 157–84. [↑](#endnote-ref-64)
65. *Methodus vitandorum errorum*, 420: “[O]ccultae a Galeno vocantur totius substantiae, quia ille gradus ultimus non pendet ab unica qualitate illius, sed ab omnibus, videliet a tali situ, raritate, densitate partium, a tali numero, figura & magnitudine, vel a tali calore, frigiditate, siccitate, & humiditate, ut nulla determinata qualitas illius susbtantiae sit, quae non conspiret in huius occultae potentiae productionem …; quilibet enim gradus harum qualitatum potest novam potentiam incognoscibilem, si alii totius illius substantiae qualitatibus misceatur, efficere.” [↑](#endnote-ref-65)
66. *Commentaria in primam Fen*, col. 514. [↑](#endnote-ref-66)
67. Ibid., col. 516. [↑](#endnote-ref-67)
68. Ibid., col. 529. [↑](#endnote-ref-68)
69. Ibid., col. 518. [↑](#endnote-ref-69)
70. Ibid., col. 520. [↑](#endnote-ref-70)
71. Ibid., col. 517. [↑](#endnote-ref-71)
72. Ibid., col. 522. [↑](#endnote-ref-72)
73. Leibniz to Oldenburg, 28. September 1670, A II, 1, 104-105: “Hypothesis consistit in circulatione aetheris cum luce seu sole circa terram, circulationi Terrae contraria, ex qua gravitatem et elaterem, et magnetis verticitatem, et ex his, omnes rerum antipathias et sympathias, et solutiones, et praecipitationes, et fermentationes, et reactiones derivo …” [↑](#endnote-ref-73)
74. Leibniz, *Hypothesis Physica Nova*, A VI, 2, 246. [↑](#endnote-ref-74)
75. Kenelm Digby, *A Discourse Concerning the Vegetation of Plants* (London: John Dakins, 1661), 12-15, 28-30. [↑](#endnote-ref-75)
76. Leibniz A VI, 1, 489-490. [↑](#endnote-ref-76)
77. Leibniz A VI, 1, 490. [↑](#endnote-ref-77)
78. Leibniz A VI, 1, 492. [↑](#endnote-ref-78)
79. Leibniz A VI, 2, 435. [↑](#endnote-ref-79)
80. Ibid. On this understanding of form in the seventeenth century, see Norma Emerton, *The Scientific Reinterpretation of Form* (Ithaca and London: Cornell University Press, 1984). [↑](#endnote-ref-80)
81. Leibniz A VI, 2, 435: “cum figura sit terminus corporis; ad figuras materiae inducendas, opus erit termino. Ut igitur varii in materia termini oriantur, opus est discontinuitate partium.” [↑](#endnote-ref-81)
82. Leibniz A VI, 2, 435-436. [↑](#endnote-ref-82)
83. Leibniz A VI, 2, 436: “Dicimus enim formas oriri ex potentia materiae, non aliquid novum producendo, sed tantum vetus tollendo …” [↑](#endnote-ref-83)
84. Rudolph Goclenius, *Lexicon Philosophicum* (Frankfurt: Petrus Fischer, 1613), 146: “Emanare est immediate essentiam comitari, tamen sine respectu existentiae, & ante existentiam, & sine respectu causae externae. Proprie est fluere ab alio, seu ex principiis essentiae subiecti existere[,] ab essentia alicuius indissolubili nexu vinculoque proficisci.” [↑](#endnote-ref-84)
85. Ibid.: “Sic emanant reales proprietates.” [↑](#endnote-ref-85)
86. Ibid.: “Sic ex anima emanant potentiae.” [↑](#endnote-ref-86)
87. Ibid., 40: “Actio immanens … maxime propria, habet unum idemque principium proximum & Activum & Receptivum. Manet in eodem supposito, & in eadem potentia, a qua elicitur, ut Cognitio & Appetitio. Huc pertinent emanationes seu resultantiae proprietatum spiritualium animae, ut, Intellectus & voluntas sunt proxime ab anima & in anima.” [↑](#endnote-ref-87)
88. Ibid. [↑](#endnote-ref-88)
89. Ibid.: “Vita naturalis immanet in anima, a qua manat, & recipitur in corpore.” [↑](#endnote-ref-89)
90. *Methodus vitandorum errorum*, 410. See Zabarella, *Libri*, 294-5. [↑](#endnote-ref-90)
91. *Commentaria in artem medicinalem Galeni*, col. 177. [↑](#endnote-ref-91)
92. Ibid., col. 176. [↑](#endnote-ref-92)
93. Ibid., col. 177. [↑](#endnote-ref-93)
94. *Commentaria in primam Fen*, col. 1083: “quia non est revera genus univocum, sed ab uno; quia comprehensiva per prius dicitur de interna, & per posterius de sensitiva externa, quae per facultatem internam percipitur … [M]ente existente laesa, homines nec videre nec sentire, nec olfacere, nec audire, nec tactu aliquid percipere, nec recte aliquid imaginari posse.” [↑](#endnote-ref-94)
95. Ibid., col. 1095. [↑](#endnote-ref-95)
96. Ibid., col. 1096-1097. [↑](#endnote-ref-96)
97. Leibniz A II, 1, 113. [↑](#endnote-ref-97)
98. Leibniz, Definitiones cogitationesque metaphysicae, A VI, 4, 1399: “Cum enim corpus dixerimus divisum esse in partes actu, quae diverso singulae motu cientur, et ob eandem rationem quaelibet pars rursus divisa sit, sane si solam materiam spectemus nec punctum assignari poterit quod cum altero maneat, nec momentum quo idem corpus maneat secum ipso; et nunquam ratio erit dicendi aliquod corpus esse unum ultra punctum, et idem ultra momentum.” Translation from *The Labyrinth of the Continuum. Writings on the Continuum Problem, 1672-1686*, trans. Richard Arthur (New Haven: Yale University Press, 2001),245. [↑](#endnote-ref-98)
99. Ibid. [↑](#endnote-ref-99)
100. *De mundo praesenti*, A VI, 4, 1507: “Mens est, aut secreta aut corpori unita. Secreta ut Deus; unita, ut *anima nostra*. Sunt et aliae *mentes*, *quae* *Angelicae* dicuntur, nostris perfectiores, quas tamen corporibus quibusdam sed longe subtilioribus unitas esse veteres credidere, quod si verum esset, videri posset anima quoque nostra licet in se incorporea tamen non nisi crassum corpus morte deponere. Nec ulla esset creatura corporis adjuncti expers.” Translation from Leibniz, *Labyrinth*, 283. [↑](#endnote-ref-100)
101. Leibniz, *De resurrectione corporum*, A II, 1, 185: “Sciendum est enim in omni re esse centrum quoddam seminale diffusivum sui, et velut tincturam continens motumque rei specificum servans. Constat hoc ex plantarum regeneratione … ex seminibus, ex vi plastica seminis in utero, ex essentiis Chymicorum. Similiter ergo in ossibus, in carne nostra … pars subtilior in spiritibus concentrata latet. Quae resecto membro, aut putrefacto ad fontem vitae, cui ipsa anima implantata est, redit. Constat hoc, vel eo experimento quod ii quibus manus pesve abscissus est, saepe eos sentire …: nulla alia ratione, quam quod Spiritus ille subtilis quo membri velut substantia continebatur, superstes eosdem nunc quoque motus exercet.” [↑](#endnote-ref-101)
102. On Leibniz’s early views on reflection, see Andreas Blank, “The Analysis of Reflection and Leibniz’s Early Response to Spinoza,” in *The Philosophy of the Young Leibniz*, edited by M. Kulstad, M. Laerke and D. Snyder, 161–175 (Stuttgart: *Studia Leibnitiana Sonderheft* 34,2009). [↑](#endnote-ref-102)
103. Leibniz, A VI, 1, 494-495. [↑](#endnote-ref-103)
104. Leibniz, A VI, 3, 517: “perception perceptionis in infinitum est perpetuo in anima, inque ea consistit eius per se existentia, et continuationis necessitas.” Translation from *De Summa Rerum. Metaphysical Papers, 1675-1676*, trans. with an introduction and notes by G. H. R. Parkinson (New Haven: Yale University Press, 1992), 75. [↑](#endnote-ref-104)
105. Leibniz, A VI, 3, 509: “In Mente nostra est perceptio seu sensus sui, ut certae cuiusdam rei particularis, haec semper in nobis, quia quoties vocabulum adhibemus, tunc id statim agnoscimus. Quoties volumus agnoscimus nos cogitationes nostras percipere, id est cogitasse paulo ante. Ergo memoria intellectualis in eo est, non quid senserimus, sed quod senserimus: quod simus ii qui sensimus, et hoc est quod vulgo appellamus idem, haec in nobis facultas independens ab externis.” Translation from Leibniz, *De Summa Rerum*, 61. [↑](#endnote-ref-105)
106. Ibid.: “Non video quomodo … mens mori seu extingui possit durantibus illis reflexionibus.” [↑](#endnote-ref-106)