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Protestant Natural Philosophy and the Question of Emergence, 1540–1615

I. INTRODUCTION

Emergentism—the view that once material composites have reached some level of complexity potencies arise that cannot be reduced to the potencies of the constituents—was clearly articulated by some ancient thinkers, including Aristotle, Galen and the Aristotelian commentators Alexander of Aphrodisias and John Philoponus. According to Alexander of Aphrodisias, the soul “is a power and form, which supervenes through such a mixture upon the temperament of bodies; and it is not a proportion or a composition of the temperament” (2008, 104; 1568, 78). As Victor Caston has argued, talk about supervenience should here be taken in the technical sense of a co-variation of mental states with bodily states (1997, 348–349). Moreover, Caston emphasizes that, for Alexander, the soul possesses causal powers that are more than the aggregates of the causal powers of the elements (1997, 349–350). Likewise, Alexander points out that some medicaments possess powers that arise from their temperament, and since this remark stems from the context of his criticism of the harmony theory of the soul, the implication again seems to be that these are powers that go beyond the powers inherent in the harmony of elementary qualities (2008, 104; *De anima* 24.24–29). In the sense that Alexander ascribes distinct new powers to souls as well as to the forms of non-animate composites such as chemical blends, Caston characterizes Alexander as one of the ancient thinkers who were committed to emergentism (1997, 350).

In medieval natural philosophy, too, deviant forms of emergentism—deviant due to a greater emphasis on celestial causation in the actualization of the potentialities of matter—have been influential, as Olaf Pluta has brought to light.¹ Also the Latin term “eductio”, which was widely used to designate the concept of emergence, stems from the medieval tradition. Standard historiography has

¹ See Pluta (2007); on the reception of Alexander of Aphrodisias from antiquity to the Renaissance, see Kessler (2011).

it that after the work of Pietro Pomponazzi, who was strongly influenced by Alexander, this theoretical option fell into oblivion until the advent of the nineteenth-century British emergentists.² In fact, thinkers considered to be central to early modern natural philosophy such as René Descartes, Baruch de Spinoza, Gottfried Wilhelm Leibniz and Robert Boyle are, for various reasons, far from adopting anything like the views of Alexander. So, at first sight it might seem to be futile even to begin to search for traces of emergentism in early modern natural philosophy.

However, changing the focus to a slightly earlier time period and a set of different thinkers may substantially change the picture about emergentism. The present article ventures to argue for this claim by providing some documentation for the presence of emergentist ideas in sixteenth- and early seventeenth-century Protestant natural philosophy. In particular, I will focus on three thinkers. The first of them is the Tübingen-based Aristotelian logician and natural philosopher, Jacob Schegk (1511–1587). During his lifetime, Schegk was a figure of European standing, mainly due to his controversy with Petrus Ramus about the nature of logic.³ In recent years, Schegk's natural philosophy is beginning to be studied by commentators,⁴ but it seems fair to say that many aspects of his natural philosophy are still largely unexplored. For present purposes, he is a promising point of reference because he began his career with a translation of and a commentary to Alexander's *De mixtione*, and in his extensive later writings on matter theory, pharmacology and biological reproduction he frequently made use of ideas first put forward there. The second thinker considered here will be Nicolaus Taurellus (1547–1606), who studied philosophy at the University of Tübingen with Schegk and later became a professor of medicine at the Lutheran University of Altdorf. In 1573, Taurellus published his first and most comprehensive philosophical work, *The Triumph of Philosophy*.⁵ Among other things, this work discusses the problem of the natural origin of the substantial forms of plants and animals — an issue that is developed further in two of Taurellus's later works, his critical commentary on Aristotle's *On Life and Death* (1586), and a 1604 dissertation, *On the Origin of Rational Souls*, which is marked by both its preface and numerous references to his earlier works as a text authored by Taurellus (which corresponds to academic practice in early modern Germany⁶). The third thinker to be discussed is the Wittenberg-based

² See Toepfer (2011, vol.1, 710–712).

³ See Petrus Ramus & Talon (1577, 207–249), Schegk (1570).

⁴ See Kusakawa (1999), Hirai (2007).

⁵ For overviews of Taurellus's philosophy, see Petersen (1921, 219–258), Mayer (1959), Leinsle (1985, vol.1, 147–165), Wollgast (1988, 148–153), Blank (2009; 2016).

⁶ See Müller (2001).

theologian and philosopher Jacob Martini (1570–1649),⁷ whose work is noteworthy for present purposes because he defended emergentist intuitions against a set of philosophical objections.

II. JACOB SCHEGK

In 1540, Schegk published a Latin translation of Alexander's *On Mixture*, accompanied by a detailed commentary on Alexander's work. The core idea of Alexander's *On Mixture* is expressed in the following account that Schegk gives of the role of the tempering of elemental qualities in mixture:

Those entities that constitute a temperament are first divided and split up amongst each other into minute parts, then their activity is gradually diminished through the composition of minimal parts [...], and third, as it were through some agreement, they jointly bring about a single form of the entire mixed body. (Schegk 1540, fol. 65r)⁸

According to this account, a substantial form of the mixture arises through the tempering of elementary qualities. And it is the elementary heat tempered through the other elementary qualities that Schegk calls “connate heat”. The difference between the different kinds of heat matters a lot in his eyes: Without innate heat, mixtures lack the capacity to act upon themselves once the balance between elementary qualities has been reached (Schegk 1585, 273). This is why such mixtures, even if they possess causal potencies that go beyond the causal potencies of mere aggregates of elements, cannot spontaneously initiate activities by changing themselves but rather depend on the presence of suitable other substances upon which they could act.

This conception shaped Schegk's own account of the nature of physical compounds. In one of his last works, *On Occult and Manifest Potencies of Medicaments* (1585), he maintains that both inanimate forms and animate forms depend upon the mixture of elements:

Some forms are merely natural, and without them animate forms cannot exist. However, the natural forms can exist without the animate forms, as when the form of the animate flesh decays. Both kinds of form have their mixture, and when the mixture is destroyed, also its substantial form is destroyed. (Schegk 1585, 122)

This conception of the origin of animate forms has the consequence that “an animate form also is a physical form” (Schegk 1585, 122). This is why Schegk takes

⁷ On Martini's metaphysics, see Leinsle (1985, vol.1, 228–238).

⁸ See Todd (1976, 158; *De mixtione* 233.2–5).

natural forms to be inseparable from matter (Schegk 1585, 54). The only exception that Schegk wants to make concerns human souls, which he takes to be the result of separate acts of divine creation (Schegk 1580, sig. G5r). But he is clear that this sets human souls apart from all other substantial forms of living beings which are “educated” from the potencies of matter (Schegk, 1580, sig. G5r). Consequently, all natural forms are understood as being not only inseparable but also causally dependent on matter: “In nature, there is no essential potency, either manifest or hidden, without a natural potency or impotency that arises in natural things due to the mixture of the four elements — mixtures that are coming to be and ceasing to be as the instrumental causes of natural potencies” (Schegk 1585, 66). More specifically, the relation between the instrumental causes and the essential form generated by them is characterized as a supervenience relation. As Schegk maintains, what cannot be the case is a situation in which different substantial forms are joined with the same temperament (Schegk 1585, 123). Or, as he expresses it: “As many differences as there are of substantial forms, so many differences are there between temperaments of mixtures of elements, through which such substances are generated [...]” (Schegk 1585, 152).

In Schegk’s view, among the natural forms that depend in this way on matter belong not only the substantial forms of living beings but also the “plastic power” (*plastica facultas*) inherent in seeds. This becomes clear when he uses the phenomenon of plant degeneration—the process by means of which a cultivar reverts back to its corresponding wild variety—to illustrate the way in which plastic power depends on matter. Schegk interprets this phenomenon as an instance of species change. A change in natural potencies modifies the essential potencies of the seed and, hence, the “essential form” of the seed (Schegk 1585, 85). The analogy between plant degeneration and the origin of plastic power suggests that, just as the substantial forms of the wild varieties of plants emerge from the change in the natural potencies of matter, so does the plastic power of a seed emerge from the instrumental causes contained in the seed. In this way, the origin of plastic powers is understood as a special case of material upward causation—a kind of causation that leads from complex properties of mixtures to substantial forms with novel causal properties.

What is more, when he characterizes the nature of these novel causal properties, Schegk invokes the role that the emergent substantial forms play in downward causation—a kind of causation that changes the material composites upon which the forms depend. Schegk maintains that the temperament of the mixture determines the substantial form, which in turn determines the further accidents that belong to the natural thing (Schegk 1585, 26). In particular, downward causation is described as being relevant for the generation of plant-based medicaments. In the first instance, downward causation affects the temperament of elementary qualities: “[T]he soul of rhubarb is the cause of the proper and ordinary proportions of elementary qualities without which rhubarb could

not have its forces and potencies” (Schegk 1585, 89). However, in Schegk’s explanation the process through which the plant soul causes qualitative changes in mixtures involves both downward causation and a subsequent new instance of upward causation—a causal relation that does not affect the plant soul but rather gives rise to new forms of plant parts. This becomes clear when Schegk writes about both rhubarb and rhubarb juice:

[B]oth of these bodies, which are mixed at the same time, are effects of the soul, which generated and produced rhubarb, insofar as it is not so much an animate body but rather a natural body, in such a way that it obtains even without the soul its medical powers and qualities, due to the nature, that is the form that it received from the soul, and which can subsist itself without the soul. (Schegk 1585, 90)

As Schegk explains, when the soul produces posterior and perfect forms in similar parts, the forms previously inhering in these parts are thereby not abolished. Rather, the posterior form existentially depends upon the previous forms such that, if the previous forms were abolished, the more perfect form would perish as well. This is what Schegk has in mind when he says that the previous forms stand in the relation of mediate matter to the perfect forms (Schegk, 1585, 42). Diachronic downward causation therefore is described as a process of perfection of previously existing forms:

In this way, the posterior does not arise out of the prior but arises and is generated after that which is prior, such that its coming into being is nothing but that the prior is perfected by the posterior, as when we say that out of a boy there arises a man, not as if the subsequent perfection of the man would destroy the nature of the boy but that he perfects it with the degree of age. (Schegk 1585, 43)

Here, Schegk focuses on physiological changes brought about by emergent vegetative and sensitive forms and the role of these physiological changes in the material causation of non-mental emergent forms that occur at a later point in time. Moreover, he analyses these non-mental emergent forms as resulting from forms that emerged even before the emergence of vegetative and sensitive potencies.

III. NICOLAUS TAURELLUS

Emergentist ideas thus are clearly on the agenda of Schegk’s natural philosophy, both early and late. This is why it makes sense to ask whether these ideas have left some traces in the work of Schegk’s most prominent student, Nicolaus Taurellus. An answer to this question may not be obvious because, in some respects,

the ontology that Taurellus develops in his *Philosophiae Triumphus* departs markedly from Schegk's natural philosophy. Most notably, Taurellus denies reality to primary matter⁹ that Schegk, like many other early modern Aristotelians, believed to be a constituent of elements.¹⁰ Rather, Taurellus takes elements to be immaterial, form-like entities (2012/1573, 278). Accordingly, he holds that only forms can enter composition and that composites are resolved again into elementary forms (2012/1573, 276). Taurellus continues to talk about "bodies" (*corpora*), but maintains that "if it is not understood as a less noble form, [...] matter does absolutely not compose anything" (2012/1573, 278). The details of this doctrine and its theoretical motivation are complex, and since I have dealt with these issues elsewhere at length,¹¹ I will not go into them here.

What may be, however, astonishing, and entirely overlooked by his commentator,¹² is that Taurellus integrates a version of emergentism into his immaterialist ontology. Consider the following passage:

[W]hen by mutual action and passion mixed things are changed in such a way that none of them remains entirely the same, but some new form arises out of them that related to the forces of all of them, without doubt there exist mixed forms that have the forces of many, bring about different effects, which is most evident in the changes of things and especially in the use of medicaments: Nevertheless, if this is accepted, then the metaphysical axiom has to be rejected according to which ONE and BEING have the same meaning, such that whatever exists is not many but only one: For multitude is not substance but quantity. (2012/1573, 272)

According to this line of thought, what emerges from the mixture of elements is a plurality of novel, but non-substantial causal powers. Taurellus indicates a sense in which his immaterialist account of elements can provide an ontological framework for understanding the origin of the causal powers of composites. These powers can be understood as supervening upon and emerging from the tempering of elemental qualities without, however, thereby giving rise to a novel kind of substance.

The passage just cited may be remarkable in a further respect. Taurellus's own subject index refers to this passage as the only one in the entire book that explicates the nature of quantity (2012/1573, 588). This is why his remark about quantity may bear more weight than may be obvious at first sight. The view that is implied by the rejection of the axiom of the equivalence of one-ness and being is that multitudes can be regarded as real beings because they possess causal

⁹ See Taurellus (2012/1573, 280).

¹⁰ See Schegk (1585, 19).

¹¹ See Blank (2004).

¹² As far as I can see, this holds for Lüthy (2001; 2012, 122–129) and Muratori (2014) alike.

powers that none of their constituents possess. Moreover, in the final remark of the passage, quantity is clearly attributed not to substances but to beings that are constituted by a multitude of constituents. Taken together with its immediate context, this remark may suggest that quantity, like the pharmacological powers of medicaments, could be regarded as one of the causal powers that supervene upon the mixture of elements. If this is what Taurellus had in mind, then extension could be understood not as a property of immaterial forms themselves but rather as an emergent property that their composition brings about.

Going a step further, Taurellus maintains that what arises in genuine mixture is not only a composition of simple compounds but also a form. In his view, this form is simple “because it is not composed but rather generated” (2012/1573, 42). Such a form differs from the mere composition of forms: “Because through generation a really unique being arises, namely the substantial form, we hold that this is not simple with respect to conjunction or some other accident and also not composite, no matter whether it derives from a single being or many beings” (2012/1573, 274). Thus, there is a sense in which emergent forms are complex—they are bearers of a plurality of qualities without having parts from which they are composed, even if they arise from a composite that has such parts. Consequently, a form that emerges from the simple constituents of a composite cannot undergo a process of being split up, although it can perish when the basis from which it emerges is changed (2012/1573, 274). This is why the simplicity and immateriality of emergent forms is compatible with their capability of being destroyed (2012/1573, 44). As Taurellus points out, the crucial difference is that form decays because it has been generated, while composites fall apart (2012/1573, 276).

This conception of the emergence of new forms is what underlies Taurellus’s analysis of the structure of plants and animals. In the case of animal generation, he ascribes causal roles to the forms of parents and to celestial influences, but claims that, for instance, an incubated egg possesses a simple substance (2012/1573, 276). This suggests a view of the substantial form of an incubated egg as a kind of natural form. As he explains, vital spirit is a sign of form; animal spirit differs from natural spirit, but it is also not yet a soul, since there is only a single soul of the fetus, but animal spirits contributed by both, the male and the female parent (2012/1573, 168). Moreover, the substantial forms such as the form of the incubated egg play a causal role in the generation of the animal soul.

The soul arises from the innate power of both seeds and the infusion of vital spirits. But this generation of the animal is not natural, or corporeal, and it also does not follow that the soul is natural in such a way that we say that it arises from the seed itself, from the substance of blood and spirit, in such a way that what arises from each could be separated [...]. (2012/1573, 168–170)

Taurellus ascribes soul and life only to the latter since only they possess sense and self-motion (2012/1573, 350), but this should not obscure the fundamental analogy between the emergence of forms in plant and the emergence of forms in animals. In his view, what possesses life in the proper sense are higher kinds of forms, the souls of animals (2012/1573, 350). The organic body of an animal, constituted by a plurality of less noble substantial forms, possesses life only in a derivative sense, since it possesses active and passive properties that derive from the active and passive properties of the animal soul (2012/1573, 352). In this sense, material upward causation is complemented by formal downward causation—a kind of causation through which the composites of elements from which the animal soul emerges undergo changes. From this ensues a circle of causation: the life of the soul is communicated to the body (Taurellus, 1586, sig. Gr); but the life of the soul is also perfected by actions that it can only carry out by means of the body (Taurellus, 1586, sig. Gv). Consequently, the soul perfects the body, the body perfects the soul (Taurellus, 1586, sig. G2r). Due to the mutual causal dependence between body and soul, the body is thus not seen as an obstacle to the activity of the animal soul but something that is necessary for the perfection of the animal soul.

Finally, we can ask how the human mind relates to emergent vegetative and sensitive faculties. Taurellus considers a creation theory of the origin of human souls (2012/1573, 144), but he also voices doubt concerning such a theory. In particular, he cautions that an act of divine creation would render the imperfection of human souls inexplicable (Taurellus, 2012/1573, 166). Moreover, he argues that if the soul is infused from the outside, then humans would lack the capacity shared by plants and brutes to generate beings of the same kind. Otherwise, humans would give birth to human bodies, but God would generate the human soul. However, as he objects, producing a being of the same species is a most natural process (2012/1573, 13). Also, in his view, the imperfection of human souls speaks against a celestial or divine origin of human souls (2012/1573, 166).

Accordingly, other passages in his writings point in a different direction. In these passages, he offers an integrated naturalistic account of the origin of the souls of non-human animals and humans. As he surmises, human souls have in common with the soul of brutes that “they necessarily have their essence and life in a body” (Taurellus 1586, sig. G4r).¹³ Therefore, he claims that “the human soul by itself is capable of ceasing to be” (Taurellus, 1586, sig. F4v). He regards the mind (*mens*) as being identical with the power of intellection (*intellegendi vis*) (2012/1573, 150). This is why he holds that the mind is something that is generated through exercise and learning (2012/1573, 36). In his view, the mind is not a different kind of soul but rather a potency of the soul (Taurellus, 1604, 11). As Taurellus argues, the mind cannot be separated from the soul nor

¹³ See Taurellus (1604, 11).

from the body since potencies are not substances or essences that could subsist by themselves (Taurellus, 1604, 11). As in the case of other natural forms, Taurellus ascribes to the human soul complexity in the sense of being endowed with manifold potencies (Taurellus, 1604, 11–12).

As he argues, if the human soul is generated out of matter, then the seed is the most suitable portion of matter from which the generation of the soul takes its origin (Taurellus, 1604, 12). This is so because not everything that proceeds from a corporeal seed is necessarily corporeal. For instance, the souls of brutes are incorporeal substances that proceed from their seeds (Taurellus 1604, 18). However, this does not imply that Taurellus would ascribe animal souls to animal seeds or human souls to human seeds. Rather, against Julius Caesar Scaliger (1484–1558), who maintains that plant and animal seeds are actual living beings with souls that are already the souls of the future plant or animal,¹⁴ Taurellus defends the view that in the seed the features of an animal are not contained actually but potentially (1604, 20). Something analogous holds for the human seed: “Many things are in the human seed that is unknown to the nature and forms of each element. This is the essential form of the seed, due to which its corporeal bulk is easily transformed into the various parts of the human body” (Taurellus 1604, 19). Thus, as in the case of non-human animals, human seeds possess substantial forms of their own, which determine through formal downward causation the structure of bodily parts, from which subsequently the human soul emerges.

This, then, is a further aspect in which Taurellus’s natural philosophy diverges from Schegk’s. While Schegk accepts the creation theory of the origin of human souls (1580, sig. G5r), Taurellus clearly embraces the view that human souls have a natural origin from suitably organized bodies. Evidently, however, theological difficulties are lurking here. As in the case of all other natural forms, Taurellus holds that the human souls cannot undergo corruption in the sense of a dissolution into parts. However, since he holds that immaterial animal souls can cease to exist (Taurellus 1604, 21), he maintains that human souls by themselves are capable of ceasing to be (Taurellus 1586, sig. F4v). At first sight, this conclusion seems to be incompatible with the Christian doctrine of the immortality of the soul.

Taurellus is clear that if body and soul perfect each other, there are two possibilities with respect to immortality: either the human soul is as mortal as the soul of brutes, or resurrection must include the body (Taurellus 1586, sig. G2r). However, he sees room to argue that in this respect there may be a dissimilarity between the souls of humans and non-human animals. In his view, this is so because, by Divine will, human beings are goals in themselves, while brutes are

¹⁴ On Scaliger’s theory of biological reproduction, see Blank (2010; 2012), Sakamoto (2016, chapter 6).

subservient to humans. Hence, brutes can fulfil their goal without immortality, but immortality is required for the fulfilment of the goal of humans (Taurellus 1586, sig. G4r-v). Thus, Taurellus uses theological considerations to show why the goal-directedness of the souls of brutes does not require assuming that they are immortal, while the goal-directedness of human souls requires assuming that human souls are immortal. Consequently, he does not challenge the theological idea of immortality. Rather, he argues that because humans are constituted not only by souls but also by bodies, felicity must be ascribed to soul and body together (Taurellus 2012/1573, 562). This is why he believes that God does not want that the body perishes entirely (Taurellus 2012/1573, 556). Taurellus concludes that if human beings are immortal, the relevant supernatural divine agency responsible for resurrection must relate to soul and body alike (1604, 26).

IV. JACOB MARTINI

Reinterpreting the idea of resurrection such as to include a human body from which the human soul emerges allows Taurellus to integrate an emergentist view of the human soul with the theological doctrine of immortality. Jacob Martini does not make equally contentious claims with respect to the origin of human souls but, like Schegk, he adopts a creation theory of human souls. Also like Schegk, however, in his *Metaphysical Distinctions and Questions* (1615) he adopts emergentism with respect to natural forms, including plant and animal souls. What is interesting about this aspect of his natural philosophy is that he defends ideas that he shared with Schegk and Taurellus against a series of philosophical objections raised, amongst others, by the Steinfurt-based philosopher Clemens Timpler (1563/64–1624).¹⁵ Looking into Martini's response to these objections may draw attention to some of the theoretical difficulties that the assumptions shared by Schegk and Taurellus face. At the same time, it may offer some insights into the strength of arguments in favor of the emergentist option.

To begin with, Martini distinguishes what he calls "immaterial substantial forms" (such as the human mind) from what he calls "material substantial forms". The latter are described as material because they are "inhering in matter in such a way that they depend on it in being and becoming" (Martini 1615, 356). As Martini indicates, this is what is called "to be educed out of the potency of matter" (Martini 1615, 356). He offers two arguments in favor of such a view: 1) Every generation presupposes a subject, and matter is the most plausible subject that precedes the generation of a substantial form. 2) Forms are produced by natural causes, and material causation is a plausible candidate for the

¹⁵ For an overview of Timpler's metaphysics, see Freedman (1988, vol.1, 210–248); on Timpler's philosophy of science, see Leinsle (1985, vol.1, 352–368).

relevant kind of causation (Martini 1615, 356). Martini defends the eduction theory against a set of (possible or actual) objections. Take the following objection, which is not ascribed by Martini to any particular author but articulates a problem that is also discussed by Jacopo Zabarella (1590, col. 164), whose *Thirty Books on Natural Things* (1590) was widely read at Protestant universities.

- (P1) All forms that are educed from the potency of matter are posterior to matter.
- (P2) The forms of elements are not posterior to matter; rather, they come into being together with the coming into being of elements.
- (C) The forms of elements are not educed from the potency of matter.¹⁶

Martini concedes that, according to the theory of eduction, there is a sense in which matter is prior to form. However, he clarifies the relevant sense of priority: “[F]or true and essential eduction, it is not necessary that matter precede substantial form temporally; for by one and the same actualization both the form and the composite are perfected simultaneously; but it is sufficient that the actions are distinguished with respect to priority of nature” (Martini 1615, 358). Therefore, the theory of eduction is fully compatible with the idea that elements come into being as informed portions of matter.

Still, even if one does not understand the priority of matter over form in a non-temporal sense, Martini notes that two further objections could be raised: 1) What is educed is a whole; but the form is not a whole, for a whole is what coalesces out of different parts; but form is only a part of a composite (1615, 359). He does not ascribe the objection to any particular thinker, but it can be found in Zabarella (1590, col. 112). 2) What is generated possesses principles of generation; but according to Aristotle, form does not possess principles of generation, otherwise these principles would need other principles, and so to infinity (1615, 359).¹⁷ As to the first objection, Martini responds: “Form is not only educed accidentally from matter: For what happens accidentally, does not have a cause but rather takes its origin from the operation of a deficient cause and is not directed toward any suitable goal” (1615, 360). By contrast, Martini takes form to be “a perfection, an end-point and a goal of development” (1615, 360). Hence, form “comes into being not accidentally but by itself and because of a certain goal” (1615, 360). The point of drawing the distinction between accidental and non-accidental eduction may not be very clear. Possibly, what he has in mind is that if forms were educed accidentally, then in the absence of a suitable goal they could not constitute a genuine whole, which would be contrary to the assumption that the result of eduction are genuine wholes. By contrast, if forms (due to their nature as goals) are educed in a non-accidental way, they

¹⁶ Here, I am paraphrasing the line of thought developed in Martini (1615, 358).

¹⁷ Martini’s reference is to Aristotle, *Metaphysics* VII.8 (1033a31–1033b9).

give rise to genuine wholes, thereby accommodating the intuition that the result of eduction are genuine wholes.

As to the second objection, Martini replies:

Generation in the proper sense does not pertain to form but rather a relation of consecution. For there is a dual end-point of generation [...] (1) as the What; and this is the composite itself that is properly generated; (2) as the Through-which; and this is the form which does not exist or is generated itself, but through which the composite exists. (1615, 360)

In this sense, Martini suggests that form is generated together with the composite or comes into being “consecutively” (1615, 360). In his view, this holds not only for composite substances such as living beings but also for elements. Even in creation, forms are “concreated”, for what is created are wholes that belong to natural species (1615, 366)—something that applies to elements but not, as he maintains, to substantial forms (1615, 365). These considerations confirm that Martini regards not only the substantial forms of complex composites but also the substantial forms of elements as the result of a process of eduction from the potencies of matter. Moreover, they indicate why the assumption that both kinds of substantial forms are the result of eduction is compatible with the view that the proper object of both creation and generation are form-matter-composites.

Martini further defends his conception of the natural origin of substantial forms against a series of objections raised by Clemens Timpler (1615, 362). According to Timpler, all substantial forms are incorporeal, for a number of reasons: 1) no substantial form is by itself perceptible by sense; 2) substantial forms are devoid of extensive magnitude and of parts and hence they are indivisible; 3) substantial forms do not occupy places; 4) no substantial form can be regarded as a kind of corporeal substance (1607, 479). In his response to these objections, Martini discusses the historical inspiration of Timpler’s position by drawing attention to some aspects of the work of the Aristotelian commentator Simplicius. Martini concedes that Simplicius calls form “incorporeal”, thus on first sight providing support for Timpler’s view (1615, 363).¹⁸ However, Martini contests that the conclusion that Timpler draws can be derived from Simplicius’s text. As Martini argues, this is so because Simplicius at the same place also calls matter “incorporeal” (1615, 363). In Martini’s reading, Simplicius thereby indicates that only form-matter composites deserve to be called bodies (1615, 363). Consequently, Martini suggests that talk about the incorporeality of form should be understood as drawing a contrast between form and the composite of which it is a constituent. Contrary to Timpler, he holds that substantial forms can be

¹⁸ Martini refers to Simplicius (1544, fol. 136 verso, commentary on *Physics* IV.10).

corporeal in the sense that they are divisible through the division of matter. As he argues, experience shows that this is the case with inanimate bodies such as stones (whose fragments are stones of the same kind), plants (out of whose parts plants of the same species can grow) and “insects” (as in the case of worms whose parts continue to have vegetative and sensitive life even after they have been separated from each other) (1615, 364).

From this perspective, Martini develops a series of replies to Timpler. As to point (1), Martini argues that form is not sensible because it is not a complete substance (1615, 365). As to point (2), he argues that form is not simply indivisible, because after division the parts of inanimate or animate beings have numerically distinct substantial forms (1615, 365). However, he admits that form is indivisible in the sense that in these parts the entire substantial form (not only a part of it) remains present (1615, 364). As to point (3), he concedes that form is not by itself in a place but maintains that it is in a place in a derivative sense since form is a whole that is in a place (1615, 365). As to point (4), he agrees that a substantial form is not a corporeal substance but denies that from this it follows that it is something spiritual (1615, 365).

That Martini regards substantial forms to be the result of emergence is confirmed by his treatment of what happens when a substantial form ceases to exist. As he argues, because substantial form is not generated (in the sense of being composed of parts), it does not undergo corruption (in the sense of being dissolved into more simple constituents) (1615, 366). Moreover, he draws a distinction between two senses of “non-being” out of which a substantial form can be understood to arise. “Creation proceeds from Non-Being negatively; here, where form arises, the development originates with non-being in the privative sense” (1615, 366). Consequently, a substantial form that arises from non-being in the privative sense can neither fall back into “nothing” in the sense relevant for creation *ex nihilo* nor be dissolved into more simple constituents. But through the corruption of matter, form ceases to be and is resolved into the universal privation of matter (1615, 366). As Martini explains, he understands privation as the “aptitude toward being” (1615, 367). In his view, this understanding of privation implies that privation is neither substance nor accident; rather, it can either be an aptitude for an accident or an aptitude for a substance (1615, 367). In this sense, privation is a “transcendental mode” (1615, 368). Hence, when substantial forms cease to exist, they terminate in such a mode—a characteristic of matter that is not nothing but rather a potentiality that can lead to the emergence of a substantial form of the same kind (1615, 368).

V. CONCLUSION

Taken together, the passages from Schegk, Taurellus and Martini show that thinking about the origin of natural forms and animal souls along the line developed by Alexander of Aphrodisias was clearly perceived as a viable theoretical option in Protestant natural philosophy. What is more, to a somewhat diverging extent, emergentism was regarded as a principle that unified explanations in natural philosophy from the nature of mixtures of elements to the nature of the powers of more complex composites such as plants, plant parts, animals, and animal seeds. As we have seen, in Taurellus there is even the suggestion that the origin of the intellectual potencies of humans could be integrated into such an explanatory pattern. It also should have become clear that Taurellus defended this idea against possible theological objections deriving from the notion of immortality. What is more, Martini's defense of emergentism about substantial forms except the human soul indicates that emergentism offered considerable theoretical resources for dealing with philosophical objections such as those formulated by Clemens Timpler.

I have not said much about how these issues fit into the larger context of the relation between natural philosophy and Confessionalization. Clearly, the issue of immortality is not the only theological issue relevant for the matters discussed here. Another issue is the theory of traducianism that was propagated by many influential Lutheran theologians and natural philosophers. According to one understanding of traducianism, the souls of humans and of non-human animals arise through the capacity of the parents' souls to "multiply" themselves in the way that sensible and intelligible species were believed to be capable of multiplying themselves.¹⁹ Clearly, the emergentist option diverges from the multiplication theory of the origin of human and animal souls. However, as we have seen, the former option is present in Taurellus, whose work was fiercely opposed by orthodox Lutherans,²⁰ but also in the natural philosophy of Martini, whose theological work was central to the formation of Lutheran orthodoxy. This raises the question of how deeply affected Protestant natural philosophy was by the process of Confessionalization. Dealing with this question in detail obviously goes beyond the scope of the present paper. However, the presence of the emergentist option in sixteenth- and early seventeenth-century Protestant natural philosophy may point to the conclusion that under the conditions of propagating Lutheran orthodoxy a greater variety of thinking about the origin of souls persisted than commentators may have realized.

¹⁹ For a detailed discussion of the divergent versions of the multiplication theory of the origin of human souls, see Cellamare (2015, chapter 6).

²⁰ See Blank (2016, sec. 7).

REFERENCES

- Alexander of Aphrodisias 1569. *De anima liber primus*. (G. Donato, Trans.). In Alexander of Aphrodisias. *Quaestiones naturales et morales...; De anima liber primus...; De anima liber secundus* (71–102). Venice: Iunta.
- Alexander of Aphrodisias 2008. *De l'âme*. M. Bergeron, & R. Dufour (Eds., Trans.). Paris: Librairie Philosophique.
- Blank, Andreas 2009. Existential dependence and the question of emanative causation in Protestant metaphysics, 1570–1620. *Intellectual History Review*, 19, 1–13.
- Blank, Andreas 2010. Julius Caesar Scaliger on plant generation and the question of species constancy. *Early Science and Medicine*, 15, 266–286.
- Blank, Andreas 2012. Julius Caesar Scaliger on plants, species, and the ordained power of God. *Science in Context*, 25, 503–523.
- Blank, Andreas 2014. Nicolaus Taurellus on forms and elements. *Science in Context*, 27, 659–682.
- Blank, Andreas 2016. “Nicolaus Taurellus,” *Stanford Encyclopedia of Philosophy*. E. N. Zalta (Ed.) (September 2016 edition). Online at plato.stanford.edu/entries/taurellus.
- Caston, Victor 1997. Epiphenomenalisms, Ancient and Modern. *Philosophical Review*, 106, 309–363.
- Cellamare, Davide 2015. *Psychology in the Age of Confessionalisation. A Case Study on the Interaction between Psychology and Theology, c. 1517 – c. 1640*. Doctoral dissertation, Radboud University Nijmegen.
- Freedman, Joseph S. 1988. *European Academic Philosophy in the Sixteenth and Early Seventeenth Centuries. The Life, Philosophy and Significance of Clemens Timpler (1563/64–1624)*. Hildesheim: Olms.
- Hirai, Hiro 2007. The Invisible Hand of God in Seeds. Jacob Schegk’s Theory of Plastic Faculty. *Early Science and Medicine*, 12, 377–404.
- Kessler, Eckhard 2011. *Alexander of Aphrodisias and his Doctrine of the Soul. 1400 of Lasting Significance*. Leiden and Boston: Brill.
- Kusukawa, Sachiko 1999. Lutheran Uses of Aristotle. A Comparison Between Jacob Schegk and Philip Melancthon. In C. Blackwell & S. Kusukawa (Eds.), *Philosophy in the Sixteenth and Seventeenth Centuries: Conversations with Aristotle* (pp. 169–188). Aldershot: Ashgate.
- Leinsle, Ulrich Gottfried 1985. *Das Ding und die Methode. Methodische Konstitution und Gegenstand der frühen protestantischen Metaphysik*. Augsburg: Maro Verlag.
- Lüthy, Christoph 2001. David Gorlaeus’ atomism, or: The marriage of Protestant metaphysics with Italian natural philosophy. In C. Lüthy, J. E. Murdoch, & W. R. Newman (Eds.), *Late Medieval and Early Modern Corpuscular Matter Theories (245–290)*. Leiden, Boston, and Cologne: Brill.
- Lüthy, Christoph 2012. *David Gorlaeus (1591–1612). An enigmatic figure in the history of philosophy and science*. Amsterdam: Amsterdam University Press.
- Martini, Jakob 1615. *Partitiones et Quaestiones Metaphysicae*. Wittenberg: Schurerus.
- Mayer, H. C. 1959. *Nikolaus Taurellus, der erste Philosoph im Luthertum. Ein Beitrag zum Problem von Vernunft und Offenbarung*. Doctoral dissertation, University of Göttingen.
- Mayer, H. C. 1960. Ein Altdorfer Philosophenporträt. *Zeitschrift für Bayerische Kirchengeschichte*, 29, 175–190.
- Methuen, Charlotte 1998. *Kepler’s Tübingen. Stimulus to a theological mathematics*. Aldershot: Ashgate.
- Müller, Rainer A. (Ed.) 2001. *Promotionen und Promotionswesen an deutschen Hochschulen der Frühmoderne*. Cologne: SH-Verlag.

- Muratori, Cecilia 2014. "Seelentheorien nördlich und südlich der Alpen: Taurellus' Auseinandersetzung mit Cesalpinos *Quaestiones peripateticae*." In H. Marti & K. Marti-Weissenbach (Eds.), *Nürnberg's Hochschule in Altdorf. Beiträge zur frühneuzeitlichen Wissenschafts- und Bildungsgeschichte* (pp. 41–66). Cologne: Böhlau.
- Petersen, Peter 1921. *Geschichte der aristotelischen Philosophie im protestantischen Deutschland*. Leipzig: Felix Meiner.
- Pluta, Olaf 2007. How Matter Becomes Mind: Late-Medieval Theories of Emergence. In H. Lagerlund (Ed.), *Forming the Mind. Essays on the Internal Senses and the Mind/Body Problem from Avicenna to the Medical Enlightenment* (pp. 149–167). Dordrecht: Springer.
- Ramus, Petrus & Omer, Talon 1577. *Collectaneae Praefationes, Epistolae, Orationes*. Paris: Dionysus Vallensis.
- Schegk, Jacob 1540. *De causa continente. Eodem interprete Alexandri Aphrodisaei De mixtione libellus*. Tübingen: Ulrich Morhard.
- Schegk, Jacob 1570. *Jacobi Schegkii Schorndorffensis Hyperaspistes Responsi, ad quatuor epistolas Petri Remi contra sa aeditas*. Tübingen [no publisher].
- Schegk, Jacob 1580. *De plastica seminis facultate. De calido & humido nativis. De primo sanguificationis instrumento*. Augsburg: Bernardus Iobinus.
- Schegk, Jacob 1585. *Tractationum physicarum et medicarum tomus unus*. Frankfurt: Johannes Wechel.
- Sakamoto, Kuni 2016. *Julius Caesar Scaliger, Renaissance reformer of Aristotelianism*. Leiden and Boston: Brill.
- Simplicius 1544. *Commentaria in octo libros Aristotelis de Physico auditu*. (Lucillus Philalteus, Trans.). Paris: Johannes Roigny.
- Sparn, Walter 1976. *Wiederkehr der Metaphysik. Die ontologische Frage in der lutherischen Theologie des frühen 17. Jahrhunderts*. Stuttgart: Calwer Verlag.
- Taurellus, Nicolaus 2012/1573. *Philosophiae triumphus, hoc est, Metaphysica philosophandi methodus*. (H. Wels, Ed., Trans.). Stuttgart-Bad Cannstatt (first edition, Basel: Henricpetri).
- Taurellus, Nicolaus 1586. *De vita et morte libellus*. Nuremberg: Catharina Gerlach.
- Taurellus, Nicolaus 1604. *Theses de ortu rationalis animae*. Nuremberg: Paulus Kaufmann.
- Timpler, Clemens 1607. *Metaphysicae Systema Methodicum*. Frankfurt: Conrad Nebenius.
- Todd, Robert B. 1976. *Alexander of Aphrodisias on Stoic physics. A study of the De Mixtione with preliminary essays, text, translation, and commentary*. Leiden: E. J. Brill.
- Toepfer, Georg 2011. *Historisches Wörterbuch der Biologie: Geschichte und Theorie der biologischen Grundbegriffe*. Stuttgart: Metzler.
- Wollgast, Sigfried 1988. *Philosophie in Deutschland zwischen Reformation und Aufklärung, 1550–1650*. Berlin: Akademie Verlag.
- Zabarella, Jacopo 1590. *De rebus naturalibus libri XXX*. Cologne: Ciotti.