Putting the Pieces Together: The Elements and Principles of Composite Objects

by

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Chapter One

Everything Old Is New Again: An Introduction to Contemporary Hylomorphism

0. Introduction

We can give an initial characterization of hylomorphism by saying it is the view that composite objects are in some sense a combination of form and matter. Let us call this the core thesis of the view. As we will see below, there are different ways of filling in the details of the core thesis. However one fills in the details, hylomorphism has been out of style for the majority of the past four hundred years. Despite being the *de facto* metaphysic of material objects in the Medieval Period, hylomorphism has generally been met with suspicion, if not outright hostility since the Early Modern Period. Even today, one need not look that hard to find philosophers criticizing metaphysical views they disapprove of as being objectionably "scholastic".

That being said, hylomorphism has seen a bit of a revival in recent years. As Kretzmann and Stump (1993: 1 – 2) pointed out, interest in Aquinas and medieval philosophy has gradually increased over the past three decades.[1] On top of that, some philosophers have recently argued

[1] For example, see Leftow (2001), Stump (1995) and Pasnau (2004).

that reviving hylomorphism gives us the resources to solve some sticky problems in contemporary metaphysics.[2]

This chapter's role is to perform the following tasks. First, I will provide some background history for hylomorphism, its origins, why early modern philosophers rejected it and why some contemporary ones want to revive it. I will start by giving cursory and (over-)simplified accounts of Aristotle's and Thomas Aquinas' hylomorphic theories. Afterwards, I lay out some of the reasons early modern philosophers set it aside as well as evaluate the strength of the reasons they used to reject hylomorphism. This chapter's historical overview will serve two important purposes. The first is to understand why contemporary versions of hylomorphism take the forms they do, no pun intended. The second is to show why contemporary hylomorphism is worth taking seriously. For a long time, most mainstream philosophers considered hylomorphism a relic of the past that was conclusively refuted by the likes of Descartes and Locke. By looking at what ancient and medieval hylomorphists believed and why early modern philosophers rejected their views, we will see how contemporary hylomorphists avoid the criticisms that undermined scholastic hylomorphism. As a result, we will see why the forms of hylomorphism on offer today deserve consideration and evaluation. Then I will discuss why some contemporary philosophers want to revive hylomorphism. Finally, I present my project and give a roadmap for the rest of my dissertation.

1. The Rise and Fall of Hylomorphism

> Our discussion will be adequate if it has as much clearness as the subject admits of….
> -Aristotle[3]

[2] For example, see Fine (1999 & 2008), Johnston (2006), Koslicki (2008) and Rea (2011).

I want to begin this section by managing my readers' expectations. This work is primarily about contemporary metaphysics, not history of philosophy. As a result, I will have to limit myself to a discussion that historians of philosophy will recognize as over-simplistic, glossing over some controversies for space and clarity reasons. I will also have to present a slightly distorted picture of hylomorphism's history since the work of important figures like John Duns Scotus and William of Ockham will mostly be ignored. Moreover, I cannot give a complete account of why scholasticism fell out of favor, since the reasons for its fall go beyond issues with hylomorphism per se.[4]

Additionally, presenting a definitive account of Aristotle's view here is impossible since it is unlikely that Aristotle held the same view over time. As Davies (1992: viii) points out, Aquinas' views are much more stable, but his mature views are incredibly developed and intricate. As a result, I can only give an impressionistic picture of their views, focusing mainly on the features that will be relevant to later chapters. The same is true for my discussion of its rejection. Accordingly, my goal in this chapter is to present their views in ways that are "correct enough" for my purposes.

1. A. Hylomorphism's Point of Origin: Aristotle

Aristotle was not the first western philosopher to discuss form and matter. For example, Plato discusses the idea that material objects are "receptacles" that hold impressions of the Forms.[5] However, the view that most have in mind when discussing hylomorphism comes from Aristotle. I want to now briefly discuss Aristotle's account of substance, form, and matter.

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[3] *Nichomachean Ethics* I. 3 1094^{b} 12. All Aristotle citations and quotes in this and subsequent chapters come from Aristotle (1984).
[4] See Pasnau (2011) for a more complete history of scholasticism's rise during the Medieval Period and fall in the Early Modern Period.
[5] For example, see *Timaeus*, $48^{e} - 49^{a}$.

Aristotle first introduces the notion of substance in *Categories* (*Cat*),[6] where he cites human beings and horses as examples.[7] Substances are instances of species and genera, such as *human* and *animal*, respectively, which he says "reveal" substances. By "reveal", Aristotle means that by listing the species and genera substances fall under we are expressing *what they are* in a metaphysically deep sense, that is, their essences.[8] Aristotle contrasts substances, species, and genera from things like an individual substance's instance of a color or instance of a shape,[9] things Aristotle later calls "accidents".[10] While accidents are predicated of substances, accidents do not tell us what substances are in the way species and genera do.

In Aristotle's early works, he declares substance the preeminent category of being in that accidents, species and genera all depend on substances.[11] In his later works, Aristotle goes further by denying that substances have other substances as parts.[12] The organic parts of substances such as fingers and teeth, says Aristotle, are essentially parts of their host wholes. The essence of a tooth, for example, is to be a part of an organism and occupy the functional role of a tooth. Removing them from their host substances destroys them, what is left over after their removal being teeth and fingers only in an equivocal sense. Since teeth and things relevantly similar to them depend on substances for their existences in this manner, they cannot be substances themselves.[13] Aristotle further denies that the elements are substances when they are parts of a substance, despite the elements being substances when existing on

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[6] Here is the first oversimplification. Scholars debate whether Aristotle changed his view between writing *Cat* and *Metaphysics* Z (e.g. Robinson [2014:§2.2.2]) or merely developed it by incorporating form and matter into it (e.g. Ackrill [1981: 127]). Since his medieval followers thought he just developed his views, I will speak as if he did for simplicity's sake.
[7] See *Cat* 5 2^a 15.
[8] *Cat* 5, 2^b 29 – 3^a 5.
[9] *Cat* 5, 2^a 15.
[10] See *Topics* I. 5 102^b 4 – 25.
[11] *Cat* 5 2^b 5.
[12] *Metaphysics* Z. 13, 1041^a 4 – 5.
[13] Barnes (1995b: 92).

their own.[14] We can thus say Aristotle's doctrine is that substances have no separable parts in the sense of having no other substances as parts.[15]

While Aristotle's earliest surviving works primarily discuss substances and accidents, form and matter become particularly important in his discussions of change in *Physics* (*Phys*) and *On Generation and Corruption* (*GC*). In *Phys* I. 7 190^{a} 22 – 35, Aristotle distinguishes two kinds of change, which he terms "coming to be so-and-so" and "coming to be without qualification". Instances of the former include changes such as those in size, color or location. Coming to be without qualification are substances coming into existence, such as when a tree grows from a seed. Aristotle describes changes of this sort this way:

> In one sense things come-to-be out of that which has no being without qualification; yet in another sense they come-to-be always out of what is. For there must pre-exist something which *potentially* is, but *actually* is not; and this something is spoken of both as being and as not-being. (*GC* I. 3 317^{b} 15 – 8)[16]

Here's the basic idea: When something comes to be without qualification, it comes into existence in virtue of a material substrate receiving a form it did not previously possess. In that sense, the substrate was potentially an F yet not actually so until the F-making form was added to it.[17] One of the examples Aristotle used to illustrate this schema is a statue and the bronze it is made of.[18] Prior to the statue's creation, the bronze actually existed but was only potentially statue-shaped. The shape or form of the statue was then added to the bronze material by an artist acting as an efficient cause, which made the bronze into an actual statue. Thus, matter without form is potentially a certain way while form makes matter actually such.

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[14] *Metaphysics* Z. 10 1035^{b} 6 – 12; 1035^{b} 24 – 5; Z. 16 1040^{b} 5 – 10. This apparently marks a change in view from that in *Cat* 5 3^{a} 30 – 4.
[15] I take this use of the term "separable" from Toner (2010: 28).
[16] Also see *Phys* I. 7 190^{b} 1 – 20.
[17] *GC* I. 3 318^{b} 13 – 8; *Phys* I. 7 191^{a} 9 – 14.
[18] This example should be understood as an analogy, since Aristotle thinks artifacts are not substances. Why he thinks so will be made explicit below.

As Barnes (1995b: 98) points out, despite the intuitiveness of his initial examples, Aristotle's exact doctrine of form gets harder to pin down as it gets applied to more and more phenomena. That being said, I will briefly mention a few features of forms that will be important for our discussion of later hylomorphists. I want to focus on what Robert Pasnau (2004) calls the proto-scientific role and the abstract individuating role of forms, in that order.

In order to get a grasp of the proto-scientific side of form, it will help to look briefly at Aristotle's discussion of nature in *Phys* II. 1. In this section of *Phys*, Aristotle discusses the things that exist "by nature" as opposed to things that exist "by art". Things that exist by art are artifacts. Things that exist by nature are substances such as organisms or "simple bodies" such as earth, air, water and fire. In this discussion, Aristotle asks what the natures of substances are, that is, what the principles of change and inertia within such things are.[19] He ultimately identifies their natures with their forms. He writes,

> [t]he form…is nature rather than the matter; for a thing is more properly said to be what it is when it exists in actuality than when it exists potentially. Again man is born from man but not bed from bed. That is why people say that the shape is not the nature of a bed, but the wood is – if the bed sprouted, not the bed but the wood would come up. (*Phys* II. 1 193^b 6 – 12)

One thing in particular from this passage is noteworthy for our purposes. Specifically, it seems as if Aristotle gives form a role that looks to our modern eyes a lot like a *causal* role. That is, it seems as though Aristotle is saying that forms are internal principles that causally maintain the substances that have them. This is what Pasnau has in mind when he says that form has a proto-scientific role in Aristotle. Whether Aristotle intended for forms to be understood

[19] *Phys* II. 1 192^b 12 – 5. Wiggins (1980: 89) considers and makes use of Aristotle's ultimate point in his discussion of how his neo-Aristotelian theory of persistence handles artifacts.

primarily as internal causes of this sort, many of his later interpreters thought he did.[20] I will say more about this when we come to Aquinas.

The second role Aristotle assigned to form is that of principle of unity and individuation. Among other things, this means Aristotle thought forms explained the *metaphysical* difference between mere heaps of matter and genuine substances. As he writes in *Metaphysics* (*Met*) Z. 17:

> Since we must know the existence of the thing and it must be given, clearly the question is *why* the matter is some individual thing, e.g. why are these materials a house? Because that which was the essence of a house is present. And why is this individual thing, or this body in this state, a man? Therefore what we seek is the cause, i.e. the form, by reason of which the matter is some definite thing; and this is the substance of the thing. (*Met* Z. 17 1041^{b} 4 – 8)[21]

In other words, what makes the various kinds of matter, e.g., flesh and bone, the matter of a single substance is the characteristic form that unites them together into a single thing.

In addition to this unifying role, Aristotle takes form to provide the essential function of substances, in the process making it a member of its species. Aristotle illustrates this role in *De Anima* (*AN*).[22] In this discussion, Aristotle famously identifies the soul with the form of the body. To explain what this identification entails, he gives two analogies with non-substances, that of an ax and that of an eye. If an ax were a natural body, Aristotle says, its function as an ax would be its soul. If its function were lost, it would cease to exist.[23] It is likewise in the case of the eye.

> Suppose that the eye were an animal – sight would have been its soul, for sight is the substance of the eye which corresponds to the account [of the soul], the eye being merely the matter of seeing; when seeing is removed the eye is no longer an eye, except in name – no more than the

[20] Pasnau (2004: 40 – 1, 81 note 17) admits that while he thinks Aristotle primarily had a metaphysical role for form, it seems that Aristotle thought at least some forms occupied this kind of proto-scientific role. For example, see *De Anima* II. 4 415^{b} 9 – 14.
[21] See also *Met* H. 2 1043^{a} 4 – 28 for a similar characterization of form.
[22] *AN* I. 1 412^{a} 1 – 412^{b} 10.
[23] *AN* I. 1 412^{b} 12 – 6.

> eye of a statue or a painted figure. (*AN* II. 1 412^{b} 18 – 21)

To sum up, Aristotle though form was what made a substance an individual as well as that in virtue of which a substance has its essence.

Before I move on to Aristotle's treatment of matter, I want to consider one last issue surrounding his account of form. In *Met* Δ. 25, Aristotle presents us with multiple senses of the word "part". Of particular interest is entry number four. In his exposition of this sense of "part", he states that parts are

> ⌈t⌋he elements into which the whole is divided, or of which it consists – 'the whole' meaning either the form of that which has the form; e.g. of the bronze sphere or of the bronze cube both the bronze – i.e. the matter in which the form is – and the characteristic angle are parts. (*Met* Δ. 25 1023^{b} 19 – 23)

It seems as if Aristotle is suggesting that forms can be parts in this passage, insofar as he seems to say that the "characteristic angle" is itself a part of a bronze cube.[24] This reading is supported by similar affirmations in other passages of *Met* where he says that the soul is a part of a human being[25] and that the form of a sphere is a part of it.[26]

That being said, it is unclear Aristotle meant that forms are parts of composite objects in a sense that we would recognize. One reason is because he seems to rule out such a reading in *Met* Z. 17 1041^{b} 28 – 31. Moreover, it seems that Aristotle's use of the term "part" was sometimes not strictly accurate by his own lights.[27] For example, while he sometimes referred to the soul's powers as its parts in the earlier sections of *AN*,[28] he seems to disparage the idea of

[24] This is, for example, how Koslicki (2008: 137 – 8) reads him.
[25] *Met* Δ. 18 1022^{a} 32.
[26] *Met* Z. 8 1033^{b} 10 – 9.
[27] See Marmodoro (2014: 15 – 9) for a non-mereological interpretation of Aristotle's notion of form.
[28] For example, see *AN* II. 2 413^{b} 25 – 30.

thinking of them as parts of the soul in *AN*'s later sections.[29] I point out this exegetical issue because of its importance to understanding contemporary forms of hylomorphism. Specifically, it is important because contemporary hylomorphists disagree over this issue.

This brings us finally to Aristotle's views on matter. In Aristotle's discussions of change, matter and form are characterized in terms of potentiality and actuality, respectively, and he identifies these notions more explicitly in later works.[30] These identifications with Aristotle's claim that there must always be a material substrate for change lead to the following issue with the four elements. In *On the Heavens* (*Cael*) III. 6, Aristotle argues that the elements can change into one another, e.g. water changing into air.[31] If the elements can change into one another, Aristotle's account of change requires there being some matter that underlies and survives such changes. And since this substrate can be the matter of multiple kinds of elements, it cannot essentially be any one of them. So, what kind of nature, if any, can this underlying matter have?

It is hard to say with any certainty what Aristotle ends up affirming in the relevant passages in *Cael*,[32] but his later commentators picked up on one passage in *Met* Z. 3 where he writes:

> By matter I mean that which in itself is neither a particular thing nor a certain quantity nor assigned to any of the other categories by which being is determined. For there is something of which each of these is predicated, so that its being is different from that of each of the predicates; for the predicates other than substance are predicated of substance while substance is predicated of matter. Therefore the ultimate substratum is of itself neither a particular thing nor of a particular quantity nor otherwise positively characterized; nor yet negatively, for negations also will belong to it only by accident. (*Met* Z. 3 1029^{a} 20 – 5)

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[29] For example, see *AN* III. 10 433^{b} 1 – 4.
[30] For example, see *AN* II. 1 412^{a} 9 – 10 and Aristotle's discussion of substantial unity in *Met* H. 6 1045^{a} 21 – 1045^{b} 25.
[31] *Cael* III. 6 304^{b} 25 – 305^{a} 12.
[32] Looking at Aristotle's argument in *Cael* III. 6 305^{a} 14 – 32 isn't particularly helpful since it seems to rule out anything that is not itself one of the elements acting as the substrate of the change of one element into another.

Taken at face value, Aristotle apparently endorses the existence of what the medievals came to call "prime matter" (or at least something very much like it) in this passage. That is, he seems to postulate something without any actual features that acts as the matter of substance. Since Aristotle characterizes matter in terms of potentiality elsewhere and describes this matter as lacking actual features, it seems that this matter must be purely potential. It is unclear what to make of this passage, since the discussion in *Met* Z. 3 is notoriously hard to follow. It is important to note, however, that later commentators took it to be an endorsement of prime matter. This brings us to our next subject, Thomas Aquinas.

1. B. Key Developments in Hylomorphism: Aquinas

While Aquinas' dependence on Aristotle has been overstated at times,[33] it is nevertheless undeniable that Aquinas took much from Aristotle. For example, Aquinas' view of substance was very much like Aristotle's, with substances being hylomorphic compounds[34] that lacked separable parts.[35] It would be tedious to list all the ways that Aquinas' views mirrored those of the Aristotelian view sketched above. For this reason, I will spend this section highlighting the ways Aquinas developed and elaborated on aspects of Aristotle's metaphysics.

While it is unclear whether Aristotle believed in prime matter, Aquinas did and discusses it at length.[36] One particularly enlightening discussion takes place in a broader discussion of substantial change, the coming into or going out of being of substances. Aquinas follows Aristotle in analyzing change in terms of something gaining or losing a form. He also

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[33] As Davies (1992: 16) notes, Christian neo-Platonists such as Pseudo-Dionysus also significantly influenced Aquinas' metaphysics. See Wippel (1993: 93 – 9) for a discussion of the role of participation in Aquinas' metaphysics.
[34] Aquinas, *De Principiis Naturae* 1 – 2.
[35] Aquinas, ST I, Q. 76, a. 8.
[36] It is worth noting that some medieval hylomorphists rejected the existence of prime matter. William of Ockham, for example, rejected the view that matter lacks all actuality. See Pasnau (2010: 638 – 41) for details.

follows Aristotle in distinguishing substantial change from change in regards to accidents. One way Aquinas grounds this distinction is in regards to the substrate of these changes. In *De Principiis Naturae*, Aquinas writes that

> [m]atter understood as without any form and privations, but subject to form and privation, is called prime matter, because prior to it there is no matter, and it is also called Hyle. Because every definition and every cognition is through form, prime matter cannot be known or defined in itself, but only by comparison, as when it is said that prime matter is to all forms and privations as bronze is to the shape of the idol and the lack of it, and it is called absolutely first. (Aquinas, 1998: 21)

In other words, prime matter is the ultimate substrate of all material beings. Unlike other kinds of matter, such as the bronze that constitutes a statue, prime matter does not have matter of its own. That is what makes it *prime* matter. Insofar as it is formless per se, it lacks all actuality in itself. It is purely potential being. And insofar as form is what makes something knowable and understandable, prime matter's absolute lack of form renders it unknowable per se. The only idea that we have of it is by analogy with more intelligible kinds of matter.

As inscrutable as this notion may seem, Aquinas thought prime matter's complete lack of actuality is what allows for the possibility of substantial change. As Wippel (1993: 112) points out, Aquinas thought that if prime matter had any actuality of its own, then all instances of supposed substantial change would really be accidental changes. Among other things, this is due to the way Aquinas distinguishes substantial forms from accidents. According to Aquinas, the reason why substantial forms and prime matter come together to make a new and genuine substance is because they are incomplete per se and complementary.[37] In that sense, substantial forms and prime matter are mutually supporting when conjoined in a composite substance. By Aquinas' lights, prime matter having any kind of actuality would undermine its being an

[37] Cf. Aristotle, *Met* H. 6, as well as Marmadoro (2014: 9 – 11).

incomplete entity. By contrast, Aquinas thought accidents were both produced and supported by substances, the latter's existence being complete and ontologically prior to the former's.[38]

In addition to his postulation of prime matter, Aquinas' account is indicative of a shift in how hylomorphists conceived of substantial forms. As I said above, Aristotle gives forms two roles in his account, what Pasnau called a proto-scientific role and an abstract metaphysical role. In the medieval period, philosophers tended to play up the proto-scientific role of form more and more over time. While Thomas exemplifies this trend, he is not original in this regard. We can see this tendency in Aquinas' precursors, such as Avicenna and Albertus Magnus. For these philosophers, substantial forms came to primarily be seen as unique, basic, internal causal powers that produce and regulate the accidental features of substances.[39]

To be clear, they did not think substantial forms caused *all* of something's accidents. They clearly realized that substances have some accidents due to external causes. Thomas is no different in this regard. As Aquinas (1998: 42) wrote, "Whatever belongs to a thing is either caused by the principles of its nature, for example, risible in man; or comes to it from some extrinsic principle, as light to air from the influence of the sun." I also do not want to imply that Aquinas ignored the metaphysical role Aristotle assigned to form. In fact, Aquinas did some subtle work trying to explain how forms can perform both the proto-scientific and the metaphysical roles Aristotle attributed to them.[40] However, as Pasnau (2004: 43) argues, the causal role of form took precedence for Aquinas and those who followed him. This growing

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[38] This paragraph's description is a massive oversimplification of Aquinas' views on substantial forms and accidents. For example, Aquinas (e.g., *De Ente et Essentia* 6; ST I, Q. 75, a. 6) thought rational souls could exist apart from matter despite being the substantial forms of human bodies. See Amerini (2013: Ch. 2) for more details. Additionally, Aquinas thought accidents could exist apart from substances through a miracle, such as when bread and wine were transubstantiated in the Eucharist (ST III, Q. 77, a. 1).

[39] Pasnau (2004: 35). Pasnau (2004: 39) goes on to argue that as the Medieval Period came to an end, philosophers came to distinguish efficient causes from formal causes largely by the fact that the former were external while the latter were internal.

[40] For example, see ST I, Q. 76, a. 3 & a. 8. See Pasnau (2004: 41 – 5) for the details of Aquinas' view and how it differs from Aristotle's view.

emphasis on the proto-scientific role of form takes us to the last part of our historical survey, hylomorphism's decline and fall.

1. C. Scholasticism's Fall and the Fate of Hylomorphism

Despite initial vehement resistance,[41] scholastic Aristotelianism as represented by Aquinas, Duns Scotus and Ockham became the *de facto* metaphysic of the West. By the end of the eighteenth century, Europe's intelligentsia would come to ridicule scholastic hylomorphism as obsolete nonsense. I want to now discuss some of the reasons why scholasticism underwent such a reverse of fortunes and evaluate whether hylomorphism deserved the ridicule heaped upon it. After presenting two of the more impressive arguments from Descartes and Locke against scholastic hylomorphism, I will argue that these arguments only undermine a specific form of late scholastic hylomorphism and that contemporary hylomorphists can easily evade their criticisms.

1. C. 1. The Fall of the House of Aristotle

Like any historical event, scholastic hylomorphism's decline and fall has multiple causes. Some were sociological and others were intellectual. From the seventeenth century onward, scholastic hylomorphism faced sustained criticism, but I want to focus in on two of the better considerations presented against it, the rise of mechanistic explanation and Locke's contention that substantial forms were explanatorily worthless.[42]

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[41] For example, see Davies (1992: vi) and McInerney (1998: xxi – v).

[42] I say "better considerations" because late scholasticism was rejected partially because its critics seriously misunderstood it. For example, Descartes and Robert Boyle both rejected it in part because they erroneously thought late scholastics believed substantial forms were substances. See Pasnau (2004: §4) for details.

As Pasnau (2004: 44) notes, on the cusp of the Early Modern Period, late scholastic hylomorphists gradually came to conceive of forms almost entirely in terms of the proto-scientific role Avicenna and Aquinas emphasized for them. Francisco Suárez's sentiments are indicative of this mindset:

> The aggregation of multiple faculties or accidental forms in a simple substantial subject is not enough for the constitution of a natural thing….A form is required that…rules over all these faculties and accidents, and is the source of all actions and natural motions of such a being, and in which the whole variety of accidents and powers has its root and unity. (*Disputationes Metaphysicae* 15.1.17)[43]

In other words, substances have a variety of powers and characteristics in addition to exhibiting a wide variety of behaviors. What is needed to unify these different features in a single substance is a substantial form that produces and regulates these powers, features, and behaviors. So we can fairly characterize late scholastic philosophers as thinking that substantial forms were necessary to explain why mercury reacts to heat by expanding, why sheep have four legs, why birds fly south for the winter, and so on. Any account of the natural world that leaves out substantial forms, these philosophers claimed, will lack the resources necessary to explain these phenomena. This supposed fact, Suárez claimed, was the best reason to believe in the reality of substantial forms.[44] The abstract role that Aristotle envisioned for forms, it seems, was either significantly de-emphasized or ignored completely.

When formal causes came to be seen as so similar to efficient causes, hylomorphic theories became vulnerable to the mechanistic alternatives of Descartes et al. In such accounts, appeals to the metaphysically basic substantial forms of late scholasticism were replaced by reductive explanations in terms of the properties of material objects' parts and their

[43]Quotation from Pasnau (2004: 38).
[44] Ibid.

interactions with one another. The following passage from Descartes' *The World* is representative of the more tactful rejections of scholastic hylomorphism:

> When a flame burns wood…, we can see with the naked eye that it moves the small parts of the wood and separates them from one another, thus transforming the finer parts into fire, air and smoke and leaving the larger parts behind as ashes. Thus someone else may imagine, if they wish, the 'form' of fire, the 'quality' of heat, and the 'action' which burns it, as things that are completely distinct in the wood. For my part…I am satisfied to conceive in it the movement of its parts. You may posit 'fire' and 'heat' in it, and make it burn as much as you wish; but if you do not also assume that some of its parts move and become detached from those which are next to them, I could not imagine that the wood could undergo any change or alteration. On the other hand, take away the 'fire' and the 'heat' and prevent it burning; on condition simply that you grant me that there is some power which violently moves its finer parts and separates them from the larger parts, I find that this alone could cause it to undergo all the same changes which are observed when it burns. (Descartes, 2003: 87 – 8)

Descartes argument is an appeal to parsimony. While Descartes does not explicitly deny that substantial forms exist, he argues that we can get by without postulating them in our scientific theories. That is, Descartes says that we can adequately explain the relevant natural phenomena in terms of the properties of natural bodies and the movements of their parts. Given the explanatory power of these mechanical factors, there is no need to postulate a single, basic internal power to explain these when reductive mechanical explanations do even better.[45]

Hylomorphism's other critics were not quite as diplomatic. While Descartes argued that substantial forms were superfluous, John Locke went even further by arguing that forms were unable to explain anything in principle. The reason that Locke found substantial forms to lack explanatory power is because the notion of substantial forms is too obscure to be useful. Locke (1975: 379 – 80) addresses substantial forms in his discussion of what he takes to be our ignorance of real essences. As an example, Locke asks us to consider a gold ring that has certain color, weight, hardness, etc.

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[45] A close reading of the Descartes passage tells us that there is more to the early modern rejection of scholasticism than issues with substantial forms. The rejection of final causes and "real qualities" in objects both loomed large. For a nice summary of both late scholastic natural philosophy as well as the Cartesian project that replaced it, see Nadler (2008: 27 – 33).

> If any one will say, that the real Essence…, on which these Properties depend, is not the Figure, Size and Arrangement or Connexion of its solid Parts, but something else, call'd its particular *form*; I am farther from having any *Idea* of its real Essence, than I was before. For I have an *Idea* of Figure, Size, and Situation of solid Parts in general, though I have none of the particular Figure, Size, or putting together of Parts, whereby the Qualities above-mentioned are produced; which Qualities I find in that particular parcel of Matter…, and not in another parcel of Matter…. But when I am told, that something besides the Figure, Size, and Posture of the solid Parts of that Body, is its Essence, something called *substantial form*, of that, I confess, I have no *Idea* at all, but only of the sound *Form*; which is far enough from an *Idea* of its real Essence, or Constitution. (Locke, 1975: 380)

In other words, not only do substantial forms fail to shed light on why things such as gold have features like their color or hardness, forms cannot do so in principle. The reason for this is that, unlike features like size or arrangement of parts, the notion of form has no content beyond being an entity that is supposed to produce and sustain more intelligible features present in a substance. If anything, Locke (1975: 475) says, appealing to substantial forms tricks philosophers into thinking we have an explanation of why substances have these features when we really don't.

While the particulars of Descartes' and Locke's philosophical theories were later found to be inadequate, their charge that forms cannot explain natural phenomena and unnecessary for doing so stuck. As a result, apart from Leibniz,[46] philosophers generally came to see scholastic forms as explanatorily useless. Thus, hylomorphism simply faded away over time.

1. C. 2. Evaluating the Case against Hylomorphism

While Descartes' and Locke's objections won the day in the seventeenth century, I do not think that contemporary hylomorphists are vulnerable to them. It is my contention that rather than attacking the core of the view, the early moderns' objections are better understood as

[46] For example, see Leibniz (AG: 42 – 3). Side note: "AG" stands for Leibniz (1989) in this and all subsequent chapters. For a discussion of the early Leibniz's attempts to reconcile a broadly Aristotelian metaphysics with mechanistic explanations of the science of his day, see Nadler (2008: 36 – 51).

challenging the late scholastic form of hylomorphism common at the time. As a result, the early modern objections to hylomorphism do not give us reason to dismiss contemporary forms of hylomorphism out of hand.

Let us begin by looking at Descartes' argument. As I wrote above, Descartes' argument is an appeal to parsimony. Descartes rightly points out that we can causally explain natural phenomena such as wood burning by appeal to mechanistic and reductive explanations without appealing to substantial forms. Therefore, by Ockham's razor, we can eliminate substantial forms from our ontology.

Descartes' argument is a qualified success. Insofar as the late scholastic hylomorphists postulated substantial forms in order to play the kind of causal roles Descartes described, this criticism is apt. The success of the reductive and mechanistic kind of explanation Descartes championed is beyond serious dispute at this point, and thus we do not need substantial forms to explain natural phenomena.

However, if Descartes' argument is to rule out every variety of hylomorphism, it would have to be the case that any hylomorphic view *must* assign this kind of causal role to substantial forms. But there is no reason to think this is true, and there is some reason for thinking that it is false. As was pointed out in §1. A, Aristotle assigned two roles to substantial forms, one proto-scientific and another metaphysical. While Aristotle had a single entity playing both roles, conceptually speaking, these two roles could conceivably come apart. If anything, as Pasnau (2011: 559) points out, it is unobvious how forms are supposed to play the two roles Aristotle gives them. The causal and individuating roles these forms are supposed to play are plausibly understood as providing fundamentally different kinds of explanation. As such, an account that says forms play both of these roles needs to explain how a single entity can play

these roles. This is not to say such an explanation cannot in principle be given. But the conceptual disconnect between the two roles and the fact that we can give mechanistic explanations for natural phenomena together suggest that we can formulate a version of hylomorphism that dispenses with the proto-scientific role of form entirely. And thus, Descartes argument succeeds only in undermining a subset of hylomorphic theories.

This is a satisfactory response to Descartes, but it still leaves us with Locke's concerns about substantial forms. Locke's basic point is that substantial forms are too obscure to play any kind of philosophically useful role. Substantial forms are basic, sui generis entities postulated as part of an account of real essences. However, says Locke, we have no idea of such forms, which means that we can have no understanding of how they produce the features we do have ideas of. And, in fact, postulating substantial forms has distracted us from other more plausible candidates for real essence.

We can respond to Locke's argument in a couple of ways. First, we should note that Locke is evaluating the same variety of late scholastic hylomorphism as Descartes. The kind of substantial forms postulated by this strain of hylomorphism are the basic *sui generis* forms that casually produce and regulate a substance's accidents and activity. However, not all hylomorphists think that forms are like this. Moreover, hylomorphism per se does not require that we think of forms in this way. While Aristotle endorsed such a view of some forms in works such as *AN*, his use of the term "form" in his entire body of work encompasses a wide variety of features.[47] It is also worth noting that some contemporary hylomorphists identify forms with the kinds of features that Locke found intelligible, such as the manner in which something's parts are arranged.[48] As a result, it seems as if Locke's criticism only seems

[47] For example, see *Met* H. 2 1042^{b} 10.
[48] For example, see Fine (1999) and Johnston (2006).

relevant to specific views of substantial forms, views that contemporary hylomorphists might not actually hold.

Second, as Pasnau (2004: 47) points out, Locke's criticism depends on the claim that forms are supposed to play the proto-scientific role. For Locke (1975: 379), real essences are supposed to produce and maintain the sensible qualities that we associate with things of various kinds. In that sense, Locke's understanding of real essences is quite similar to that of medieval hylomorphists' understanding of substantial form. And if we understand Locke's objection in terms of forms being obscure entities postulated to produce and regulate the characteristic qualities of substances, this objection has some plausibility.

But if we move away from thinking of forms along the lines of being internal causal powers, this objection seems to lose much of its bite. As Pasnau (2004: 47) puts it, "If…forms play a crucial role in the identity conditions of substances, then it may be enough for that purpose to be able to explain in general terms what such forms are even if their nature in particular cases remains obscure." For a bit of perspective, consider Michael Loux (2006: 109 – 10) characterizations of kinds. According to Loux, kinds

> …are universals which objects exemplify by belonging to them….Kinds…are prior to their members; they determine, so to speak, the identity of their members. As Aristotelians have characterized them, kinds mark out their members as *what* they are. Thus, Aristotle tells us that where a universal is a kind to which an object belongs, that universal enable us to answer the "What is it?" question posed about that object….The kind to which a concrete particular belongs, then, provides us with existence conditions for that particular. (Loux, 2006: 109 – 10)

The observant reader will note that Loux's description of kinds says very little about what these entities are like in and of themselves beyond being a type of universal. Instead, Loux primarily discusses the metaphysical roles that kinds play, namely, characterizing substances as what they are and providing the existence conditions of substances. Moreover, this does not seem particularly problematic. Rather, if we need to postulate something that plays their

metaphysical role, our inability to say much about them apart from this role is not a significant problem. *Mutatis mutandis*, the same considerations apply to substantial forms. As a result, Locke's criticism, like that of Descartes, only really undermines a specific kind of hylomorphic theory and fails to undermine the plausibility of hylomorphic accounts of objects in general. This takes us to the next task of this chapter, discussing the contemporary attempts to revive hylomorphism.

2. Reviving Hylomorphism

Despite its ignominious fall, hylomorphism has made a comeback recently in analytic metaphysics and philosophy of religion. In this section, I present brief sketches and overviews of the two flavors of hylomorphism found in contemporary analytic metaphysics. The presentations here will be very brief, but I will fill in the details in subsequent chapters. The main purpose of the following discussion is both to briefly introduce the main schools of thought and to give a sense of what motivates these divergent views. As will become clear below, aside from their shared commitment to the core thesis of hylomorphism, there is very little that all contemporary hylomorphists agree upon. I will begin with neo-scholastic hylomorphism's beginnings and a rough summary of their views. After that, I will turn to the neo-Aristotelian movement in analytic circles that has developed over the past twenty years.

2. A. Neo-Scholastic Hylomorphism

Despite losing its hold on the wider intellectual culture, scholasticism never lost its foothold in the Catholic Church. While the Church has always held Aquinas in high regard, his works took on a new centrality in the late nineteenth century. Throughout the nineteenth century Europe

underwent prolonged periods of upheaval that led to an astonishing amount of political and religious change.[49] As Lawrence Cunningham (2009: 208) notes, "[The Church's response] to these rapidly unfolding social and political realities was clear: throwing up the barriers against the tide of history and condemnation of the new ideas abroad." Part of the Church's strategy was giving Thomas' philosophy the pride of place. In his encyclical *Aeterni Patris*, Pope Leo XIII emphasized Aquinas' *bona fides* and prescribed that his works be taught in Catholic schools and seminaries.[50] Leo hoped that this would lead to an embrace of Aquinas' conservative political and religious views, which would in turn provide a more or less monolithic bulwark against the attacks of the Church's "modernist" critics.

While many of Leo's goals went unmet, his endorsement of Aquinas gave birth to the neo-Thomist movement in Catholic philosophy and theology.[51] While neo-Thomism flourished in Catholic circles in the late nineteenth and early twentieth centuries, mainstream Anglo-American philosophers pretty much ignored it. This has changed in recent decades. Given Aquinas' association with conservative strains of Catholicism, less conservative Catholic thinkers have moved away from Aquinas since the Second Vatican Council.[52] As a result, Aquinas has a diminished yet still respected status in the Catholic thought. This diminishment of Aquinas' status has coincided with a growth of interest in medieval philosophy among analytic philosophers of religion.[53] There has also been a modest growth of interest among analytic metaphysicians in Aquinas' metaphysics. This new interest is part of a general interest in reviving aspects of Aristotelianism. Examples of these neo-scholastic hylomorphists include

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[49] For a detailed discussion of this period and the changes that came with it, see O'Malley (2008: Ch. 2).
[50] Ibid., p. 61 – 3.
[51] For example, while the Church of Leo's day was opposed to religious freedom, the post-Vatican II Church has embraced it. See the Second Vatican Council's Declaration on Religious Freedom (*Dignitatis Humanae*) in Tanner (2012: 304 – 18).
[52] See Freddoso (2016) for a biased yet informative discussion of this state of affairs.
[53] One of many examples of this is the interest in both Ockham's and Molina's views in the debate over human freedom and divine foreknowledge. For examples of these figures' work factoring into these debates, see Adams (1977 & 1991), Craig (1999), Freddoso (1982) and Plantinga (1974: Ch. 9; 1986).

Edward Feser (2006), John Haldane (1998), David Oderberg (2002, 2005 & 2007) and Patrick Toner (2008, 2009, 2011 & 2012). Brian Leftow (2001 & 2010), Robert Pasnau (2004) and Elenore Stump (1995) are plausibly said to be sympathetic to this project, even if they do not embrace every aspect of the view.

So what do neo-scholastic hylomorphists believe? Here is a very brief sketch of the basics of their view, the full details of which I will provide in the next chapter. Contemporary neo-scholastics are not entirely unanimous in opinion, but there is a common core of views shared among them. They share the goal of reviving a version of medieval hylomorphism and reconciling such a view with the deliverances of contemporary science. As we shall see, this desire to reconcile medieval hylomorphism with contemporary science forces them to diverge from their forebears in at least one significant respect, the explanatory role of substantial form.[54] Aquinas' metaphysics is seen as a starting part in this project.[55] Accordingly, their views resemble those of Aquinas' significantly. For example, they think some macroscopic objects, particularly organisms, are substances in Aquinas' understanding of the notion.[56] Moreover, they fill in the core thesis of hylomorphism by asserting that substances are composites of substantial form and prime matter, the former of which actualizes the potential of the latter to form a substance. They think substances have matter and forms as parts of substances, though this claim is sometimes qualified.[57] Finally, like Aquinas and the later

[54] One might wonder whether neo-scholastic hylomorphists' emphasis on the metaphysical role of form disqualifies them from being considered neo-*scholastics*, since the scholastics emphasized the proto-scientific role of form to the detriment of the metaphysical role. Emphasizing the proto-scientific role of form was a major part of the medievals' research program. But, Aquinas and others did make use of the metaphysical role of form, and the neo-scholastics do not significantly differ otherwise from the scholastics in metaphysics. Thus, considering these philosophers neo-scholastics seems to be a fair characterization.
[55] For example, see Oderberg (2002: 126).
[56] This view is also defended by non-hylomorphists, such as Loux (1978: 158 – 75; 2006: 107 – 17).
[57] For example, see Feser (2006: 222), Oderberg (2007: 65 – 6) and Toner (2010 & 2012).

medievals, they think that forms are basic entities, irreducible to the properties of the parts of substances or the relations that hold between them.[58]

Their desire to reconcile Aquinas' metaphysics with contemporary science determines what reasons that they use to motivate their project. They diverge from their medieval forebears in that they generally do not use forms to explain biological or chemical facts as the later scholastics did. Rather, these philosophers motivate their project primarily by arguing that their brand of hylomorphism has the resources to solve problems in metaphysics and the philosophy of mind. For example, Haldane (1998) and Feser (2006: 219 – 28) argue that physicalist conceptions of mind are inadequate[59] and present their hylomorphic views as alternatives to both physicalist and substance dualist theories of mind.[60] By contrast, Oderberg (2007) and Toner (2008 & 2012) argue that their views solve various metaphysical problems and shed light on metaphysically important phenomena. I will say more about this view in the next chapter, but this brief description is sufficient for this chapter's purposes. This takes us to the next variety of hylomorphism, neo-Aristotelian hylomorphism.

2. B. Neo-Aristotelian Hylomorphism

Neo-Aristotelian hylomorphism is part of a wider resurgence of interest in Aristotle on the part of contemporary analytic metaphysicians. Unlike neo-scholastic hylomorphists interest in Aquinas, these neo-Aristotelians' interest in Aristotle is not part of a desire to bring back his philosophical views *in toto*. In fact, they often find significant aspects of his views, such as his

[58] Oderberg (2007: 65 – 8).
[59] They differ from property dualists like Chalmers (1996: 94 – 106) in arguing that we cannot give a plausible physicalist account of intentionality, as opposed to arguing that phenomenal states are inexplicable in terms of physical events.
[60] Also, Toner (2008: 292 – 3) presents his account as a way of heading off Hasker's (1999: Ch. 5) argument for substance dualism.

claim that organisms lack separable parts, unworkable.[61] Rather, their endorsement of Aristotle's views comes more on a case-by-case basis. Neo-Aristotelians look back to Aristotle's works in order to find aspects of his views that they think will help move debates in contemporary analytic metaphysics forward. This includes topics such as persistence over time;[62] the nature of substance;[63] causation[64] and the relationship between essence and modality.[65] Neo-Aristotelian hylomorphists look back to Aristotle primarily for help solving problems relating to composition, such as the special composition question and the grounding problem.

The special composition question asks: "What are the necessary and sufficient conditions for a plurality of objects to compose another object?"[66] The three broad answers to it are "no conditions," "every condition," and "some but not all conditions." These are given by mereological nihilists, universalists and restricted composition theorists respectively. Nihilists believe that there are no composite objects, and only mereological simples exist.[67] Universalists believe that any two objects compose a third.[68] One is a restricted composition theorist if one's views fall anywhere in between. Unlike nihilists and universalists, the views of restricted composition theorists' views run the gamut. They disagree with one another about significant issues such as the existence of artifacts, the existence of the parts of organisms and even whether the partisans of these debates substantially disagree with one another.[69] They are all

[61] For example, see Koslicki (2008: 113 – 4).
[62] For example, see Wiggins (1980) and Lowe (2009a).
[63] For example, see Loux (1978), Hoffman & Rosenkrantz (1994 & 1997) and Lowe (2006 & 2009b).
[64] For example, see Ellis (2001: Ch. 4), Molnar (2003) and Heil (2003: Ch. 8).
[65] For example, see Fine (1994 & 1995), Koslicki (2012) and Lowe (2012).
[66] The basic formulation of the question comes from van Inwagen (1990: Ch. 1).
[67] For example, see Unger (1979), Dorr (2002) and Sider (2013).
[68] For example, see Lewis (1986b: 212 – 3), Schaffer (2009: 358 – 359, fn. 11), Sider (2001) and van Cleve (1986)
[69] For examples of such philosophers, see Hirsch (2002), Hoffmann & Rosenkrantz (1997), Koslicki (2008), Markosian (1998), Merricks (2001) and van Inwagen (1990). Hirsch stands out from the others listed in that he thinks the debates around the special composition question are merely verbal.

united, however, in the desire to find a principled middle ground between nihilism and universalism.

The next issue neo-Aristotelian hylomorphists bring their views to bear on is the grounding problem. I will discuss this problem at length in Chapter Three, so I will give a simplified version of it here. The grounding problem arises like so: Imagine a clay statue and the lump of clay it is made from.[70] The lump existed before the statue and can survive being smashed while the statue cannot. By Leibniz' law, these modal and temporal differences entail that the lump is numerically distinct from the statue. However, once we grant that the statue and the lump are distinct things, we have the following problem.[71] The lump and the statue differ in regards to what Bennett (2004: 341) calls their sortalish properties. Sortalish properties are

i. Persistence conditions, particularly modal properties,
ii. Kind membership, and
iii. Properties had at least in part in virtue of the properties described in (i) or (ii).

Intuitively, the statue's and the lump's sortalish properties should be explained by their non-sortalish properties, such as the properties of their parts, their parts' arrangements and the properties that are grounded in them. But that cannot be the case for the statue and the lump since by hypothesis they share all of their non-sortalish properties. So we seem forced to say there is no explanation for why the lump's and the statue's sortalish properties differ. But this seems implausible, too.

There are two broad approaches the grounding problem. Following Kit Fine (2008), we can call the philosophers who take the first approach "monists". Monists agree that we cannot

[70] While variations of this argument have proliferated over the decades, the *locus classicus* of the following argument is Wiggins (1968). The lump and statue example is adapted from Gibbard (1975).
[71] An important version of this argument is found in Burke (1992), but see Olson (2001) and Bennett (2004) for important discussions of this problem.

explain why the statue and the lump differ in regards to their sortalish properties. They try to dissolve the grounding problem by undermining the argument for the claim that the statue and the lump are numerically distinct.[72] We can follow Fine again in calling the philosophers who take the second approach "pluralists". Pluralists accept that the lump and the statue are distinct, and then either try to explain their difference of sortalish properties or minimize (or at least downplay) their inexplicability.[73]

Before describing how neo-Aristotelian hylomorphists weigh in on these issues, I want to briefly discuss a point of contention between neo-Aristotelian hylomorphists. One point of contention between them is whether to accept the neo-Aristotelian thesis (NAT). Following Bennett (2011b: 1), we can formalize NAT in the following manner:

(NAT) All mereologically complex objects have formal proper parts.

That is, composite objects have their forms as literal parts. The observant reader will recognize that NAT's name is a bit of a misnomer. As I pointed out in §1.A, there is some evidence that Aristotle held it or something close to it at one point. Moreover, neo-scholastics accept something close to it, and their *raison d'etre* is to bring back what is universally acknowledged as an old idea. Nevertheless, this is its name in the literature, so I will not buck the trend by giving it a different name.

As I said, neo-Aristotelian hylomorphists disagree about NAT's plausibility. For example, Kit Fine (1999 & 2008) and Kathrin Koslicki (2008) endorse it, while Mark Johnston (2006) argues at length against it. Some neo-Aristotelian hylomorphists seem to take no line on NAT one way or another, such as Michael Rea (2011).

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[72] Examples of monists include Burke (1994), Gibbard (1975), Lewis (1971), Merricks (2001), Olson (2001) and van Inwagen (1990).
[73] Examples of pluralists include Fine (2005 & 2008), Koslicki (2008), Moyer (2006) and Rudder Baker (2002 & 2007).

I also take this opportunity to say that I will be focusing my attention in the following chapters on the accounts that include NAT. There are three reasons for this. The first reason is that NAT is an interesting thesis that is relatively novel from the standpoint of contemporary metaphysics. The second reason is more aesthetic. Given that NAT-affirming neo-Aristotelians share the view that forms are parts with neo-scholastic hylomorphists, focusing on these neo-Aristotelians will give my project a nice thematic unity. The last reason is somewhat pragmatic. Addressing the positive views of neo-Aristotelians who reject NAT would take my discussion too far afield from the ultimate goals of my project. So, while their accounts are interesting and deserve attention, I can give only attention to parts of their views given my projects' constraints.

So, how do neo-Aristotelians bring NAT to bear on the special composition question and the grounding problem? In regards to the special composition question, Koslicki's account exhibits the most explicit use of NAT to answer it. She also uses NAT as part of her method of restricting composition. She does this by claiming that all genuine composite objects' meet the criteria set by the formal parts or "structures" that are characteristic of their essential kinds. In regards to the grounding problem, Fine (2008) and Koslicki (2008) use NAT to point out a non-sortalish difference in order to explain the lump's and the statues' difference of sortalish properties. Specifically, they claim that the statue has a *part* the lump lacks, the form of a statue. From this non-sortalish difference, they claim, we can explain the difference in sortalish properties. How all this is supposed to work takes us to the last section of this chapter.

3. The Way Forward

Since I have spent the majority of this chapter describing what others think, it is now time to

outline my project. My project has two parts, one critical and one constructive. The critical part of my project is to argue against the varieties of hylomorphism that treat forms as parts. To that end, I will argue that the neo-scholastic forms of hylomorphism on offer have serious metaphysical liabilities we should avoid if possible. I will also argue that while there are no conclusive arguments against NAT, neo-Aristotelian hylomorphists arguments for NAT fail, too. My constructive project will consist mainly of adapting and reforming Koslicki's manner of restricting composition without making reference to NAT.

I will begin my project by discussing neo-scholastic hylomorphism in the next chapter. I will focus mainly on the work of David Oderberg and Patrick Toner, since their work provides us with a good sense of the basic neo-scholastic views on substantial forms, prime matter, and the nature of substance between the two of them. I will argue that we should reject this view as it currently stands because their acceptance of prime matter and their view of substance create more problems than they solve.

In the third chapter, I focus primarily on Koslicki's account and describe how NAT factors into it. I will then discuss the reasons she gives for accepting NAT. Specifically, I will address her "Master Argument" as well as her claim that NAT lets us solve the grounding problem. I will argue that she and her ideological sympathizers have failed to compellingly argue for NAT, and that there is also no compelling direct argument against it, either.

In the final chapter, I begin my constructive project. I will argue that while Koslicki fails to justify NAT, her overall manner of restricting composition is plausible and viable without NAT. I modify her account to avoid reference to NAT as well as fill in some details she left open. I then close out the chapter by tying up some loose ends from the second chapter by

discussing the relationship between ontological dependence and metaphysical explanation, as well as the dependence relations that hold between composite objects and their parts.

Chapter Two

Doubting Thomas: A Critical Evaluation of Neo-Scholastic Hylomorphism

0. Introduction

This chapter marks the beginning of my project's critical portion, which I will begin by discussing neo-scholastic hylomorphism. In the previous chapter I said neo-scholastic hylomorphism has its roots in the metaphysics of Thomas Aquinas. As a rule neo-scholastic hylomorphists share the ultimate goal of reconciling Aquinas' metaphysics with the findings of contemporary science. Accordingly, Aquinas' system is the starting place for neo-scholastic hylomorphists' metaphysical enquiries.[1] Due to its use in defense of Roman Catholic theology and the difficulties of reconciling it with metaphysical naturalism, neo-scholastic hylomorphism is a minority view among analytic metaphysicians. However, the view has an impressive pedigree and, as we shall see, evaluating it will let us gain some insight into the nature of substance and ontological dependence.

[1] For example, see Oderberg (2002: 126).

I turn now to the task of presenting and evaluating neo-scholastic hylomorphism. My ultimate conclusion is that the view is currently untenable despite incorporating some keen metaphysical insights about the nature of substance. In the following section, I present the basic core of the view, its account of substance, form, and matter. In the section after that, I criticize some aspects of the view and then argue that there is insufficient reason to take these problematic theses on. I will then wrap up the chapter by summarizing my findings and transitioning to my discussion of neo-Aristotelian hylomorphism.

1. Neo-Scholastic Hylomorphism: A Brief Sketch

Let me begin this section with a caveat. As much as I would prefer to present a single philosopher's account, I cannot do so. This is because there is a difference of emphasis among neo-scholastic hylomorphists. Some extensively discuss the view's understanding of form and matter and say little about substance while others do the opposite. In order to present a balanced picture, I will present aspects of both David Oderberg's and Patrick Toner's accounts. By and large their accounts are in synch, and I will note where they seem to disagree.

This chapter section has three subsections. In the first, I discuss what neo-scholastic hylomorphist think substances are and what kinds of entities they think are substances. In the second, I discuss their basic views of substantial forms and what metaphysical roles they play. Finally, I close out this section by discussing neo-scholastic hylomorphists' view of prime matter.

1. A. Substances as Integrated Wholes

As philosophers use the word, "substance" is inherently a term of art.[2] This separates substance from other philosophical notions like personhood, causation and knowledge, which come from everyday thought and discourse. Moreover, philosophers use "substance" to express two different ideas. The first use more or less corresponds to the notion of a concrete individual object.[3] We can contrast substances of this sort with other categories of being, such as properties, events and facts. The second use of "substance" expresses the idea of a metaphysically independent being. Substances of this sort are independent in the sense of being *basic* or *fundamental* beings. While these two senses of substance are not mutually exclusive, they could conceivably come apart. For example, someone might think there are ordinary objects while also thinking that events are the fundamental entities.[4] For such philosophers, substances in the first sense are not substances in the second sense of the term.

I raise this terminological point for two reasons. First, I am taking this opportunity to clarify how I will use "substance" in this chapter, namely, in the second of the above senses. Additionally, I will use "object" to refer to concrete entities that are not properties, events, etc. As such, it may be the case that some objects are substances while others are not. Second, I mention all of this because it picks out a characteristic feature of neo-scholastic hylomorphism. Neo-scholastic hylomorphists think substances are fundamental objects that are essentially instances of fully determinate object kinds. That is, what it is to be a substance is to be an instance of the relevant substance kinds.

This brings us to the question of what kinds are substance kinds. Neo-scholastic hylomorphists follow the Aristotle of *Cat* 2 and 5 in taking organisms to be substances. This is not to say that they think only organisms are substances, since they seem committed to the

[2] Robinson (2014).
[3] For an example of this use, see van Inwagen (2007: 200).
[4] For an example of such a view, see Nolan (2011).

existence of non-organic substances. They seem to accept the existence of things like artifacts and heaps that have no organic components. While they do not think those things are substances, accepting their existence requires there being non-organic substances of some kind upon which they depend.

That being said, neo-scholastic hylomorphists apparently disagree about what non-organic substances there are. For example, Oderberg (2007: 69, 80) seems to think that quantities of stuff like, for example, lumps of gold are substances. By contrast, Toner (2010: 34; 2008: 285 – 6) seems committed to denying these are substances since they lack non-redundant causal powers. I mention this merely to give a clearer picture of the view's shape. Insofar as nothing in my evaluation turns on this point, I will not take a side in this internecine debate.

We must now ask how mereologically complex organisms could be fundamental beings. After all, don't composite objects depend on their parts? The strategy here for neo-scholastic hylomorphists is saying that while organisms have parts, they do not have any *separable* parts. By "separable part" they mean a part that is ontologically independent of its host composite and can exist apart from it. For neo-scholastic hylomorphists, all of an organism's parts are ontologically dependent on the specific organism that has them. This dependence relation makes organisms into intense cases of what Jonathan Schaffer (2009: 374) calls *integrated wholes*. An integrated whole is a composite object all of whose proper[5] parts are ontologically dependent on it. On this account, what makes organisms into intense cases of integrated wholes is that integrated wholes do not necessarily have to possess non-separable parts. By that, I mean that there is no obvious reason in principle why the parts of an integrated whole could not change their dependence base over time by being transferred from one whole to another. As a result, it seems right to say that neo-scholastic hylomorphists think substances are intensely

[5] That is, a part that is non-identical with the whole. See Koslicki (2008: 12) for more details.

integrated wholes because removing any of their parts would automatically result in the destruction of those parts. This point holds for any putative composite substance, organic or inorganic.

On this view, organisms are the dependence base of both their organic and inorganic parts. An organism's organic parts are those that are inherently designed to perform some vital or non-vital function for the substance. Examples of such parts include organs, bones and cartilage. Inorganic parts are those that are non-biological in nature. Rather, these parts are the kinds of objects chemists and physicists study. For Aristotle and the medievals, these kinds of parts were earth, air, water and fire. For us, a list of something's inorganic parts would include carbon atoms, protons, electrons, quarks and so on.

In order to better understand this view, we need to look at the details of the account. Let us begin by looking at their account of organic parts. First, Toner suggests that the nature of organic parts plausibly makes them depend on their host organisms. He (2010: 42) puts it this way: "It makes sense to say that part of what it is to be a liver is to play a certain kind of role in an organism, and that when something no longer plays that role, it is no longer a liver. Although we refer to a detached liver as a liver…we use the term equivocally." The idea here is that of Aristotle in *Met* Z. 10. Jonathan Barnes summarizes the idea thusly:

> Parts are essentially parts of *wholes*; fingers are essentially fingers of *bodies*. In order to explain what it is to be a finger we must make reference to bodies; and for there to be fingers is precisely for bodies to be in such-and-such a condition. Fingers are not fundamental. (Barnes, 1995b: 99)

To be clear, Toner does not *argue* for this view so much as he suggests it as a way to understand the nature of organic parts. This suggestion has some initial plausibility, since any attempt to provide an account of what an organ is will have to make reference to its biological

function.[6] At the very least, Toner's account seems to be a decent starting place for clarifying the relationship between such parts' functions and their essences. If we find this account of organic parts' essences plausible, we will be less inclined to reject the idea that an organism is ontologically prior to its functional parts. However, this view comes at a cost. The idea of an organ transplant would seem to require that an organ persists through its removal from the donor and its placement in the recipient. This account of organic parts apparently entails that organ transplants never occur, strictly speaking. I address the consequences of this suggestion in §2. B. 2 below, so I will grant it for now for sake of argument.

Even granting the plausibility of Toner's suggestion for organic parts, we cannot extend it to cover inorganic parts. No plausible account of their essences will take reference to organic functions to be essential to them. For example, physicists would not define electrons in terms of the multitude of roles they might happen to play in an organism, nor should they. So how can we motivate the claim that electrons and quarks are inseparable parts of organisms?

Toner thinks things like electrons and quarks exist as substances when free-floating but cease to exist when they become parts of organisms.[7] This does not mean that organisms lack electrons or quarks as parts, however. Toner thinks substances' inorganic parts are merely what Lowe (1998: 101) calls "spatial parts" as opposed to "substantial parts". Something is a substantial part of an object if and only if it is a substance and a part of another object. A purported example of a substantial part would be a single bee in a swarm of them. By contrast, a spatial part of an object would be a spatially defined region of the object.[8] The example that

[6] Of course, Toner also assumes that any organ is essentially an organ. While this claim is not trivially true, it seems very plausible, at least at first glance.
[7] Loux (2006: 117) takes a similar view.
[8] Here is a potential problem for Toner's view. This characterization of spatial parts suggests that they are individuated by their spatial location within a whole. This would be problematic for Toner, since organisms have a lot of inorganic moving parts. It seems as if their inorganic parts cannot be individuated by location. However,

Toner (2010: 288) gives is Lowe's example of "the left-hand third of my desk facing me." These two kinds of parts are distinct, but it is unclear that they're mutually exclusive. For example, it seems as if the left-hand third of the desk facing someone can be a substantial part if we take "the left-hand third of the desk facing them" to non-rigidly refer to an object that can exist apart from the desk.[9]

According to Toner, while inorganic substances cease to exist upon assimilation into a substance, their causal powers are inherited by that substance's resulting new spatial parts. Given that composite substances are ontologically prior to their spatial parts, composite substances are the ultimate subjects in which these powers inhere. Toner gives the following illustration:

> …[C]onsider substratum theory….Imagine that a substance has a substratum in which its properties inhere. Imagine further that the hydrogen atoms and oxygen atoms are substances, and also that they are [metaphysical] atoms…Each atom has a substratum in which the various properties – including, of course, the causal powers – of the atom inhere. Now, imagine two hydrogen atoms and an oxygen molecule coming together to form a water molecule; and suppose this water molecule is a substance. When the water molecule comes into existence, the original three substrata disappear, and a single new substratum comes into existence. The properties that used to inhere in the three atomic substrata now inhere in that one molecular substratum; now, there is just one substance present – the water molecule. (Toner, 2008: 287)

At this point, we might wonder whether Toner can truthfully say that we have electrons *inter alia* as parts, since *electron* and the like are *substance* kinds. Toner thinks he can say this with a little qualification. In order to see how, let's take a brief look at a distinction Toner borrows from Michael Rea (2000: 172). Rea distinguishes instantiating a kind in a *classificatory* way from instantiating a kind in a *merely nominal* way. We can distinguish them like so:

> (CK) Some x is a classificatory instance of a kind K if and only if "x is a K" is the metaphysically best answer to the question of what x is.

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since Toner never addresses the question of how exactly these parts are individuated, I am unsure of how big a problem this really is. Accordingly, I will set this potential problem aside for the duration of this discussion.

[9] Of course, there is some controversy about whether such an arbitrary undetached object would be a real entity. I address the question of whether these kinds of objects are real in Chapter Four §3.C.1 below.

And,

> (NK) Some x is a merely nominal instance of a kind K if and only if x instantiates qualities that are distinctive features of classificatory instances of K and x is not a classificatory instance of K.

Here is an illustration. Imagine a bronze statue of a ship, call it "ship". Let us further stipulate that ship is a classificatory instance of *statue*. Accordingly, ship is essentially a statue and has the persistence conditions associated with *statue*. On the other hand, ship apparently has a lot of important properties in common with instances of the kind *bronze lump*. It has the same chemical components as a lump of bronze, has the density and mass of a comparable bronze lump, etc. All of this indicates that while ship is a statue in the sense of CK, it is also nominally a lump of bronze.

Accepting Rea's distinction lets Toner (2008: 288 – 9) say organisms have electrons and quarks as parts. Insofar as a substance's spatial parts instantiate the causal powers of electrons and quarks, they count as nominal instances of those kinds. So, Toner can say that we are substances that, in a qualified sense, have quarks and electrons as parts.[10] With Toner's distinction in hand, Toner asserts that science per se is neutral between his account and the commonly accepted atomist interpretations of it. His and their interpretations of the scientific data are empirically equivalent, so he concludes science isn't a problem for his view so much as the metaphysical theses people use to interpret the empirical data.

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[10] Possible Objection: According to some philosophers, such as Armstrong (1997: 65 – 8), Bird (2012) and Heil (2005: 410 – 1), all there is to being an electron is having the characteristic charge, mass and spin associated with the kind. Accordingly, it follows that Rea's distinction does not actually apply to anything. So, Toner cannot use it in order to avoid his problem.
Reply: This is one way of understanding kind membership, but it's not the only one on offer. Some of them, such as those of Ellis (2001), Loux (2006: 107 – 10) and Lowe (2006: 26), are compatible with Rea's distinction. Also, if having those features is there is to being an electron, then it is unclear Toner even needs this distinction. It seems that he could say that the spatial parts of substances are literally electrons due to the fact that they have the right properties.

I want to mention one last thing before I close out this subsection. In addition to being intensely integrated wholes, neo-scholastic hylomorphists think substances are agents in a very robust sense. Among other things, this means that substances are causally active things, as opposed to merely being acted on by other things.[11] However, Toner (2008: 285 – 6) goes even further than this.[12] Toner thinks substances must have non-redundant causal powers, i.e. powers that are not grounded in the properties, activities and arrangements of their parts. Having non-redundant causal powers is one of the things that separate substances from mere aggregates.[13] Toner, then, endorses a restricted version of what Jaegwon Kim (1993: 348) calls Alexander's dictum (AD).[14] AD states that "to be real is to have causal powers," a claim that Kim (1993: 350) interprets to imply that something that is irreducible to its dependence base must have "novel" (i.e. non-redundant) causal powers. Toner's thesis is restricted in the sense that while AD is supposed to apply to everything, Toner's claim is limited to fundamental entities.

1. B. Form and Matter

Having sketched the neo-scholastic view of substance, we can now discuss what makes it a *hylomorphic* theory of substance. I say this because nothing I have said so far distinguishes this view from Michael Loux's (1978: 163 – 80; 2006: 107 – 17) non-hylomorphic Aristotelianism. It is now time to see how form and matter come into the picture.

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[11] This idea has a storied history. For example, Leibniz depended heavily on it in his critique of Malebranche. For more details, see Rutherford (1993).

[12] *Pace* Toner (2010: 26 – 7), I doubt this commits neo-scholastic hylomorphists to the view that substances are the relata of causal relations. While eminent philosophers such as Chisholm (1982) and Lowe (2008: Ch. 8) have thought this (at least for some kinds of causation), it is notoriously difficult to maintain. I cannot adequately defend the claim here, but I think that those who accept a Kim-style analysis of events can skate by with simply saying that substances a) exemplify causal powers and b) partially compose the events that are the relata of causal relations.

[13] Cf. Merricks (2001: 114 – 6; 2005: 630 – 3) and O'Connor (2008: 54 – 5).

[14] For the history of AD and its origins in the writings of Samuel Alexander, see Kim (1993: 348 – 9). For a critical evaluation of AD, see Hudson (2003).

Neo-scholastic hylomorphists add form and matter to their account in order to clarify their claim that substances are mixtures of actuality and potentiality. They make this claim because their candidate substances routinely come into and go out of existence. Their broadly Aristotelian understanding of change motivates them to postulate a principle of potentiality (i.e., matter) that undergirds the possibility of change and a principle of actuality (i.e., substantial form) that actualizes this possibility.[15] Let us now discuss these principles in detail.

1. B. 1. Form as a Basic Part

David Oderberg gives us the following description of substantial form:

> …[Substantial form] is the 'intrinsic incomplete constituent principle in a substance which actualizes the potencies of matter and together with matter composes a definite substance or natural body.'…Now substantial form is *intrinsic* since it is a constituent solely of the substance. It is a *constituent* because it is a real part or element of it, though not on the same level as a substance's natural parts such as the branch of a tree or the leg of dog. Rather, substantial form…is a radical or fundamental part of the substance in the sense of constituting it as the kind of substance it is. It is a *principle* in the sense of being that from which the identity of the substance is derived – that *by virtue of which* the substance is what it is. It is *incomplete* in the sense that it does not and cannot, contra Platonism, exist apart from instantiation by a particular individual. (Oderberg, 2007: 65 – 6)

Note first that this is explicitly a mereological understanding of form. Forms are literally parts of substances, though of a special sort. They are essential parts in that losing them destroys their host substances and in the sense that forms are primarily what make substances what they are in a metaphysically deep sense. Second, insofar as forms are parts, they are intrinsic to what have them.

Finally, forms ontologically depend on substances. It is somewhat unclear what Oderberg thinks this dependence amounts to. He (2007: 84) affirms that substantial forms are

[15] Oderberg (2007: 62 – 5) argues for neo-scholastic hylomorphism by appealing to the phenomenon of substantial change. I address this in more detail in §3.A below.

universals of some sort and then writes, "Nothing that exists in the spatio-temporal world exists as anything more than particulars. There are universals, but these exist only as particularized – except in the mind, where they exist as universal and hence as abstract." He (2007: 270, note 27) clarifies later that talk of universals' existence in the mind should be taken somewhat literally. He goes further to apparently say that a universal exists as its multiple instances out in the world while literally being one thing in the minds of people who can think about it.[16] At the very least this seems paradoxical, since it apparently entails that *one* thing can exist as *several* distinct things simultaneously. While Oderberg's espoused view is of questionable coherence, this does not strike me as a serious problem for neo-scholastic hylomorphists generally. As far as I can tell, neo-scholastic hylomorphists need only say that substantial forms are dependent beings, not that they are dependent in the exact way Oderberg claims. Accordingly, I think they could cash this dependence out in other ways, such as treating substantial form as tropes or relevantly trope-like.[17] Since none of my criticisms of neo-scholastic hylomorphism depend on this aspect of Oderberg's account, I will set it aside.

Oderberg refers to substantial form as the "structure" of substances. Identifying substantial form with structure is a common tack among hylomorphists.[18] However, Oderberg means something unique by it. It is tempting to think of something's structure as the way that its parts are arranged, i.e., as a relation or set of relations that hold between something's parts. Some neo-Aristotelians explicitly think of form in this way.[19] Oderberg (2007: 66 – 9) does not. For reasons I cannot fully spell out here, he (2007: 67 – 8) doubts we can identify a relation or set of relations that tie(s) all and only a target object's parts together. Rather, he takes the view

[16] I cannot say for certain, but I suspect Oderberg's view is an attempt to spell out one suggested by Aquinas in *De Ente et Essentia* Ch. 3. See Aquinas (1998: 38 – 9) for more details.
[17] I say more about the nature of ontological dependence in §3.B of this chapter and §4.A of Chapter Four.
[18] For example, see Koslicki (2008) and Toner (2012).
[19] For example, see Fine (1999).

I attributed to Aquinas in the previous chapter, i.e., that form is a basic *sui generis* entity that combines with prime matter to compose a substance.[20]

Neo-scholastic hylomorphism's conception of form as a basic entity is tied to form's role as the principle of unity for substances. For reasons I present below (§2.A), neo-scholastic hylomorphists think prime matter lacks any unity per se. According to this view, form communicates its own unity to matter, the result of which is the existence of a tightly unified substance. It has to be a tight unity in and of itself in order to perform this role. They take this to mean that substantial forms are indivisible in the sense of being basic forms that cannot be separated into further parts or features.[21] If forms had any constituents of their own, there would have to be some further principle of unity that unites these constituents together. It would then follow that whatever unites a form's constituents is the substance's real principle of unity.[22]

Having presented neo-scholastic hylomorphism's basic account of form, I should mention something that makes it a *neo*-scholastic view. For both the medievals and their contemporary ideological descendents, substantial forms are the "formal causes" of substances. For the medievals, this meant that forms provided two different kinds of explanation, one metaphysical and one proto-scientific. The medievals followed Aristotle in asserting that we need forms to act as principle of unity and to (at least partially) ground the identity and persistence conditions of substances and their parts.[23] Substantial forms do this by providing the whole substance's essential function, those of its proper parts and how their functions

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[20] See Chapter One §1.B.
[21] See Amerini (2013: 28 – 33) for Aquinas' rationale for accepting this thesis and the related thesis that a substances can have only one substantial form.
[22] Cf. Aristotle's argument in *AN* I. 5 411^{b}5 – 14.
[23] Aristotle, *Met* Z. 17.

contribute to the functioning of the whole.[24] This level of functional unity provides substances with their tight unity and explains why they lack separable parts. This is another reason why a form cannot be identified with a relation or collection of relations holding between something's parts. While the instantiation of relations is posterior to the existence of their relata, substantial forms are explanatorily prior to the existence of the parts of substances.

As I discussed in Chapter One §1.C.1, the medievals blurred the line between formal and efficient causes by affirming that substantial forms produced and sustained many of substances' accidental features. Despite their reverence for their medieval forebears, neo-scholastic hylomorphists primarily emphasize the metaphysical roles substantial forms can play. It is easy to see why. As I said in the previous chapter, we can adequately explain why, for example, quantities of silver have their characteristic properties in mechanistic terms. There is no need to postulate a further, ontologically basic substantial form to produce and sustain those features.

1. B. 2. Prime Matter

Having discussed substantial form, let us now turn to its correlate, prime matter.[25] The notion of prime matter is difficult to characterize, primarily because it is hard to say anything positive about it. This is because prime matter is not *actually* anything. It is not an individual or some kind of generic stuff. It does not have any actual features, essential or accidental. Anything something could actually be, prime matter is not. It is, to use Oderberg's (2007: 72) own words,

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[24] Oderberg (2007: 67 – 71). See also Pasnau (2004: 40 – 2; 2011: §24) and Aquinas, ST I, Q. 76, a. 8.

[25] In addition to prime matter, neo-scholastic hylomorphists postulate another variety of matter, which they call "designated matter". The exact reasons why they postulate designated matter and how it relates to prime matter raise a tricky set of issues. As a result, I cannot adequately discuss this variety of matter in the space allotted in this chapter. Moreover, none of my criticisms of neo-scholastic hylomorphism depend on anything related to the notion. For an introduction to designated matter and the philosophical issues surrounding it, see Oderberg (2002 & 2007: 108 – 20).

"the closest there is to nothingness without being nothingness..." Prime matter is pure potential being, its only characteristic being the potential to receive substantial forms. In this sense, prime matter per se is potentially any and everything without actually being anything.

So far, prime matter might sound bizarre and confusing, if not outright incoherent. Why would neo-scholastic hylomorphists make it a part of their ontology? Oderberg and other neo-scholastic hylomorphists think we need to postulate an ultimate material substrate and that prime matter is the only plausible candidate for this substrate. We can understand the idea of an ultimate material substrate or "ultimate matter" as matter that has no matter of its own, i.e., matter that is not made of something else.[26] The neo-scholastic hylomorphist postulate of prime matter is one candidate for the ultimate material substrate, one that they postulate for reasons listed below.[27] Neo-scholastic hylomorphists think we need to postulate an ultimate material substrate in order to ground the possibility of substantial change. We can initially characterize substantial change as a substance coming into or going out of existence, but that characterization is only a rough approximation. Oderberg et al, naturally, want to distinguish everyday substantial changes from things being annihilated or created *ex nihilo*. I share this inclination since there is an intuitive difference between, say, the natural generation of new organisms and the possibility of God creating a new organism completely out of nothing. What distinguishes substantial changes from creation *ex nihilo* and annihilation is that, unlike the latter two, the former requires a material substrate that pre-exists and survives the change. But, Oderberg says, the only way to guarantee the possibility of substantial change is to

[26] Fine (1992: 42).
[27] See Pasnau (2011: Ch. 3) for more details on the historical debates regarding the nature of ultimate matter.

postulate an ultimate material substrate that is the substrate of all substantial change and cannot undergo substantial change itself.[28]

Even if we do need to postulate some kind of ultimate material substrate, why should we think it is prime matter? I will get into the full story in §3.A below, but I can say a little bit about why here. Oderberg does not say so explicitly, but I suspect that his reasoning is as follows.[29] Assume that the ultimate material substrate is not purely potential in nature and is thus actually something or other. Since form is what gives actuality to something, this ultimate matter would then be a matter-form composite. But, this would imply that this substrate is made of another sort of matter. This, by definition, cannot be the case. Hence, the ultimate material substrate can only be characterized as purely potential.

2. Evaluating Neo-Scholastic Hylomorphism

Having sketched the theory, we can now start to evaluate it. I have several objections to this view. First, I have qualms about the idea of prime matter. Second, I think that neo-scholastic hylomorphism's account of substance creates more problems than it solves. Insofar as neo-scholastic hylomorphism's view of substantial forms is tied to its account of substance, undermining the latter will also undermine the former.

2. A. Against Prime Matter

I want to begin this subsection by clarifying what I aim to accomplish. Specifically, I want to make it clear that I do not claim to give a knock-down argument against the idea of prime

[28] Oderberg (2007: 74 – 6). I discuss their claim that prime matter is the material substrate for all substantial change in §3.A below.
[29] The reasoning here is more or less that implicit in Aquinas (1998: 21 – 2).

matter. Rather, my criticisms here are primarily to highlight some serious problems with neo-scholasticism's characterization of prime matter.

As was said above, neo-scholastic hylomorphists think prime matter must lack all actuality in order to be the ultimate material substrate. If it has any actual features in itself, it would have to possess some sort of form. That would make the ultimate material substrate a composite of matter and form, thus making it non-ultimate matter. Nonetheless, as Oderberg (2007: 72) admits, prime matter must exist and have an identity of its own if it is to undergird substantial change. It could not be the substrate of substantial change if it did not. That is, prime matter has to exist prior to the substantial change and persist through it. However, it does not *actually* exist. Rather, as Aquinas (1998: 22) says, it only exists potentially.[30]

There are two problems with this schema. First, it seems as if we typically treat existence and actuality, at the very least, as being coextensive. The reason why is because of a plausible fact about the nature of potentiality. Some entity x being potentially but not actually F entails that x is not F. We can see that this claim is plausible by looking at examples. For example, if I say that Daenerys is potentially yet not actually burned, my statement entails that Daenerys is unburned. Rather, it seems as if saying that Daenerys is just potentially burned implies that she has other features that ground her potential for being burned. This is not to say that all potentiality is grounded in actuality, since we might need to postulate a primitive potentiality to have features at some level. I am simply making the point that having the mere potential for having a feature precludes having that specific feature.

While existence is not a kind or property, the general point still seems to apply. When we say that a younger sister for Princess Charlotte potentially exists, we are not saying that

[30] For a reminder of why prime matter can only potentially exist, see Chapter One §1.B above.

Princess Charlotte's younger sister has potential existence analogously to how Charlotte has actual existence. Rather, Charlotte's younger sister potentially exists in virtue of Prince William and Princess Katherine both existing and being capable of having more children. Nonetheless, Princess Charlotte's younger sister does not exist as of my writing. What I think this case suggests is that claims about potential existents are made true, not by such things having a lower grade of existence, mere potential existence. Rather, such claims about potential existence are made true by facts about what is actually existent. So, strictly speaking, while it is perfectly correct to say that some things potentially exist, there does not seem to be such a thing as potential existence. Thus, insofar as prime matter only has potential existence, it seems that prime matter does not exist.

Finally, and perhaps most damagingly, it seems as if prime matter cannot perform the role it is postulated to play. The reason why is that prime matter per se is "indivisible". As Oderberg puts it,

> …[prime matter] is common, i.e. multiply instantiable (wherever there is actuation by a substantial form)…[P]rime matter is indivisible, being mere potentiality, so it cannot serve as the basis of the division of a species or nature into individuals. We cannot say, 'Here is some prime matter, and there is some more,' but we can say, 'Here is Socrates, and there is Callias', or in other words 'Here is prime matter informed by the nature of Socrates, and there is prime matter informed by the nature of Callias'. (Oderberg, 2007: 109)

Among other things, Oderberg says that due to its nature as pure potentiality, prime matter cannot come in distinct parcels. As a result, all material substances share the exact same prime matter. But if this is so, how could prime matter be the substrate of multiple substantial changes? Consider the fact that there are multiple substances of the same kind. Recall the example of Princess Charlotte. On the view under consideration, Charlotte's coming into existence occurred when a human substantial form joined with prime matter in order to generate a new human substance. Either this form is a universal shared by all human beings or

it was an individual form unique to Charlotte. Both of these options are problematic. If this substantial form is a universal, it seems as if prime matter was already joined with it since human beings existed prior to Charlotte coming into existence. But, how could prime matter come to be joined with a substantial form that it is already joined with? The very idea sounds contradictory.

One could avoid this seeming contradiction by taking the following line: individual humans come into being when their *individual* form of humanity joins with prime matter. Oderberg's remark about "prime matter informed by the nature of Socrates" etc. in the above cited passage seems to suggest this view of substantial change. While this description of substantial change seems internally consistent, it seems to create problems for neo-scholastic hylomorphists. First, it seems as if Oderberg cannot make this move since he (2007: 109) apparently says that individual forms are individuated by their being instantiated in matter. Thus, there cannot be individual forms prior to their instantiation in matter. Second, this way of understanding substantial change is problematic for neo-scholastics even if they reject this way of individuating forms. If substances come into being because their individual forms are added to prime matter, then it follows that the existence of forms is explanatorily prior to that of substance. However, if the existence of forms is explanatorily prior to that of substances, it is unclear how forms can depend on their host substances. As I argue in the final chapter, explanatory priority of this sort implies ontological priority.[31] Thus, neo-scholastic hylomorphists cannot understand substantial change in these terms. As a result, it seems that prime matter cannot act as the ultimate substrate of substantial change. Thus, not only is the idea of prime matter of questionable coherence, it seems unable to do what its proponents postulate it for. Accordingly, it seems we should reject the existence of prime matter.

[31] See Chapter Four, §4.A.

2. B. Against Organisms as Intensely Integrated Wholes

To reiterate, neo-scholastic hylomorphists think that organisms are substances, which they take to imply that organisms lack separable parts. I will present two criticisms of this view in this chapter subsection. First, I will argue that it is difficult to provide a plausible account of ultimate matter consistent with the claim that organisms are intensely integrated wholes. Second, I will argue that the claim that organisms are intensely integrated wholes gives rise to implausible consequences.

2. B. 1. Intensely Integrated Wholes and Ultimate Matter

I just argued against accepting the existence of prime matter. Part of the reason I objected to prime matter was that its proponents say that it only has potential existence. However, if we move away from Aquinas' view and closer to the view of ultimate matter found in other medieval hylomorphists, this seems to be less of a problem. Unlike Aquinas, these philosophers thought that the ultimate material substrate must have some degree of actuality of its own.[32] So, perhaps we can characterize the ultimate material substrate as being an actually existent substrate that is a "pure determinable lacking quality, quantity, and active power, such that, if informed by any one of a range of substantial forms, it will be one of the two essential constituents of a complete substance."[33] On such an account, we can think of ultimate matter as a kind of stuff analog of bare particulars. It has an identity of its own and actual existence, but it is otherwise indeterminate per se. Parcels of ultimate matter gain determinate features and compose substances in virtue of combining with substantial forms. Accepting this account of

[32] For more details, see Pasnau (2010: 638 – 41).
[33] Kronen and Menssen (2012: 165). I should say that this account of ultimate matter is *inspired by* aspects of their account rather than being an accurate depiction of it. As a historical note, the view described here probably most resembles that of medieval hylomorphist Peter Auriol. See Pasnau (2011: 39 – 40) for more details.

ultimate matter requires further alterations to the neo-scholastic hylomorphist schema, since form can no longer be *the* principle of actuality full stop. However, that does not seem too problematic. One natural way to revise the account is to understand substantial forms as the principle of determination. If we make this further change, that forms cannot be the principle of actuality does not seem obviously problematic.

However the details of the altered account shake out, it seems that they will conflict with the claim that substances are intensely integrated wholes. As was said above, neo-scholastic hylomorphists think substances lack separable parts. But the reality of substantial changes entails that this account's ultimate matter is separable from substances. It survives the destruction of any individual substance and can become a part of something else. Thus, it seems that neo-scholastic hylomorphists must give up their claim that substances lack separable parts, which they might view as a problem. One might try to blunt this conclusion by saying that ultimate matter must be a part of some substance or another, but it still ends up being a separable part of any given substance it composes.

As a side note, one might wonder if this is a problem for Oderberg's version of hylomorphism as well. After all, prime matter has its existence and identity independently of any given substance. So, isn't it a separable part, too? Perhaps, but it is unclear how problematic this really is. Oderberg might avoid this objection due to his denial that prime matter has any actual existence of its own. That being said, the more problematic features of prime matter leaves it unclear how strong this objection is or how Oderberg would fill in the details of this hypothetical objection. As a result, I have decided to withhold judgment about what this line of reasoning means for neo-scholastic hylomorphists of Oderberg's stripe.

It is unclear how to solve this problem without either giving up the reality of substantial change or denying that organisms are intensely integrated wholes. Neither option seems to be an ideal move for neo-scholastic hylomorphists. Without the reality of substantial change, neo-scholastic hylomorphists lose their main argument for the hylomorphic aspect of their account. Moreover, giving up on the reality of substantial change requires a rejection of the thesis that organisms are substances. If organisms are substances, then substantial change is a real phenomenon, since they routinely come into and go out of existence.[34] The other option is to embrace a weaker claim about the manner in which substances' parts depend on them. Rather than saying they are integrated wholes that lack separable parts, they might move to the weaker claim that organisms are merely integrated wholes, at least some of whose parts cannot exist apart from some substance or another. This move would solve the problem in this subsection, but it would require a further amendment to their views on the nature and function of substantial forms. And the following problems would still remain.

2. B. 2. Puzzles about Organisms as Substances

In this section, I will argue that it is plausible that neo-scholastic hylomorphists' view of substance has false consequences. In order to illustrate these problems, I need to make a quick digression to discuss a relevantly similar view of material composites. In past decades, Michael Burke (1992 & 1994) has developed and defended a revisionary account of composite objects and their persistence conditions called the dominant sortal view.[35] The best way to grasp the account is by seeing how Burke uses it to solve the following problem about material

[34] On a historical note, Leibniz (AG: 78 – 9) suggested to Arnauld that animals came into being by an act of creation and could only be destroyed through complete annihilation. To the best of my knowledge, this view is unique to Leibniz.

[35] Rea (2000) also defends such an account. I present Burke's version because he originated it and because Rea's view does not significantly differ for my purposes.

composites. Here is an illustration of the problem. Jamie is a knight fighting in a war. In the course of fighting, he is captured by his enemies, one of whom eventually cuts off his right hand. Call the part of Jamie that is the compliment of his missing hand "J-minus". According to Burke, at the moment right before losing his hand, t_0, Jamie had J-minus as a part.[36] After the amputation at a later time t_1, we have to ask what the statuses of Jamie and J-minus are. After the amputation there seem to be four possibilities. First, there is the possibility that Jamie survived and J-minus did not. Second, we have the possibility that J-minus survived while Jamie did not. Third, there is the possibility that both survived. Finally, there is the possibility that neither survived.

All of these possibilities are problematic. Jamie seems to have survived because, as preferable as it is to have both hands, hands are not vital parts. In other words, we tend to think amputation is mutilation, not murder. On the other hand, J-minus seems to have survived as well. J-minus didn't lose any parts and didn't seem to undergo any significant change during the amputation. But both of them surviving would mean that we now have two things existing at exactly the same place at the same time and sharing all of their remaining parts. According to Burke (1992), this situation has its own problems. But these four options are exhaustive. So what are we supposed to make of this puzzle about Jamie and J-minus?

Burke (1994) tries to solve the problem for opting for the first possibility. But how does Burke defend the claim that J-minus went out of existence when Jamie lost his hand? Burke would point to three facts:

a. Jaime is a person,
b. *Person* is a maximal kind,

[36] One might think hand-compliments like J-minus don't really exist. I agree and give reasons why I think they do not in Chapter Four. However, insofar as I only mention them in order to illustrate how Burke's account is relevantly similar to Toner's, nothing in my discussion ultimately turns on their reality.

And,

c. All persons are necessarily persons.[37]

A kind, K, is a maximal kind if and only if no instance of K can have another relatively largish K as a proper part. A plausible example of a maximal kind is that of *cat*, since no cats have other cats as parts. For example, the left front paw complement of a cat is not itself an animal, even though there are cats that are indiscernible from the left front paw complement of a cat. *Person* likewise is a maximal kind.

How do (a) – (c) entail that Jamie survives while J-minus does not? Assume for the sake of argument that J-minus survived Jamie's hand amputation. If J-minus had survived, then it would have become a person upon Jamie losing his hand. Since *person* is a maximal kind, J-minus was not a person prior to Jamie's hand loss. And as Burke (1994: 135) claims, since both Jamie and J-minus are wholly material beings, it seems as if J-minus has all the parts necessary for grounding a robust mental life at t_1. That is, J-minus has a properly functioning human brain and central nervous system among its parts.[38] But since being a person is a necessary feature for all persons, this would entail that J-minus contingently has a necessary feature. This is a contradiction in terms. So, J-minus must have gone out of existence when Jamie lost his hand.

As I said above, Burke's account is structurally similar to Toner's. They both claim that certain notions are maximal, *person* for Burke and *substance* for Toner, to argue that what

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[37] One might quibble about whether every person is necessarily a person. Some, like Eric Olson, think a broadly Lockean account of personhood allows for the possibility of something contingently being a person. This may be true, but this isn't fatal for Burke's general point. We could replace *person* with the maximal kind like *human organism* and the argument works just as well.

[38] This claim might raise a red flag. As Olson (1997) points out, J-minus has all of these parts prior to the amputation. Given that these parts are the grounding base for having a mental life, doesn't that mean that J-minus has *always* been a person and that *person* is not maximal? (Sider [2001: 163 – 4] makes a similar yet slightly different point.) Burke (2004) responds to this worry, but insofar as I'm only presenting Burke's view to contrast it with Toner's, rehearsing it would be a distraction.

initially seem to be innocuous changes actually result in something's destruction. For Burke, this result is due to the persistence conditions of proper parts of a larger whole.[39] For Toner, these revisionary judgments are about the persistence conditions of the substances assimilated into larger substances. Moreover, these revisions are partially motivated by the acceptance of initially plausible essentialist theses. In the case of inorganic parts, Toner assumes that all substances are necessarily substances. Since no substance has other substances as parts, says Toner, any substance assimilated into a composite substance is destroyed in the process.

Their views' relevant similarities result in their facing some similar problems.[40] Let's begin by looking at Jim Stone's (2002) objection to Burke's account. Stone thinks that Burke's account follows the letter of essentialism while violating its spirit. In his (2002: 220) words, "A fundamental idea underlying sortal essentialism is that when the inner principle that explains a thing ceases to explain it, the thing is no more." To put the point more perspicuously,

> …essentialism derives its plausibility from cases where sortal change corresponds to a profound change in the inner principle from which most of the [object's] characteristics flow. A general sort [i.e. an essential kind] marks such an inner principle, which is *why* a thing's general sort is essential to its identity. In short, the ideas that motivate sortal essentialism are (1) a thing cannot survive the loss of the inner principle that explains it, and (2) a substance sortal corresponds to such a principle. Otherwise why think that a sortal change must end a substance's career? (Stone, 2002: 218)

Stone's general idea seems to be this. Any plausible version of essentialism entails that a real composite's kind membership is at least partially grounded in a feature of the composite that explains the presence of an important subset of the object's properties. Accordingly, when a composite goes out of existence, it has to be because of some change in regards to *this* feature. A

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[39] Burke extends his account to cases of coinciding entities that come into being without anything gaining or losing parts, e.g. statues coming to coincide with lumps of material. Insofar as this part of his account is irrelevant to my aims, I will only mention this in passing.

[40] That said, Toner's account apparently lacks analogues for some of Burke's problems. For example, while Burke has trouble providing a principled criterion for which sortals "dominate" which (see Carter [1997], Rea [2000] and Sider [2001: 165]), Toner has no similar problems.

statue, for example, goes out of existence because of some change in regards to its statue-making shape features. An organism goes out of existence because its vital metabolic processes have irreparably ceased. The list could go on *ad nauseam*. However, on Burke's account, some things cease to exist without undergoing any change in regards to their relevant feature. Consider Jamie and J-minus again. On Burke's account, J-minus ceased to exist solely in virtue of Jamie losing his right hand. That hand was not part of J-minus, and Jamie's hand loss did not correspond to any significant change in regards to J-minus' inner principle. Yet, says Burke, Jamie survived while J-minus perished. According to Stone, this claim is just wrong-headed.[41]

I think Toner has a similar issue. I say that it is similar because it is not exactly the same. I imagine that Toner would say that elemental substances lose their inner principles (i.e. their forms) when a larger substance assimilates them. I imagine that he'd say something like this: "Of course electrons lose their forms when they become parts of larger substances. That's what destructive substantial changes are, after all. The larger substance gains a new spatial part, and its new spatial part gets its existence, function, and properties from its host substance's substantial form." I find this response unconvincing. The reason why is that it undermines the claim that forms play an explanatory role within substances.

Neo-scholastic hylomorphists think forms act as provide functional explanations for substances' *essential activities*.[42] As I mentioned above in §1.A, neo-scholastic hylomorphists think substances are inherently *active* entities. Part of their active nature is having a relatively specific activity in order to maintain their existence. Mammals, for example, must take in oxygen and expel carbon dioxide in order to stay alive. Given that something's essential

[41] Burke (2004) does have a response to this objection. Since I only mention Burke's and Stone's exchange because of its relevance to my critique of Toner, discussing Burke's reply to Stone would take my discussion too far afield.
[42] See Oderberg (2007: 69) and Pasnau (2004: 39 – 44).

activity is determined by its substantial kind and its kind membership is primarily determined by its form, forms act as an explanation for its essential activity.

Pinning down the exact relationship between essential activities and substantial forms depends on what kind of explanatory role you assign forms. As I mentioned earlier, the medievals thought forms played both a metaphysical role and a proto-scientific one. For reasons I outlined previously, defending form's proto-scientific role is a quixotic endeavor. As a brief recap, it seems best to understand substantial form's explanatory role in terms of metaphysical functional explanation. Something's form provides its function and performing this function is what keeps it in existence. Aristotle had this role in mind when he wrote that if the eye were an animal "sight would have been its soul".[43] The upshot is that the ability to perform something's function is primarily what determines its persistence conditions. What changes a substance can survive are the changes consistent with the substance being able to continue performing its essential activity. As a result, a substance losing its ability to perform its function results in a loss of form and thus its destruction.

Toner's view seems incompatible with this schema. We can see this by considering the following scenario: There is a particular electron, call it "*e*". This electron is a proper part of an ethyl alcohol molecule in a glass of scotch. After taking a sip of this scotch, the drinker, call him "Archer", consumes this molecule. After making its way into Archer's system, the molecule is broken down and its components metabolized. The process results – so it seems – in *e* being assimilated into Archer as a part. According to Toner, the event of *e* being assimilated into

[43] *AN* II, 1 412^{b} 18.

Archer leads to *e* going out of existence. Its prime matter becomes a part of Archer and *e* is replaced with a spatial part of Archer.[44] Let us call that spatial part "*a*".

Given the above account of form and essential activity, it would seem that the reason that *e* went out of existence has to be that something made it stop performing its essential activity. However, nothing about the processes that resulted in *e*'s assimilation would seem to have made *e* stop performing its essential activity. As a bit of evidence for this hypothesis, it is worth noting that *a* apparently still engages in the activities that were essential to *e*, which would presumably be carrying an electric charge or spinning in a specific way. Granted, performing these activities are not essential to *a*, since, as a part of Archer, *a*'s essential activity is its contribution to Archer's functioning as a human organism. And I will grant that the fact that *a* still performs these activities is not a problem in and of itself. Rather, the problem is what *a*'s continued performance of these activities tells us about the processes by which *e* was assimilated. That is, the fact that *a* continues performing the activities essential to *e* suggests that nothing about being drawn into Archer stopped *e* from performing the relevant activities.[45] Accordingly, Toner's account seems to imply that becoming a part of Archer destroyed *e* without making *e* cease its activity, which seems contrary to the way that forms are supposed to explain essential activities.

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[44] Caveat: It's unclear how *e*'s matter can become a part of Archer. By hypothesis prime matter is the only thing that can survive this change, yet Archer already had this as a part. But on the other hand, given that this is a substantial change and Archer's new spatial part has to come from something, Toner seems committed to saying that *e*'s matter becomes a part of Archer. Let us waive this concern for the time being.

[45] John Bengson (personal communication) suggested to me that neo-scholastic hylomorphists can say that something about *e* being drawn into Archer that causes its essential activity to be inessential to *a*, and this fact explains why *e* goes out of existence. However, that's not quite right on this account. According to neo-scholastic hylomorphists, Archer's substantial form explains why *a* does not have *e*'s essential activity as its own, not the fact that *e* was drawn into Archer. As for saying that Archer's form explains why *e* stopped existing, it is unclear how this would work unless Archer's form *causally* prevented *e* from performing its activity. This would seem to push us toward giving form a causal role. This would be problematic for Toner's account, since in order to maintain his claim that his view is empirically equivalent to the atomist alternative, forms would have to be causal factors that had in principle empirically undetectable effects.

Neither Toner nor Oderberg explicitly address this problem. However, Oderberg makes some claims relevant to the objection that Toner might use in a response. Oderberg writes that when a quark is a part of composite substance, it

> …is ontologically dependent on the whole of which it is a part, albeit in a way that is radically limited by the whole. The substantial form is what determines the permissible and impermissible behavior of the quarks in the body, which is why some chemical reactions typically occur, others rarely, and others not at all. (Oderberg, 2007: 71)

What this passage suggests, I think, is this: While quarks and electrons have the same causal properties, the inorganic parts of composite objects do not behave in the same way their free-floating counterparts do. This suggests that neo-scholastic hylomorphists could respond to my objection more or less in the following manner: The essential activity of an electron is not merely carrying an electric charge, but also includes various other activities that electrons only engage in when they exist apart from any organism. Thus, when an organism assimilates an electron into it, the process does terminate the electrons essential activities.

Admittedly, this response is rather sketchy since it is unclear how neo-scholastic hylomorphists would fill in the details. Part of this uncertainty is because I do not know enough about how free-floating electrons behave in order to contrast their behavior with that of those belonging to organisms. Another reason why it is difficult to fill in the details is because it is unclear how the differences neo-scholastic hylomorphists could point to would be ontologically significant. Would, for example, electrons that belong to an organism behave so differently from those that belong to heaps of chemicals that we would be justified in thinking there was a metaphysically significant difference between them? It is unobvious that they would. Finally, it is unclear how to motivate the claim that *those* behaviors are the ones that are essential to electrons in a way that independently plausible. That is, would those specific behaviors of free-floating electrons plausibly seem essential to them if we were not already

committed to neo-scholastic hylomorphism? Again, I suspect not. As a result, this potential response does not seem promising, and my objection still stands.

The previous objection was against Toner's account of the inorganic parts of substances. Toner's account also has a problem with organic parts that is relevantly similar to one of Burke's problems. In order to grasp this issue, let us make another digression to see Burke's other problem.[46] Let's get back to Jamie's case. Post-amputation, the mercenaries take Jamie to a castle. Among its denizens is a disgraced scholar by the name of Qyburn. Qyburn is a skilled physician and the alchemic equivalent of a mad scientist. With the skills gained through his medical training and human experiments, he saves Jamie's life after Jamie develops sepsis. If Qyburn had been present at the amputation, he could conceivably have re-attached Jamie's lost hand with the right equipment.

As we learned above, Burke thinks that J-minus went out of existence when Jamie lost his hand. There was a torso that remained afterwards, call it J-minus*. J-minus* is just Jamie himself. From these considerations it follows that J-minus≠J-minus*. But, given the hypothetical scenario spelled out above, we have to ask what reattachment would have meant for J-minus*. One of the three following scenarios would have to be the case. Either

i. J-minus*, being identical with Jamie, survives, grows in size after the reattachment and accordingly ceases to be a torso,
ii. J-minus* survives the reattachment, stays the same size and accordingly ceases to be identical with Jamie,
iii. J-minus* goes out of existence when Jamie's hand is reattached.

Option (i) seems correct for the following reasons. First, option (ii) is, *pace* Gallois (1990), impossible.[47] While I cannot argue for the claim here, I think that when the notions of identity and necessity are properly understood, identity has to hold necessarily and thus *permanently*.

[46] This objection is similar to and derived from that in Carter (1997).
[47] Plus, Gallois' view is independently implausible. For a critique, see Sider (2001: 165 – 76).

Second, option (iii) is impossible. For the reasons mentioned previously, Burke claims that J-minus* is identical with Jamie. So, if Jamie survives the reattachment, so does J-minus*. So by process of elimination, Burke is committed to (i).

So, Burke has to answer the following question. Jamie post-reattachment is not a torso, but he still has one. Is Jamie's post-attachment torso his original one, J-minus, or is it another torso, call it J-minus′? At first glance, Burke does not seem to have a principled reason for saying one way or another which torso Jamie has. Our normal judgment would imply that J-minus is Jamie's torso, but our normal judgment is that J-minus never stopped existing in the first place.

Toner has an analogous problem with organic parts. Consider the following scenario: Sam and Dean are brothers. Sam is given a poison that destroys his kidneys in such a way that he needs either to get a new kidney or to start dialysis in the immediate future. But since they are in the middle of nowhere, dialysis machines are unavailable at the small hospital in their locale. But fortunately for Sam, Dean is a sufficiently good donor match. And being the ever-protective older brother, Dean enthusiastically gives Sam one of his kidneys. Call that kidney "KD". On Toner's account, KD ceases to exist when the doctors remove it from Dean. When the resulting mass of matter is place in Sam, a new kidney comes into existence. Call the new kidney "KS". A short time later, Castiel, Sam and Dean's angel friend, finds them and learn what has transpired. Castiel then goes out and finds the remains of what we would call Sam's old kidneys, reversing the poison's damage by use of his angelic powers. After Castiel repairs the damage, Sam and Dean undergo another surgery. The doctors remove KS from Sam and the resulting tissue is placed in Dean, resulting in a kidney, call it KD* coming into being. Sam

gets the repaired kidney tissue, bringing everyone back to their natural states of having two kidneys.

Question: Is KD* the same kidney as KD? It is unclear whether Toner can give a principled answer one way or another. We are inclined to say KD* is KD, but that is probably because we thought KD never stopped existing. He could say that KD* is a different kidney than KD because kidneys cannot have temporal gaps in its existence. That judgment has some plausibility, but it is unclear to me that "gappy" existence is genuinely impossible. Some artifacts, for example, seem capable of having gaps in their existence.[48] So it is unclear that something having gaps in its existence is impossible full stop. One might argue that kidneys specifically cannot have such gaps, but it is unclear how to motivate that claim when defending a revisionary account of organic parts. Toner might say that KD* is a different kidney than KD, but we have to wonder what would differentiate it from KD. Both have Dean as their dependence base, as does any parcel of matter that would have composed them. Given that they're inseparable from Dean, it would seem that they and the matter that composes them are individuated by being parts of Dean. Accordingly, appealing to any of the kidneys' components to individuate them seems to be a non-starter.

I should point out that the dependence aspect of Toner's view makes this a greater problem for him than Burke's analogous problem. Burke could theoretically point to the continuity of matter in Jamie's case to say that J-minus comes back into existence when Jamie's hand is re-attached. That is, J-minus* has more or less the same matter that J-minus did. As a result, when Jamie/J-minus* gets his right hand back, he has a torso with more or less all the same matter arranged torso-wise as J-minus and is part of the same organism as J-minus was.

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[48] See Simons (1987: 195 – 99).

So, why not say that the post attachment torso is J-minus?[49] Toner seems unable to make a similar claim due to his insistence that substances have no separable parts. His view would seem to rule out any continuity of matter between KD and KD* besides prime matter, which is shared by all material objects. As a result, Toner seems unable to make any responses analogous to the response made above on Burke's behalf.

Toner might reply that KD and KD* are identical because they are both organic parts with the same function and spatial location in Dean.[50] Toner does not specify that those are the features that individuate organic parts, since he does not say much about how to individuate the parts of substances. However, it seems fair to say that any account of how to individuate the parts of substances would have to make reference to location and function. That is, it seems plausible to say that their functions determine what these organic parts are, and their locations in the organism are what individuate numerically distinct organs of the same kind. And, Toner might say, this way of individuating organic parts gives us the right answer to the question of whether Dean gets his kidney back after the second surgery.

This response might seem initially plausible, but it leads to some implausible consequences. For example, this response seems to entail that if Castiel had created new kidney-like masses of tissue from some other matter for Sam, their insertion into Sam would count as Sam getting his old kidneys back. And it would also seem to imply that Sam got one of his kidneys back with some slight differences in its genetic code after the first surgery. While this would give Toner a principled criterion by which to identify KD and KD*, this criterion seems rather implausible. Toner could bite the bullet on this point and say that these

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[49] Sidelle (2002: 128 – 9) makes a suggestion in the neighborhood of this on Burke's behalf, despite not accepting Burke's view.

[50] Presumably there is some flexibility in regards to their relative locations since many organs do not have a perfectly static location. For example, lungs take up more or less space depending on whether they are expanded or contracted.

consequences are trade-offs for his view that are offset by the reasons for accepting his view. Accordingly, this behooves us to evaluate why we should accept his view.

3. On (De)Motivating Neo-Scholastic Hylomorphism

I spent the previous chapter section presenting problems that result from accepting neo-scholastic hylomorphism. However, every theory has its problems. Neo-scholastic hylomorphists are within their rights to acknowledge these problems and take up solving them as part of their research project. In order to really undermine their view, I need to show that we need not take up this research project, which is my goal in this section. I will undermine the rationale for accepting the existence of prime matter as well as outline some ways of responding to Toner's case for organisms being intensely integrated wholes.

3. A. Prime Matter: What Is It Good for? Absolutely Nothing!

As was said above, Oderberg thinks prime matter is necessary for the possibility of substantial change. I briefly glossed over his argument above, but I now want to present it in more detail. Oderberg (2007: 71 – 6) gives the following argument for prime matter:

1. Substantial changes occur.
2. If substantial change occurs, then either
    a. Substantial changes have no subject, or
    b. The non-ultimate matter of a substance is the subject of substantial change, or
    c. Prime matter is the subject of substantial change.
3. Substantial changes must have a subject.
4. Non-ultimate matter cannot be the subject of substantial change.

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5. Prime matter is the subject of substantial change.

Accordingly, (5) entails that prime matter exists in some sense. I need to clarify a few things before evaluating the argument. By "subject of substantial change" and equivalent expressions,

I mean the matter that preexisted a substance's coming into existence and that remains after it ceases to exist.

The argument is valid, but we have yet to see if it is sound. Let's start our evaluation with (1). Before I evaluate it, I should say more about what Oderberg thinks substantial change is and what its reality entails. Specifically, he thinks substantial change entails the rejection of the four-dimensionalist account of change. Rather, he thinks its occurrence entails the existence of "real changes" on the part of three-dimensional entities that come into and go out of existence. Why does Oderberg think so? Because he thinks it is obvious from experience. For Oderberg (2007: 63), denying that real substantial change occurs "…is to deny a fundamental metaphysical datum that is obvious to the sense – what might be called a non-negotiable aspect of our picture of reality."

As a three-dimensionalist, I think four-dimensionalism is false. However, its falsity does not strike me as obvious from sensory experience. In fact, I doubt anyone could come to Oderberg's conclusion apart from reading some rather substantial metaphysical assumptions into their experiences. At best, his line of reasoning is question-begging. Also, I think he falls just short of offering a persuasive definition of real change when he says that four-dimensionalism rules out the possibility of it.[51] However, given my rejection of four-dimensionalism, I am willing to grant (1) for the sake of argument.

Oderberg does not directly argue for (2), so I will address it in more detail later. For now, let us turn to his case for (3). Oderberg says a lot in defense of this premise, but he is most convincing when he writes:

[51] For a more detailed discussion of the possibility of change in the context of four-dimensionalism, see Sider (2001: 212 – 6).

> And the only way [to account for substantial change without accepting (3)], it seems, is to speak of *creation* and *annihilation*: when…[a] wall is hammered into a pile of rubble, the wall is annihilated and replaced by a newly created pile of rubble. The problem with this account, however, is that in nature there is *no* pure creation and annihilation. The sorts of phenomena we speak of when we speak of creation and annihilation are ones in which prior material is turned into something else…. (Oderberg, 2007: 73 – 4)

One might think that Oderberg does not argue for (3) here so much as stipulate it. But I think that would be an uncharitable reading. He is using "substantial change" to refer to the kinds of changes that take place routinely such as when organisms come into existence. We all acknowledge that these kinds of changes are very different sorts of events from, say, God bringing something into existence solely by divine fiat. If substantial changes do not require any kind of material continuity over the course of the change, how could we distinguish them from creation *ex nihilo* and annihilation? Accepting (3) seems that the most plausible way to distinguish them. Accordingly, I'm inclined to accept it.

This takes us to (4). As a side note, the thesis that substances are intensely integrated wholes seems to entail (4). If a substance is an intensely integrated whole, then all of its parts depend on it specifically for their existence. Accordingly, a substance's proximate matter cannot survive its destruction and thus cannot be the subject of substantial change. Oderberg would probably accept this line of reasoning, but he tries to defend (4) on more theoretically neutral grounds. He specifically targets proximate matter in his argument, but *mutatis mutandis* his reasoning applies to any of the candidates suggested by (2b).

In order to see why Oderberg rejects (2b), let me briefly say that proximate matter is. Something's proximate matter is the matter of that thing that is not the matter of any of its other parts. One example of proximate matter is the wooden top and legs that collectively compose a wooden table. So, while the legs of a table are part of the table's proximate matter,

the cellulose molecules that compose them are not. Oderberg thinks proximate matter cannot be the ultimate substrate of substantial changes because

> …the support used to explain substantial change cannot be something whose existence during the change cannot be guaranteed. When ⌜a⌝ wall is hammered into rubble some matter survives in the rubble but other matter is dispersed to the winds. The matter of the wall undergoes all sorts of atomic and molecular changes as a result of the hammering: if the wall is pulverized, are we to say that the heap of fine powder is the same matter as that of the wall? Even if it is, the fact that substantial changes can occur without the preservation of sensible matter: the matter can undergo radical molecular change, as when flesh is burned to ashes. (Oderberg, 2007: 74)

To clarify, Oderberg does not think that walls are substances, since artifacts are not substances. Rather, his treating a wall as if it were a substance in this passage serves to illustrate the point he wants to make. Hence, we should not read too much into it. That being said, Oderberg's argument seems to be this:

A. The subject of a particular substantial change is something that is guaranteed to survive the destruction of the relevant substance.
B. It is metaphysically possible for a substance's proximate matter to be destroyed in the course of the substance going out of existence.

   _____

C. Proximate matter cannot be the subject of substantial change.

Oderberg seems to take (A) as an obvious fact about substantial change. The general idea is that it cannot ultimately be a contingent matter of fact or sheer luck that the subject of a substantial change survives it. Oderberg argues for (B) by pointing out that while something's proximate matter might just happen to survive its destruction, we can easily imagine other instances where it is destroyed with the substance it composes. And once we accept (A) and (B), (C) would seem to follow.

We can easily see how this line of reasoning can be used to prop up (4). *Mutatis mutandis* we can run this argument for a substance's matter at any non-ultimate level of decomposition. Consider the wooden table again. As I wrote above, the table's top and legs are its proximate matter, while the cellulose molecules that compose them are non-proximate matter. There are

ways of destroying the table that would both destroy its proximate matter and the cellulose molecules that compose the proximate matter. We could dissolve the table in a vat of hydrochloric acid, for example. As a result, we must conclude that there is some ultimate matter that cannot undergo substantial change. And, for reasons outlined above in §1.B.2, this ultimate matter must be thought of as Aquinas' prime matter.

Having presented Oderberg's case for prime matter, let's see where I think it goes wrong. As I said earlier, I will accept (1) for the sake of argument. Additionally, (3) strikes me as incredibly plausible. So I will focus on (2) and (4). Let's consider them in that order. One might think that (2) presents us with a false trilemma. As I said above, there are other conceptions of ultimate matter besides that of prime matter. So, one has to wonder why Oderberg seems to think prime matter is the only plausible candidate for the ultimate material substrate. Oderberg does not say so explicitly, but I think he endorses the argument I sketched in §1.B.2. To reiterate: Given an Aristotelian account of change, ultimate matter cannot be a form-matter composite. If it were, then the ultimate material substrate would be made out of further matter, which is impossible. Thus it must be matter without form, which according to Oderberg, means that it is matter without any actuality. Thus, we have the purely potential being Aquinas and his followers call prime matter.

I think there are two ways to resist these lines of reasoning. First, as I pointed out in §2. B.1, if someone can provide a slightly different account of how form and matter relate to actuality and potentiality, respectively, then we could in principle reject the identification of matter with potentiality. As I suggested in §2.B.1, one might alternatively identify form as the principle of determination and matter as what form makes determinate. By accepting this conception of form and matter, we can maintain that there is an ultimate material substrate, that substances have a hylomorphic structure as well as avoid the problems that come with

postulating prime matter. While these considerations are not necessarily conclusive, they at least show that the alternative conception of form and matter is *prima facie* plausible and just as attractive as Oderberg's version.

Second, we could agree that ultimate matter must lack metaphysical components, but deny that ultimate matter lacking metaphysical components implies that it is pure potentiality. While hylomorphists primarily discuss substances that are form-matter composites, the Aristotelian tradition has never completely rejected the idea of non-composite substances. Aristotle's Prime Mover, for example, lacked material components.[52] Aquinas[53] also thought that God[54] and the angels were immaterial.[55] While hylomorphists have traditionally rejected the existence of mereological atoms,[56] it seems as if hylomorphists could in principle accept the existence of substances that are not form-matter composites. So, if ultimate matter is some quantity of mereological atoms, we apparently have room to deny that prime matter is the ultimate material substrate of change. And, insofar as metaphysical atomism is a viable and attractive metaphysical theory, this option seems to be an attractive response to Oderberg's argument at first glance.

However, there is a cost to the atomist option. Namely, this option is incompatible with the thesis that material composites are intensely integrated wholes. Insofar as atoms lack any kind of composition, they cannot undergo substantial change when becoming parts of

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[52] See *Met* Λ. 7 $1073^{a}4-12$.
[53] See ST I, Q. 3, a. 3. As a bit of historical color, medieval theists universally thought God lacked matter, but Aquinas' view that the angels did as well was controversial. Many Christian (e.g. Augustine and Bonaventure) and Jewish (e.g. Ibn Gabirol) philosophers at the time thought the angels were composed of both form and "spiritual" matter. For more details, see Spade (2008).
[54] Of course, God complicates things. Strictly speaking, Aquinas thought God, while *subsistent*, was not strictly speaking a *substance*. Aquinas (1998: 301 – 4) argued that God was not in a genus and substance is considered a genus in Aristotelian metaphysics. Thus, God is not strictly speaking a substance.
[55] Aquinas cashed this out by saying that such beings were pure form without matter. This judgment motivates Aquinas' idiosyncratic opinion that every angel differs from the others in both number and kind. Since matter grounds the possibility of there being multiple instances of the same kind, multiple individuals cannot fall under the same immaterial determinate kind. See ST I, Q. 50, a. 4 for details.
[56] Oderberg (2007: 71, 269 endnote 16) follows his ideological forebears in this regard.

composite objects. This means that they are separable from whatever composites have them as parts. Thus, anything that has these atoms as parts cannot be an intensely integrated whole. But, since I have shown that there are serious problems with the idea of ordinary composite objects being intensely integrated wholes, there might be independent reason to accept this cost of atomism. Thus, it seems as if (2) might be a false trilemma.

Regardless of what we think of (2), there is serious problem for Oderberg's case for (4). The above line of reasoning casts doubt on the claim that the ultimate material substrate must be prime matter. However, I think that Oderberg's case for there being an ultimate material substrate is faulty. The main problem is that (A) is ambiguous. We can understand (A) in at least two ways, namely

> A′. The subject of a particular substantial change is something that necessarily survives any possible event that destroys the relevant substance.

And,

> A″. The subject of a particular substantial change is something that necessarily survives the specific kind of event that destroys the relevant substance.

(A′) and (A″) differ in that the former is a stronger claim than the latter. For ease of presentation, consider a token amoeba, call it "Alfred". (A′) implies that when Alfred goes out of existence, the subject of substantial change must survive any and every method of Alfred going out of existence. So, regardless of whether Alfred is burned, crushed or vaporized at ground zero of a nuclear explosion, the surviving subject of substantial change is always the same thing. By contrast, (A″) is a much weaker claim. It is compatible with there being different subjects of substantial change in different circumstances. All of the potential subjects must have

composed Alfred prior to its destruction, but by my lights, that is the only constraint (A″) places on the subject of substantial change.[57]

Depending on which of these two disambiguations we accept, (C) may or may not follow. If we replace (A) with (A″), then (C) does not follow. Given (A″)'s rather minimal constraints, the fact that it's possible for some of Alfred's components to be destroyed with Alfred in some circumstances does not rule out that those components are the subject of substantial change in other circumstances. (A′) would yield Oderberg's desired conclusion. And, I think (A′), or something in its neighborhood, is what Oderberg has in mind. For example, he rules out quarks being the subjects of substantial change by saying that

> …since quarks themselves can substantially change, they cannot do the job [of being the subject of substantial change]: there is no metaphysical guarantee of substantially changeless quarks throughout the substantial transformation, and so we would be back with the impossible situation of creation and annihilation. (Oderberg, 2007: 74)

In other words, the only thing that could undergird substantial change as its subject is something that is itself incapable of going out of existence in a substantial change. Quarks can undergo substantial change, and thus they aren't the subjects of substantial change.

That being said, I cannot see why we need to follow Oderberg on this point. I'll grant that we need to preserve some kind of material continuity in substantial change in order to distinguish it from annihilation and creation. But that alone does not commit us to (A′) rather than to the weaker (A″). All we need is to endorse a principle that guarantees enough material

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[57] One might wonder if (A″) rules out the possibility of organisms being intensely integrated wholes, since it seems compatible with the proximate matter of such things surviving their hosts' destruction. (A″) is compatible with organisms being intensely integrated wholes, since (A″) is still true if the only thing that survives the destruction of an intensely integrated whole is prime matter. However, it does not entail that prime matter is the only thing that survives the destruction of an organism.

continuity to distinguish regular coming into and going out of existence from creation *ex nihilo* and annihilation. It seems that (A″) works just as well as (A′) in this regard.

Imagine a world where there is no ultimate material substrate, that is, a world where every material object is made out of other matter. Given that any natural destructive event is finite in its destructive power, it seems that something or other that composed Alfred would survive his destruction. Some causes might destroy more of Alfred's parts than others, but it seems that they couldn't destroy *all* of Alfred's material components. As far as I can tell, this would allow for enough material continuity between Alfred and whatever exists after its destruction to stave off complete annihilation. While this example takes place in a possible world without an ultimate material substrate, that it lacks such a substrate seems inessential to the sufficiency of the constraints in (A″). That is, the non-ultimate substrates of change that are sufficient to maintain material continuity in that world would not be made insufficient in a different world that has an ultimate material substrate. Thus, (A″) seems sufficient for guaranteeing the material continuity necessary for distinguishing substantial changes from creation ex nihilo and annihilation.

Moreover, the minimal constraints in (A″) have some intuitive plausibility. When, for example, a bronze statue goes out of existence by being melted down, we do not automatically identify the substrate of this change with the quarks and electrons that compose the statue at the quantum level, or what have you. Rather, it seems natural to identify the molten metal as the substrate of this change. At least it does to me. I will grant that this intuition is not definitive proof that (A″) is correct, but I think it at least shifts the burden of proof onto Oderberg to argue for why we should accept the stronger (A′) over (A″). Accordingly, I am inclined to judge that Oderberg's argument for (4) is currently inconclusive.

I think I have sufficiently undermined Oderberg's arguments for prime matter. But as I said above, neo-scholastic hylomorphists can use their account of substance to motivate (4). If we think that organisms are intensely integrated wholes, then (4) seems unavoidable. This takes us to the final part of section three, the evaluation of the thesis that organisms are intensely integrated wholes.

3. B. A Lack of Integrity

In this subsection, I will begin the process of undermining one of Toner's arguments for substances being intensely integrated wholes. Part of Toner's case for his view is a David Lewis-style display of how many problems his view eliminates. I do not have time to address Toner's cumulative case for his view. Rather, Toner's work contains one main motivation for accepting the organisms as integrated wholes thesis, an argument I will call the Independence Argument. I will present this argument and argue that it is resistible.

Toner (2011) presents this argument in the course of criticizing Fine's (1995), Lowe's (1994) and Gorman's (2006) accounts of substance. For the sake of brevity, I will present Lowe's attempt. It's the easiest to present and is similar enough to the others that the specific differences won't matter. Lowe characterizes a substance as

> …an object which does not depend logically for its existence upon the existence of any others distinct from itself (other than its own proper parts, if it has any) and does not depend logically for its identity upon the identity of any object distinct from himself. (Lowe, 1994: 534)

Toner objects to this characterization on two slightly different grounds. First, Toner says that this characterization has an ad hoc exception built into it. This account is supposed to present us with an independence account of substance. However, while it says that substances must be independent of external objects, it makes an exception for a substance's parts. This seems to be

an ad hoc exception that is only there to prop up Lowe et al's desire to preserve the claim that mereological composites are substances.[58] Second, if we allow this exception to stand, we allow for the possibilities of two very different kinds of substances, mereological simples and mereologically complex objects. But this seemingly leads to the following problem:

> Lowe argues further that simple substances have no criteria of diachronic identity, while the criteria of identity is provided for any composite substance by its form….All the more reason to doubt that the two kinds can be unified! One kind is wholly independent and has no criteria of diachronic identity, the other kind is dependent on its parts and has criteria of identity provided by its form: and these are the *same kind*? It seems unlikely. (Toner, 2011: 38)

In other words, Lowe's account of substance seems to give us a disjunctive and disunified category. It is on par, Toner says, with categorizing things that can be carried through the air and legitimate flying things as flying things.[59] Both sorts of things travel through the air, but only some of them actually fly. Likewise, simples and composites are both independent of *external* objects, but only the former seem independent in the intuitively relevant sense. Accordingly, says Toner, we should conclude that substances cannot depend on their parts. Thus, all substances are either simples or at least some are intensely integrated wholes.[60] And, since humans are complex substances, some substances are intensely integrated wholes.[61]

We can formalize Toner's implicit argument this way:

1. The ontological independence of substances rules out substances depending on their parts.
2. If the ontological independence of substances rules out substances depending on their parts, then either only mereological simples are substances or at least some substances are intensely integrated wholes.
3. Human persons are substances and mereologically complex.

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4. Some substances, specifically human persons, are intensely integrated wholes.

[58] Toner (2011: 38)
[59] Ibid,, p. 40.
[60] Ibid,, p. 42 – 3.
[61] Ibid,, p. 38.

The argument is valid, but I think it is unsound. The most obvious weak spots are (1) and (3). In the remainder of this chapter section, I will present the broad strategies for undermining (1) and (3). In the case of (1), I will present Lowe's (2009b) work on ontological dependence and characterizing substance in order to illustrate how you might do this. In addition to presenting this strategy, I will point out a serious weakness. I will then present my preferred strategy for rejecting the claim that we are substances. While I ultimately reject (3), I will not be able to do so satisfactorily until I answer some other questions about the nature of composite objects in Chapter Four. Because of this, I will close out this chapter section by outlining the shape of an adequate response and drawing an important distinction that will come into play later.

Let us begin by discussing a strategy someone might use to undermine (1). We can start by noting that Toner seems to appeal to a rather course-grained notion of ontological dependence. Perhaps this appeal is defensible, but it is not obviously correct. Philosophers writing on the topic have plausibly argued that we can distinguish a few varieties of ontological dependence.[62] I point this out because it allows for the possibility of highlighting one kind of ontological dependence, characterizing the notion of substance in terms of it and then arguing that this characterization of substance allows composite substances to have separable parts.

Lowe's (2009b) later work on the subject exemplifies this strategy. In the earlier work Toner cites, Lowe (1994) characterizes substance in terms of what he calls "logical dependence". In his later work on the topic, Lowe does not reference logical dependence very much, and when he does, he says it is a relation that holds between propositions.[63] Rather, he starts his task by a) stipulating that an adequate account of substance allows for composite substances with separable parts and then b) distinguishes different varieties of ontological

[62] For example, see Koslicki (2012), Lowe (2009b) and Tahko (2015: 94 – 105).
[63] Lowe (2009b: §1).

dependence.[64] Lowe spends a lot of time chisholming his characterization of substance, and it would be tedious to present every step he takes. Instead I will only mention the final steps in Lowe's process.

Lowe eventually focuses in on a variety of ontological dependence, which he calls Identity Dependence (ID). Lowe formulates (ID) as

> (ID) x depends for its identity upon $y =_{df.}$ There is a function, f, such that it is part of the essence of x that x is $f(y)$.

Explaining exactly what it means for x to be $f(y)$ would take the discussion too far afield. For my purposes, it suffices to say that that x being $f(y)$ entails that the identity of y fixes or determines the identity of x in the sense that y determines what x is, x's essence. Using this sense of dependence, Lowe then goes on to characterize substance in the following manner:

> (SUB-4) x is a substance $=_{df.}$ x is a particular and there is no particular y such that y is not identical with x and x depends for its identity on y.[65]

Lowe finds this characterization satisfactory, since it allows for composites substances that have separable parts. At least, they count as substances as long as none of their particular parts determines their identities. Moreover, (SUB-4)'s inclusion of (ID) apparently presents us with a single feature that unites the category of substance, seemingly heading off Toner's concern about the resulting category of substance being objectionably disjunctive. And, most importantly, Lowe's decisions in characterizing substance this way do not seem objectionably ad hoc.

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[64] Lowe (ibid: §1, §4 – 5). Lowe does not explicitly say that such composites must possess separable parts, but it is plausibly implicit.
[65] Ibid,, §5.

I am disinclined to take this course of action because I worry about how exactly to motivate it. As I mentioned at the beginning of §1.A, philosophers use "substance" in two different senses. One use of "substance" denotes concrete objects, and the other denotes fundamental beings. My main worry is that Lowe is conflating these two notions of substance in his attempt to give only one characterization of substance. He says, for example, that an adequate account of substance will allow for composite substance.[66] But that only seems to be a reasonable constraint if we read "substance" as denoting concrete objects. By contrast, it seems less obvious to say that we need to build in the possibility of composite fundamentalia into our account of substance. That is not to say that the idea of composite fundamentalia is *obviously* incoherent. But at the same time, it does not strike me as something an account of substance *must* accommodate. One might worry that conflating these two notions of substance is what allows Lowe to think that permitting the existence of composite substances is a legitimate constraint. Moreover, while (SUB-4) presents us with a unified category of substance, it is unobvious without further argument that we can say everything in it is fundamental. This is important because Toner (2010: 34) makes it clear that this is a primary feature that he thinks makes something a substance. Accordingly, I think it is more plausible to admit that Toner and Oderberg are right and say that composites with separable parts cannot be fundamental beings.

This takes us to my preferred method of responding to Toner, rejecting (3). There are a few ways of doing this. First, one could deny that human persons exist, a stance taken by mereological nihilists such as Ted Sider (2013) and the early Peter Unger (1979).[67] Second, one could say human persons are mereological simples. The most obvious way of doing this is by endorsing some form of substance dualism, as E. J. Lowe (2008: Ch. 5), Alvin Plantinga (2006) and Richard Swinburne (2007) have. Finally, one could argue that human persons are

[66] Lowe (2009b: §1).
[67] I say "the early Peter Unger" because he (2006: 36) no longer claims that he doesn't exist.

mereologically complex yet non-fundamental beings. I find the third option to be the most promising. By my lights, denying that human persons exist is difficult to maintain consistently. Moreover, while substance dualism's philosophical problems are somewhat exaggerated,[68] it is still notoriously difficult to motivate.[69] By contrast, I think the third option is both initially plausible and ultimately defensible.

For various reasons, my case against (3) here will be inconclusive. This is because my argument against (3) turns on claims about the nature of composition and ontological dependence that I will not argue for until Chapter Four. However, I will start the process by presenting the explicit and implicit reasons that Toner gives for (3). I will close out this chapter section by clearing one obstacle for rejecting (3).

Toner does not say too much in the way of defending the claim that human persons are substances. That being said, he presents us with a more elaborate rationale for the claim that we are substances. Toner (2008: 285) states that we have free will in addition to endorsing a libertarian conception of free will. Toner seems to draw the conclusion that these two facts imply that we have non-redundant causal powers. Presumably, the best explanation for our possession of non-redundant causal powers is that we are substances.

In addition to this explicit line of reason, Toner takes a strongly deflationary view of non-substances. He writes,

> I sweep ⌜some bits of trash⌝ together into a pile. The bits are prior to the pile: the pile is dependent on, grounded in, explained by, reducible to, existent in virtue of, and nothing more than what is prior to it: namely, its parts. The pile of trash is not a substance. (Toner, 2010: 35)

[68] See Lycan (2009).
[69] For critiques of the standard arguments for mind-body dualism, see Olson (2007: 151 – 3) and van Inwagen (2002: Ch. 10 & 11).

This line suggests an endorsement of something in the neighborhood of Jonathan Schaffer's view of dependent beings. Schaffer (2009: 353) writes that "…in Aristotelian terms…*whatever is dependent* [i.e. a derivative entity] *is not fundamental*, and thus *no addition to the sparse basis.* Thus, Armstrong's notion of a free lunch seems best understood against an Aristotelian back ground." On such a view, the relationship between dependent entities and their dependence bases is one of abstraction, the dependent beings being latent within their bases and drawn out of these bases, so to speak, by the mind's act of separating them out.[70]

Due to his belief that we have non-redundant casual powers, Toner seems to think that human beings are something over and above their parts. It is easy to see how someone would draw this conclusion. If a dependent being is nothing over and above its dependence base, then it seems right to say that all of its features are also latent within the base and thus can be explained in terms of it. Since non-redundant causal powers are supposed to be "novel", they are inexplicable in terms of an object's parts. As a result, Toner claims that humans having non-redundant powers rules out human beings depending on their parts. So, does this line of reasoning work? I do not think so, since I think we cannot say that dependent beings are always nothing over and above their dependence base. Let me explain.

First, I want to draw a distinction between something being ontologically dependent and something being ontologically derivative. "Dependence" will be used here as a placeholder to denote ontological dependence of some variety.[71] We can understand derivativeness in terms of dependence, specifically

> An entity x is derivative $=_{df.}$ x is metaphysically dependent and x is nothing over and above its dependence base.

[70] Schaffer (2009: 378).
[71] I clarify the nature of dependence and distinguish different varieties of it in Chapter Four §4. A.

Despite the fact that the expression "nothing over and above" is notoriously slippery, we can still say that some dependent beings are obviously derivative in this sense. Mereological sums, if such things exist, are nothing over and above their parts. According to mind-body physicalists, human mental states are nothing over and above neurological states, and so on. However, I think some dependent beings are plausibly an addition in being to what they depend on. First, consider tropes. Some might disagree,[72] but I find it most plausible to think that they are dependent beings of some kind.[73] Some would say that tropes depend on the specific individuals that possess them, but nothing I say here turns on this point. While tropes are dependent beings, I do not think tropes are nothing over and above their host entities, and I do not think instantiation is a relation of abstraction.[74] I say this because if tropes were derivative beings, the debate over their existence would look much different than it does. The general (but not unanimous)[75] consensus among ontologists is that accepting tropes is taking on an extra ontological commitment, one that more austere nominalists do not accept. Moreover, as a rule, trope theorists do not try to assuage the austere nominalists' scruples by saying that tropes are nothing over and above the things that have them. One might suspect that this is because the standard view of tropes treats them as substance-like.[76] Maybe, but those who accept both objects and tropes typically acknowledge them as a further commitment for their theories.[77] Rather, they argue that there are considerations which make the addition of this further commitment worth the cost. Accordingly, tropes or other similar entities (e.g. Aristotelian universals) are significant additions to one's ontology even to the philosophers

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[72] For examples of this view, see Campbell (1981), Robb (2005) and Williams (1953 & 1986).
[73] As do Lowe (2006: 14), Martin (1980), Molnar (2003), Schaffer (2001) and Simons (1994). Armstrong (1989: Ch. 6), who accepts the existence of universals, accepts the conditional claim that if there are tropes, they are dependent entities.
[74] A quick qualification: I am considering basic tropes here and contrasting these with structural tropes, tropes that are instances of structural properties. Examples of basic tropes would plausibly include features like the mass and charge of an individual electron, assuming that electrons are mereological simples.
[75] Schaffer (2009), obviously, disagrees.
[76] For example, see Campbell (1981) and Robb (Op. Cit.).
[77] For example, see Martin (1997) and Armstrong (1989: Ch. 6).

who think they are metaphysically dependent. Hence, there are plausibly dependent beings that are non-derivative.

Second, consider moral properties. Most will accept the claim that an act is right or wrong *in virtue of* some set of the act's natural features.[78] For example, an act might be wrong in virtue of it causing more harm than good.[79] Nonetheless, it seems right to say that an act's moral status depends on the act's natural features. As a moral realist, I endorse the thesis, roughly put, that moral features are objective, stance-independent features of the world.[80] There is an internecine debate among moral realists over how to understand the relationship between moral properties and the natural properties upon which they depend. The exact details of this debate are not important here, but I want to point to one particular view on the table, moral non-naturalism. Moral properties, some non-naturalists say, are normative in a way that is inexplicable in terms of the natural properties they depend on.[81] So, on this view, while moral properties depend on the relevant kinds of natural properties, moral properties are something over and above the natural properties. There is an ontological gap between the moral and the natural despite the former's dependence on the latter. Accordingly, dependent beings are not necessarily derivative beings in the sense outlined above.

This example is more controversial than the previous example of tropes. A common objection to moral non-naturalism is that its implied metaphysic makes it impossible for the moral to ontologically depend on the natural. Michael Ridge presents the main problem this way:

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[78] Most do, but not all. For example, see Rosen (forthcoming).
[79] One should not read anything into my use of "might". I have no worked out normative ethical theory, and I only used this word is order to hedge my bets.
[80] For more precise formal descriptions of the view, see Copp (2007: 6 – 7) and Shafer-Landau (2003: 13 – 8).
[81] For example, see Enoch's (2011: 100 – 9) argument against naturalist moral realism. For denials of this normativity, see Copp (2007: §8).

> Very plausibly, the moral facts are in some way entirely fixed by the natural facts. The problem for the non-naturalist is that non-naturalism seems unable to explain this supervenience. For if moral properties and natural properties really are, in Hume's terms, "distinct existences" then it is hard to see why it should be impossible for the former to differ with no difference in the latter and since the natural properties are non-moral ones (given non-naturalism) this makes supervenience seem problematic. Non-naturalism's apparent inability to explain such a basic platitude as global supervenience poses a serious problem... (Ridge, 2014: §6)

The basic idea is this: moral non-naturalists postulate an ontological gap between moral facts and natural facts. This ontological gap implies that moral facts and natural facts are distinct existents. And since distinct existents are only contingently connected, it follows that non-naturalists cannot claim that moral facts depend on natural facts. Since (almost) everyone grants that moral facts depend on natural facts, this conclusion is taken to show that a non-naturalist construal of moral facts is unworkable.

While this argument has some plausibility, I think the conclusion is resistible. A response that I have a lot of sympathy for is denying that distinct existents can only be contingently connected. Ridge's objection to moral non-naturalism asserts that distinct existences can only be contingently connected. Philosophers have dubbed this claim "Hume's dictum" (HD), due to its roots in the writings of David Hume. HD has a lot of proponents, but as Wilson (ibid & 2013: 152) has argued, there is not much of a positive case for it. [82] Moreover, HD has some *prima facie* implausible consequences. As Wilson (2013: 151) points out, HD is often taken to mean that all causal connections are metaphysically contingent. This means that, say, the causal powers associated with the property *being negatively charged* are only contingently associated with it. This is problematic, because, as Wilson points out,

> in everyday thought and action we obviously characterize the objects (features, processes, etc.) of our attention in terms of what these can do with or for us – which characterization is not crudely behavioral, of course, but includes how their qualitative aspects may affect us or other entities, sensorily or otherwise; and the sciences are even more explicitly concerned with characterizing, in the laws that are their ultimate expression of understanding, natural

[82] Also, see DeRossett (2009) for additional reasons to doubt HD.

> phenomena in terms of broadly causal evolution. We have no clear access, and moreover no clear concern, with whatever non-causal core is, according to the Humean, supposed to underlie the contingently sprinkled causal and other connections. (Wilson, 2013: 151 – 2)

In other words, HD presents us with a view of causation at odds with the way that we conceive of the objects, properties and events we encounter in everyday life and study in the sciences. It divorces causal powers from the nature of things in a way that lacks intuitive plausibility. Given such consequences and the fact that there is little in the way of evidence in its favor, HD is questionable at best. Accordingly, it seems as if Ridge's objection fails to demonstrate that moral non-naturalism's construal of moral facts is metaphysically impossible. Thus, the idea of an entity being dependent yet non-derivative seems defensible, which is all I need to make my original point.

So, it seems right to say that ontological dependence need not entail derivativeness. As a result, it is less obvious that humans having non-redundant causal powers per se would entail that we are substances. I want to be clear about what this conclusion actually proves. While this fact undermines Toner's implicit rationale for (3), this does not show that this premise in fact false. Philosophers have presented other reasons for thinking that dependent wholes are also derivative beings. While Toner has not appealed to these considerations, he could in principle use them in order to support (3). Accordingly, a deeper and more detailed discussion about the nature composite wholes and their relationship to their parts is needed to make my rejection of (3) satisfactory. This will ultimately require developing an alternative account of composite objects, a task that will take place over the subsequent two chapters. As a result, I will have to pause this discussion until I begin my constructive project in Chapter Four.

4. Summary and Conclusion

Despite Neo-scholastic hylomorphism's plausible insights into the nature of substance, it seems that we should not accept it. It has some problematic commitments along with some counter-intuitive results. Prime matter seems problematic, and the idea that we are substances leads to some implausible conclusions. Since the arguments in its favor appear resistible, we have reason to look for a less problematic alternative.

Neo-scholastic hylomorphism is not the only variety of hylomorphism on offer. There is still the neo-Aristotelian hylomorphism of philosophers like Kit Fine (1999 & 2008) and Katherine Koslicki (2007 & 2008). Nothing I've said so far has ruled out their accounts. I will now turn to such accounts in the next chapter.

Chapter Three

Structural Issues: Reviving Aristotle in Contemporary Analytic Metaphysics

0. Introduction

In the previous chapter I presented and evaluated an attempt to revive a modified version of medieval hylomorphism. My final judgment was that while this kind of account contains some keen insights about the nature of substance, it is also an incredibly revisionary metaphysic. Moreover, I think we can plausibly resist the considerations given in its favor. However, the problems I raised for neo-scholastic hylomorphists centered on their postulation of prime matter and their claim that organisms are intensely integrated wholes. The objections I raised in the previous chapter do nothing to undermine the thesis that forms are parts of (of at least some) objects. I want to now turn to a family of theories that endorse the neo-Aristotelian thesis (NAT). To reiterate, NAT is the following thesis:

(NAT) All mereologically complex objects have formal proper parts.

It is also worth noting that NAT is more general than the view of forms that neo-scholastic hylomorphists are committed to. That is, while they can endorse NAT,[1] neo-scholastic hylomorphism per se only commits its proponents to the more restricted claim that *substances* have forms as parts, as opposed to concrete objects generally having formal parts.[2]

In this chapter, I will focus mainly on Kathrin Koslicki's account, the reasons that she does or could give on NAT's behalf , as well as consider an objection to the principle. In particular, I will evaluate Mark Johnston's argument against NAT and show why I think he fails to undermine it. I then say why I think that the arguments for NAT do not work. Finally, I take stock of the debate over NAT and then make a suggestion about how to move the debate forward.

1. Contemporary Neo-Aristotelian Hylomorphism

Unlike neo-scholastic hylomorphists, the views of neo-Aristotelian hylomorphists vary widely. That is, while these philosophers agree on some topics (e.g., by rejecting the neo-scholastic view of forms and organisms), they disagree deeply over the nature of forms, matter, and wholes. Some[3] accept NAT and others[4] reject it. While Fine (1999: 67; 2008: 112) and Johnston (2006: 658) think forms are relations,[5] Koslicki (2008: 253 – 4) toys with the idea that forms are objects of some kind. Accordingly, we cannot simply point to a list of theses that all or only

[1] For example, Toner (2012) endorses and defends NAT.
[2] One might wonder why I decided to directly address the claim that forms are parts in this chapter and not in the previous one. After all, neo-scholastic hylomorphists think that forms are parts, too. Part of the reason that I made this choice is because the neo-scholastic view of form is idiosyncratic and tied to their view of substance. If you do not accept their view of substance, there seems to be no reason to accept that forms are *sui generis*, basic entities. Second, there are few direct arguments for this view of form in the neo-scholastic literature, which I found made it more difficult to structure a discussion of their view of form. By contrast, neo-Aristotelians argue for NAT more directly.
[3] For example, see Fine (1999; 2008) and Koslicki (2008).
[4] For example, see Johnston (2006).
[5] Let me qualify that claim a little. Johnston thinks forms are *typically* relations of some sort. He (ibid.: 658) allows for objects to have non-relational forms, e.g. singleton sets' principles of unity being their members' existences.

neo-Aristotelians accept. Rather, Howard Robinson's take seems to be on the right track when he writes,

> Van Inwagen's unwillingness…to apply the nihilism to himself…prompted the thought in other philosophers that there may be a way of having a doctrine of Restricted Composition on the basis of being things of the right kind – namely have a structure of the right kind – and that this idea resembled Aristotle's notion of form and his doctrine of hylomorphism….It is difficult to provide a compact account of these philosophers' positions, as it can seem that all they have in common is a belief in some form of restricted composition and a sense that the Aristotelian label 'hylomorphism' helps give their theories a pedigree. (Robinson, 2014: §3.4)

There are a few things I would quibble over in Robinson's appraisal. For example, it is unclear that all neo-Aristotelian hylomorphists want to restrict composition. Kit Fine's account, for example, does not seem to put too many restrictions on composition. Rather, it seems better to say that they all share some level of dissatisfaction with the formal mereological system that Simons (1987: 1) calls "classical extensional mereology" (CEM).[6] Regardless, Robinson correctly points out that neo-Aristotelian hylomorphists don't want to bring back Aristotle's metaphysics *in toto*. In fact, they split with Aristotle very sharply on some topics, e.g., Aristotle's contention that organisms are integrated wholes.[7] Their goal is solving problems in contemporary analytic metaphysics, primarily the special composition question and the grounding problem for coinciding objects. Aspects of Aristotle's metaphysics, i.e., a hylomorphic analysis of composite objects, come into the picture as potential solutions to these issues. Beyond that, these philosophers show little attachment to the historical Aristotle's metaphysics, which allows neo-Aristotelians to exhibit a wide variety of views.

This variety of views forces me to make some difficult choices for my discussion. I previously said that I would focus primarily on NAT in this chapter, the two highest-profile defenders of which are Kit Fine and Katherin Koslicki. For simplicity's sake, I will focus on

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[6] See Koslicki (2008: Ch. 1) and Simons (1987: Ch. 1 – 2) for an overview of CEM.
[7] For example, see Koslicki (2008: 112 – 7).

Koslicki's account here. This is because hers is the more conservative of the two approaches. Here's what I mean by that. For many reasons I cannot list here, Koslicki and Fine are both unhappy with CEM's account of parthood.[8] While Fine's account is an attempt to modify CEM, Koslicki's is an attempt to provide a formal mereology that gives us a more commonsensical ontology of composite objects.[9] Koslicki's account is also more conservative in the sense that CEM itself is a revisionary account of parthood. As others have pointed out, CEM was not formulated in order to capture our pre-theoretical concept of parthood.[10] Rather, it was formulated primarily as an alternative to classical set theory in light of Russell's paradoxes, making its use to analyze our common sense notion of parthood something its original formulators did not intend.[11] Given Koslicki's desire to formulate a more commonsensical account of parthood, I find her account initially more plausible than Fine's.

This chapter has three subsections. First, I briefly sketch Koslicki's account of structure. The second and third subsections discuss Koslicki's accounts of matter and composite objects respectively, as well as how they compare and contrast with the neo-scholastic hylomorphists discussed previously.

1. A. Structure in Koslicki's Mereological Hylomorphism

Koslicki wants to find a middle ground between mereological nihilism and mereological universalism. Looking at her favored restrictions on composition will both help fill in the

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[8] See Fine (1999) and Koslicki (2008: Ch. 1) for their objections to CEM.
[9] Koslicki (2008: 171).
[10] For example, see Comesaña (2008: 34) and Koslicki (2008: 15).
[11] Jessica Wilson (2013: 154 – 6) suggests that CEM has the philosophical prominence it does primarily due to sociological rather than philosophical considerations. I am sympathetic to her claim, but I doubt that it is the entire story. For example, philosophers like van Cleve (1986) and Sider (2001: 120 – 39) have argued forcefully for theses that are CEM adjacent. That being said, while these are serious arguments, they do not nearly account for the prominence CEM possesses. For some critiques of these arguments, see Koslicki (2004) and Markosian (1998).

details of her account and help show how its claims fit together. She gives multiple versions of her restriction, but the following works for our purposes:

> (RCP) Restricted Composition: Some objects, $m_1,\ldots, m_n$, compose an object, O, of kind, K, just in case $m_1,\ldots,m_n$, satisfy the constraints dictated by some formal components, $f_1,\ldots,f_n$, associated with objects of kind, K.

In order to get a sense of what RCP asserts, we need to understand a) what objects are designated by the "m" variables, b) what "formal components" are, c) how formal components dictate constraints for material objects to satisfy and d) what it means for formal components to be "associated with" a kind.

Let's start by discussing formal components and how they dictate constraints for composites' material parts. The discussion so far of how to ontologically classify formal parts is ambiguous. We could be asking what kind of entity a formal component is, or we could be asking what role this part plays in determining the identity, essence and existence of a composite K. If we are asking what category forms belong to, Koslicki is non-committal. She does, however, identify formal parts with what she calls *structures*. It is tempting to identify structures with properties or relations that "tie" a composite's components together, so to speak. However, Koslicki refuses to make this identification. In fact, she entertains but she stops short of endorsing the idea that structures are a kind of object with which those properties and relations are "associated".[12] But she ultimately remains non-committal about what category structures belong to.

Despite her remaining non-committal on the category of structure, she does discuss the relationship between structures and their corresponding manners of arrangement. Part of the reason why Koslicki does not identify them is because she thinks something's parts being

[12] See Koslicki (2008: 252 – 4) for her rationale for entertaining this notion.

arranged a certain way is sometimes only one aspect of their structure. One reason why she thinks so comes up in her discussion of chemical structures.[13] In the case of chemical structure, there is more to them than their associated manner of arrangement. Specifically, the structures of molecules consist in both the way the molecules' parts are arranged and the molecules' formulae, i.e. the kinds of parts that compose them. The gist of this is that structures

> …are always closely linked with certain properties and relations which elements in the domain come to exhibit as a result of occupying the positions made available by the structure in question; but these properties and relations are nevertheless in these contexts not identified with the structures with which they are associated. (Koslicki, 2008: 252)

As a side note, this point is worth remembering since it will be very important when discussing Koslicki's use of structure to solve the grounding problem.

We might ask at this point what it means for properties and/or relations to be associated with a structure. Can we understand this association relation in terms of some other familiar relation, e.g. the part-whole relation? Is it a *sui generis* necessary connection between structures and these properties and relations? Koslicki does not say and does not give us much to go on in her discussion of structure.

While Koslicki says little about what structures are, she tells us a great deal about what they do. The structures associated with a kind, K, a) dictate what sorts of material objects can compose K's and b) what manners of arrangements allow those objects to compose K's. Koslicki (2008: 172) uses the metaphor of a recipe to describe structure. A structure acts as a kind of recipe for K's by listing what ingredients (i.e. material components) go into making K's and how these ingredients are to be put together in order to produce a K. For example, consider the kind *coke bottle*. The structure or structures associated with this kind allow for different materials to compose a coke bottle and also rules out the use of others. For example, the

[13] See Koslicki (2008: 244 – 5).

relevant structures allow for coke bottles to be made out of materials such as glass, aluminum or plastic while also ruling out the use of, say, quantities of mercury as components for coke bottles. These structures also dictate how these bits of metal, glass or plastic have to be arranged in order to compose a coke bottle. For example, these components have to have to be arranged densely enough to contain a liquid in order to compose a coke bottle.

As a result of these metaphysical roles, Koslicki says that structures at least partially determine what Karen Bennett refers to as an object's "sortalish properties".[14] Bennett uses the term "sortalish properties" to pick out

i. persistence conditions, particular modal properties like *being necessarily shaped about like so*,
ii. kind or sortal properties, and
iii. properties that things have partially in virtue of their instantiation of properties in categories (i) or (ii).[15]

It's easy to see why Koslicki thinks that structures partially determine such features.[16] One might think that structures go a long way toward determining whether composites' identities and existence depend on any individual components, what kinds of parts they can have, what parts they can lose, how variable their manner of arrangement can be, etc.[17] As a result, Koslicki thinks that structures go a long way in explaining why objects have the persistence conditions they do. Moreover, she thinks that structure determines a composite's kind membership, since on her view having the relevant structure is part of what makes something fall under the associated kind. As such, structures are partially why an object has properties grounded in its persistence conditions and/or kind membership by Koslicki's lights.

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[14] Koslicki (2008: 254 – 5).
[15] Bennett (2004: 341). This is a slight modification to Bennett's formulation, since she treats "essentially" and "necessarily" as equivalent. I've changed the wording in order to avoid confusion later.
[16] Of course, as Alan Sidelle (personal communication) pointed out to me, one might think that Koslicki is sneaking in a sortalish property here since her account implicitly asserts that objects have their structures necessarily. I can see why someone might think so, but I'm unsure whether this is actually the case.
[17] Koslicki (2008: 235 – 6).

This brings us to the association between kinds and structures. Koslicki (2008: Ch. 8) has much to say about kinds, but little of it is germane to this chapter's discussion.[18] She does not say much about the nature of the association relation that holds between kinds and structures aside from the fact that somehow objects are instances of these kinds in virtue of their structures. Additionally, Koslicki thinks that multiple structures can be associated with the same kind. I suspect that this allows her to remain neutral about some features of structures. For example, allowing for multiple structures to be associated with a kind allows her to remain non-committal on how fine-grained structures need to be.

Koslicki's inclusion of NAT, a thesis the majority of philosopher reject, in her account particularly stands out. While Koslicki attributes some of the resistance to NAT to metaphysical prejudice, she does feel the need to give reasons for accepting NAT.[19] In addition to pointing out the theoretical benefits of accepting NAT, she presents a standalone argument for it. I discuss this argument in more detail below, but it will be helpful to briefly summarize it here. Koslicki (2008: 179 – 81) presents her "Master Argument" roughly as follows: She accepts that there are coinciding objects, i.e. objects that exist at the exact same place, at the exact same time and apparently share all of their proper parts.[20] Moreover, Koslicki argues that in such cases, one of the coinciding objects is a proper part of the other. For example, a lump of clay is a proper part of the statue that is made out of it. And, as many other philosophers have claimed, an object with one proper part must have at least one other proper part that does not overlap the first. In the case of the statue and the lump of clay, the statue does not have any material parts that are not also part of the lump of clay. Accordingly, the statue must have a formal part in addition to its material parts. And since the statue and its clay are not relevantly different

[18] I discuss Koslicki's account of kinds in Chapter Four §1.A below.
[19] Koslicki (2008: 262).
[20] The reason for adding this qualifier "apparently" will become clear below.

from other material objects, we should conclude that all material composites have formal parts, i.e. their structures. That is, NAT is true.

1. B. Material Parts and Composites in Koslicki's Hylomorphism

Koslicki thinks that material composites are wholes with both material objects and structures as parts. In one regard, she resembles neo-scholastic hylomorphists because of her postulation of non-material parts for composites.[21] But unlike Toner and Oderberg, Koslicki says little about the nature of matter. For example, she refuses to take a side in the debate between atomists and those who think matter is infinitely divisible.[22] This is because Koslicki is not trying to provide a complete metaphysic of the natural world. Rather, her primary goals are to formulating an alternative mereology to CEM and finding a plausible principle restricting composition. As a result, she does not commit herself to a specific metaphysic of matter or feel the need to argue that there is an ultimate material substrate.

It is also worth noting how else her account differs from Toner's and Oderberg's. One key difference is Koslicki's denial that composites are intensely integrated wholes. Thus, she rejects Toner's Aristotle-inspired claim that objects cease to exist when they are assimilated into organic composites. First, she points out the revisionary nature of this thesis, which she dubs "Reverse Mereological Essentialism". It is revisionary in that it forces us to attribute persistence conditions to objects such as hands that we typically deny.[23] Moreover, the rearrangement of a composite's ingredients only forces them to undergo mere Cambridge

[21] I say "non-material" rather than "immaterial", since the latter tends to have supernatural connotations that Koslicki probably wants to avoid.
[22] Koslicki (2008: 187).
[23] Koslicki (ibid: 115 – 6; 176 – 7). As a side note, Koslicki's discussion in Ibid., p. 155 – 6 is aimed at Verity Harte's reconstruction of Plato's view. As Koslicki understands Harte, Harte says that Plato thought Reverse Mereological Essentialism holds for *all* material composites. Even if Plato thought this, Aristotle and his medieval disciples did not. Accordingly, only some of her objections apply to Aristotle and his intellectual heirs.

changes that do not seem to be of any existential import. She thinks that our prior judgments about persistence conditions place the burden of proof on the proponents of Reverse Mereological Essentialism, a burden of proof she does not think they have met.[24]

A final difference between Koslicki and neo-scholastic hylomorphists is that while the latter think that organisms are fundamental entities, Koslicki does not address the issue of fundamentality. This is unsurprising, given that she thinks mereologists as mereologists have no business pontificating about what kinds of objects exist.[25] So, I suspect that she would most likely agree that mereologists *qua* mereologists have no business declaring what objects are fundamental. This completes my sketch of Koslicki's brand of hylomorphism. Now let's turn to evaluating its plausibility.

2. Johnston's Argument against NAT and Why It Fails

In this section, I turn to the task of evaluating Koslicki's account, specifically its postulation of NAT. The argument I will be considering is that of Mark Johnston (2006: 672 – 5). Despite my sympathy with Johnston's conclusion, I think his argument fails. I briefly present his argument and then show why I think it fails.

Johnston frames his argument against NAT as a way to undermine the uniqueness of composition thesis (UCT). UCT states that no two composite objects can have exactly the same parts at the same time. One way to defend UCT is to endorse NAT, which is what Fine (2008) and Koslicki (2008: 182 – 3) do. They both accept that there are coinciding objects, as well as

[24] Koslicki (2008: 177). She (ibid: 178, fn. 16) makes a similar claim about persistence conditions to dismiss Burke's dominant sortal view.
[25] Ibid., p. 171.

the claim that each of these coinciding entities has only one formal part.[26] This conjunction of claims would allow these objects to coincide without sharing all their parts. Insofar as coinciding objects are the only potential counter-examples to UCT, accepting NAT potentially reconciles UCT with the existence of coinciding objects. As a result, Johnston feels the need to argue against NAT.

The thrust of Johnston's argument is that forms' metaphysical role precludes them from being parts of composite objects. As Johnston puts it,

> …on the conception of objects as having their own principles of unity [i.e. forms] as parts, it will often be true – and this is fatal to the conception – that the principle of unity will not hold of itself and the other parts of the object. So it is with being attached at right angles [in the case of a cross]. This is a relation that could not possibly hold of three things, one of which is a relation. (Johnston, 2006: 672 – 3)

Johnston thinks that forms are relations that hold between a composite object's parts. Moreover, he thinks forms are principles of unity in virtue of the fact that they *relate* the parts of composites in a way that unifies them into a single whole. However, the relevant kinds of relations typically cannot have themselves as relata. As Johnston points out,

> [t]he obvious problem is that there will be no general guarantee that *R* holds of all the parts *and itself*. Unless *R* is such as to hold among all the parts and itself, it cannot be the principle of unity that we seek. For since it is supposed to be a part, then it should hold of all the other parts and itself. Otherwise there would be no account of what in virtue of which *all* the supposed parts form a whole. (Johnston, 2006: 673)

When we look at one of Johnston's first examples of principles of unity, we can see that he has a point. One of Johnston's (2006: 652 – 3) first examples of a principle of unity is the bipolar bonding relation that holds between a hydrogen ion and a chlorine ion in an HCl molecule.

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[26] Let me qualify that claim. Parthood is transitive and so the formal parts of a composite's material parts are also parts of the larger composite. Koslicki (2008: 187) recognizes this and distinguishes between having a structure as a part simpliciter and having a structure as a part derivatively. Some x has a structure s derivatively iff there is a y such that y is a material part of x and s is a part of y simpliciter. A structure s is a part of object x simpliciter iff it occupies the metaphysical role outlined in §1.A above.

While it seems that the bonding relation has the ions as its relata, it does not seem to have itself as a relatum. Thus, if we think of principles of unity this way, it seems unavoidable that most candidate principles of unity cannot have themselves as relata.

We can formulate Johnston's argument like so:

1. Forms are principles of unity.
2. If forms are principles of unity, the parts of composite objects are parts of those objects in virtue of being the terms of the relations that act as principles of unity.
3. If the parts of composites are parts of those composites in virtue of being the terms of the relations that act as their principles of unity, then these relations can only be parts of composites if they are relata of themselves *inter alia*.
4. Many, if not all, of the relevant relations cannot be relata of themselves.

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5. Forms often cannot, if ever, be parts of the composites that have them, i.e. NAT is false.

The argument is valid. So what should we make of the premises? As I said above, premise 4 seems fairly obvious. Premise 1 is more or less definitional for hylomorphists generally and thus beyond serious reproach. Moreover, once we grant the implicit definition of parts in (2), (3) seems hard to deny. So, the argument's plausibility comes down to (2).

I think that Koslicki would reject (2). As we saw in the previous section, Koslicki denies that structures are relations.[27] Rather, she thinks that relations are only associated with structures. So, forms as Johnston conceives of them are only part of Koslicki's overall account of structure. To be fair to Johnston, his argument was not specifically aimed at Koslicki. Rather, Johnston meant for this argument to elucidate the consequences of his own brand of hylomorphism. But, this shows the limits of this argument, since using this argument against Koslicki would be dialectically improper unless Johnston argues further that his account of forms is more plausible than Koslicki's or those of others.

[27] Also, neither do the neo-scholastic hylomorphists I discussed in Chapter Two.

That being said, writing off (2) on these grounds seems a little hasty. For one thing, while Koslicki denies that forms are relations, other neo-Aristotelians think they are.[28] Accordingly, it would be worthwhile to see how that brand of neo-Aristotelian could respond to Johnston while still accepting this view of forms.

A better objection to (2) is that it begs the question. Premise 2 turns on understanding parthood in terms of being a relatum of a principle of unity. It seems to me that pre-theoretically we primarily think of parts as what composites are, in some sense, "made out of". If we think of parts primarily as what composites are made out of, the idea that composite objects are partially made out of a relation is not obviously false. Thus, it is unclear why we should think that all parts have to be relata of principles of unity. Moreover, it is unclear to me how to argue for (2) without presupposing the falsity of NAT or something relevantly similar. In order to justify the acceptance of (2), we would have to argue that composite objects could not be made out of their forms in the relevant sense. However, that seems to be what Johnston's argument is trying to prove. Thus, it seems as if Johnston's argument begs the question. As such, it seems as if Johnston's argument fails to undermine NAT.

3. The Case for NAT and Why It Fails, Part One: Koslicki's Master Argument

In the previous section, I presented an argument against NAT, and I argued that it failed. In this section, I will begin looking at the positive case for NAT. I will begin by presenting Koslicki's "Master Argument" for NAT. After that, I will evaluate her argument and say why I think that it fails.

[28] For example, see Fine (1999: 65 – 8).

3. A. Koslicki's Master Argument

Koslicki knows that many of us find NAT hard to believe, and she responds to this disbelief by arguing for it. Her primary argument is her "Master Argument".[29] We can formulate the argument this way:

1. It is possible to make an object S from a single preexisting material ingredient, L.
2. L is a proper part of S.
3. Anything that has one proper part has at least two non-overlapping proper parts.
4. S has a proper part Q that does not overlap L. (2, 3)
5. S has no material proper parts other than L. (1)
6. Q is a proper part, but not a material proper part, of S. (4, 5)
7. If anything is a proper part of a composite object, it is either a material proper part or a formal proper part.
8. S has a formal proper part. (6, 7)
9. If there is nothing special about S, then all mereologically complex objects have formal proper parts.
10. There is nothing special about S.

(NAT) All mereologically complex objects have formal proper parts.[30]

Let us look at the premises individually. Premise 1 claims we can create new objects from a single pre-existing ingredient. Koslicki argues for (1) by pointing to the phenomenon of lumps of clay constituting statues.[31] She argues that the constituent lump of clay and the constituted statue are numerically distinct objects. She does this by presenting a version of Wiggins' (1968) argument for coinciding objects. That is, S came into existence after L and cannot survive being smashed while L can. By Leibniz's Law it follows that we have two objects in the same place at the same time, one of which came into existence with the other as its single preexisting ingredient.[32]

[29] Koslicki (2008: 179 – 81). She presents an earlier, simpler version of the argument in Koslicki (2006: 725 – 7).
[30] This formulation of the Master Argument is a modified version of Karen Bennett's (2011b: 1). I changed it by making some implied premises explicit and by slightly altering the wording of (3). I used Bennett's formulation in part because, as Bennett (2011b: 2, fn. 1) points out, "ingredient" is less question-begging than Koslicki's chosen terms in the context of her argument.
[31] Koslicki (2008: 178).
[32] Ibid., p. 179 – 80.

Premise 2 asserts that L is a proper part of S. We can see Koslicki's (2008: 176 – 9) basic rationale behind (2) by looking at her reasons for affirming that material components are parts of composite objects. Specifically, Koslicki thinks their being parts of composites is the best explanation for the following facts about composites and their material components.[33] First, a composite's material components intuitively provide the substrate from which a new composite comes into existence. L seems to fit this description in regards to S. Second, taking material components to be proper parts of composites gives us an intuitively plausible explanation for why composites "inherit" similar properties to their components. This is particularly so in the case of S and L. L being a proper part of S gives us a rather intuitive explanation of why S has the weight, shape, size etc. it does. Finally, Koslicki thinks that taking L to be a proper part of S allows us to straightforwardly assimilate the case of L and S coinciding in space and time to the metaphysically benign sort of coincidence that we see in other cases of composites and their proper parts, i.e., a car being as the same place as one of its tires.

Koslicki apparently thinks that these three considerations point to a general thesis that Karen Bennett (2011b: 4) calls the Material Ingredients as Proper Parts (MIPP) thesis. Bennett formulates MIPP like this:

> **MIPP**: If the material ingredients from which an object is created persist through the process of creation, they are proper parts of that object at the beginning of its existence.

Since L is a material ingredient of S and L plausibly persists through the process of S coming into being, it follows from MIPP that L is a proper part of S.[34]

This takes us to (3), which Koslicki refers to as the Weak Supplementation Principle (WSP). The basic idea is that if a composite object has one proper part, it has another proper part that does not overlap the first one. Two objects overlap if and only if they share a proper

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[33] Ibid., p. 178 – 9.
[34] *Pace* Burke (1994).

part. In Koslicki's (2008: 168) words, WSP asserts that if you remove one of an object's proper parts there will always be at least one object left over as a remainder. At first glance, WSP seems intuitively plausible. It seems to adequately describe the common sense examples of composites, e.g., cars and their parts. However, Koslicki goes beyond pointing out WSP's initial plausibility by claiming it is partially constitutive of the notion of parthood. She gives two brief arguments for this. First, she points out that parthood is a partial ordering relation, an asymmetrical, irreflexive and transitive relation. However, it is only one of many such relations. For example, the *being numerically greater than* relation is a partial ordering relation. However, this relation is nothing like the parthood relation. There must be a feature of parthood that distinguishes it from other partial ordering relations. Accepting WSP is the most obvious way to distinguish parthood from the other relations. Accordingly, anyone who wants to reject WSP must give an alternative way of distinguishing parthood from other partial ordering relations. Second, WSP is the weakest principle that allows us to rule out intuitively impossible mereological states of affairs. For example, WSP together with the asymmetry, irreflexivity and transitivity of parthood rules out the possibility that some composites have parts all of which overlap one another.

Premise 9 is fairly straightforward. If there is nothing special about L and S that makes the idea of S having a formal part plausible, S's having a formal part appears to be an instance of a more general phenomenon. And since there seems to be no such factor in the case of L and S, (10) seems correct as well.

3. B. Evaluation of Koslicki's Master Argument

So what should we make of the Master Argument? First, (1) – (3) are all very controversial. For one thing, philosophers have written countless papers over the past fifty years defending or

criticizing the argument behind (1).[35, 36] That being said, I am inclined to grant this premise for the sake of argument. First, I have nothing to say about the argument behind it that hasn't already been said in the literature. Second, the view embodied in (1) is widely held among philosophers, so it is worthwhile to find out whether those who accept it are committed to any other of Koslicki's conclusions. This brings me to my next point. Even if we grant this premise, there are bigger problems for the argument.

Premises 2 and 3 have some problems in common. First, as some have pointed out, Koslicki's analysis of proper parthood is not the only one possible.[37] There are at least two ways to analyzing the notion. One might follow Koslicki *inter alios* and define a proper part as a part that is non-identical with the whole to which it belongs.[38] Call this the "non-identical part" reading of proper part. On the other hand, one might say a proper part is one that only occupies a subregion of the spatial region the whole occupies.[39] Call this the "smaller part" reading of proper part.[40] The smaller part reading would be catastrophic for Koslicki's argument. If we understand proper parthood that way, (2) would be false on account of L and S occupying the exact same region in space. One might think this is merely a semantic point, but as I will clarify below, it has some noteworthy consequences for the task of justifying (3).

This brings (3) into focus. This premise is vulnerable on two fronts. First, we can apparently produce counter-examples to it. Second, it seems as if the evidence for it is less

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[35] The *locus classicus* of this argument is Wiggins (1968). Other philosophers who follow Wiggins and Koslicki in endorsing it include Fine (1995; 2008), Johnston (1992), Lowe (2003), Moyer (2006) and Rudder Baker (1997). Critics of this argument include Burke (1992; 1994), Gallois (1990), Gibbard (1975), Lewis (1971), Merricks (2003: 38 – 47), Noonan (1993), Olson (2001) and Yablo (1987).

[36] Also, Peter van Inwagen (1990: 125 – 6) has argued that the state of affairs described in the creation of S from L, if genuinely generative, would have implausible metaphysical results.

[37] For example, see Sidelle (2010: 373).

[38] For example, see Simons (1987: 27).

[39] For example, see van Inwagen (1981: 123).

[40] I'm borrowing the terminology of "non-identical part reading" and "smaller part reading" from Donnelly (2010).

compelling than Koslicki lets on. Let us start with one of the more compelling of the supposed counter-examples.[41] Trenton Merricks argues against WSP like so:

> Suppose that the statue is constituted by (but not identical with) the lump. And suppose, further, that this implies that the lump is a proper part of the statue. Finally, add that each of the statue's parts share some parts or other with the lump. All of this together implies that WSP is false. (Merricks, 2009: 303)

I should probably make two things clear at this point. First, Merricks does not endorse this argument, since Merricks denies there are lumps and statues.[42] Rather, he does this to present us with a little insight. Second, if Merricks' argument sounds familiar at this point, it should. While a little more compact, Merrick's argument shares a few structural features with Koslicki's Master Argument. In effect, where Koslicki uses *modus ponens*, Merricks uses *modus tollens*. Accordingly, we seem to have a dialectical stalemate.

In order to break this stalemate, we have to ask whether we have better reason to think that WSP is true than that Merricks' argument is sound. This forces us to take a better look at the case for WSP. Despite Merricks' (2009: 303) hyperbolic claims to the contrary, we have seen that Koslicki's has presented some considerations in favor of WSP. First, she has claimed that WSP is intuitively plausible on its own. Second, she has presented two challenges for anyone who would reject WSP. I am inclined to think that both of those lines of argument fail.

In regards to the intuitiveness of WSP, Alan Sidelle (2010: 373 – 4) and Maureen Donnelly (2010: 230 – 1) both argue that the seeming obviousness of (3) may be illusory. As I noted above, there are two ways of reading "proper part". If we read proper part as "smaller part", (3) is obvious. However, Koslicki cannot have this reading in mind since it rules out L being a proper part of S. But, the non-identical part reading renders (3) unobvious, if only

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[41] Fine (2007: 161 – 2) argues that singleton sets present us with a counter-example to WSP. However, Fine's counter-example depends on elements of sets being sets' parts and set elementhood lacks formal features of parthood. For example, parthood is transitive while set elementhood is not. Thus, I think Fine does not present us with a genuine counter-example.

[42] For example, see Merricks (2000).

because Merricks' objection has some initial plausibility. All of this is to say that (3)'s intuitive credentials are inconclusive at best.

But what about the other reason Koslicki gives for accepting (3)? To reiterate, Koslicki claims that WSP is the weakest principle that rules out certain impossible mereological state of affairs and that it provides us with a way of distinguishing parthood from other partial ordering relations. First, her assertion that WSP is the weakest principle that rules out impossible mereological states of affairs is false. There is at least one weaker principle that has some initial plausibility and performs the task she says only WSP can do. Maureen Donnelly (2010: 231) presents us with an initially plausible alternative to WSP she dubs QS.

> QS. If y has any proper part, then there are objects x and z such that (i) x and z are both proper parts of y, and (ii) x and z share no parts.

QS lets us rule out some of the mereologically impossible states of affairs Koslicki wants to rule out, such as states of affairs in which a composite whole has only parts that overlap. Moreover, QS seems intuitively plausible, and Merricks' potential counter-example does not affect QS. Thus, we have no obvious reason to prefer WSP to QS on these grounds alone. Thus, Koslicki needs to provide further reasons to think that WSP is uniquely suited to rule out the impossible states of affairs that need ruled out.

Second, Koslicki argues that anyone who rejects WSP needs to provide an alternative way to distinguish parthood from other partial ordering relations and provide us with a reason to think the alternative is better. Again, QS is a *prima facie* plausible alternative. It is intuitively plausible, distinguishes parthood from other partial ordering relations and, unlike WSP, seems to have no counter-examples.

I want to be clear that I am not arguing that we should definitely accept QS over WSP, and neither does Donnelly.[43] The case I have made for QS is only *prima facie* and judging whether it is ultimately a more plausible alternative to WSP would require a more detailed discussion than I have presented here. However, I think that I have shown that there are initially plausible responses to her arguments for WSP, especially in light of the dialectical stalemate between Koslicki and Merricks. As such, I think I have shown that her defense of WSP should be considered inconclusive at this point.

It should be noted that accepting QS over WSP would render the Master Argument invalid. Let us grant (2) and QS in place of (3). L is a proper material part of S, but QS only entails that at least two of S's parts are disjoint. Given the transitivity of parthood, any disjoint parts of L satisfy QS's constraints.

But let's set aside those issues with (2) and (3) for now. Even if they can be answered satisfactorily, there is a bigger problem for (2). Karen Bennett (2011b: 3 – 4) argues that Koslicki's case for MIPP better supports a weaker principle that does not entail (2). In order to show this, she asks us to consider the following stronger principle:

> **MIPP**$^{+}$: The material ingredients from which an object is created are proper parts of that object (at the beginning of its existence).

This principle is stronger than MIPP. It's also too strong full stop, since sometimes the ingredients used to make composites do not survive the causal processes that bring the composites into existence. Bennett's example is that of making a cake. Eggs are listed among the cake's ingredients, but they are not listed as parts of the finished cake. That is because the eggs are cracked and mixed into the batter so thoroughly that they cease to exist as discreet entities. Accordingly, we can conclude that **MIPP**$^{+}$ is false.

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[43] Donnelly actually argues for replacing WSP with a different principle. See Donnelly (2010: 233 – 9) for details.

Bennett brings up **MIPP**$^{+}$ in order to discuss Koslicki's case for MIPP. In the case of the eggs and the cake, the ingredients do not come to coincide with the whole by being their parts. But there is a sense in which we can say that the eggs maintain a presence in the cake. Vegans or people with egg allergies, for example, would be unwilling to knowingly eat such a cake. Moreover, the properties of the eggs do in some sense explain some of the properties of the cake, e.g., the cake's protein level or texture. But insofar as the original ingredients of the cake were destroyed, MIPP does not do much in the way of explaining these facts. Rather, Bennett thinks that we have a plausible alternative to MIPP:

> **Proper Parts of Material Ingredients as Proper Parts (PMIPP)**: (Some of? Many of?) the proper parts of the material ingredients from which an object is made are proper parts of that object at the beginning of its existence.

PMIPP's vagueness aside, it provides something of an explanation for the relevant cake example where MIPP does not. Some parts of the eggs maintain a presence in the cake, becoming coincident with parts of it and their properties (at least partially) determine the properties of the cake. Insofar as Koslicki's argument for MIPP is supposed to be an inference to the best explanation, it would seem that Koslicki's case better supports PMIPP rather than MIPP. However, if we reject MIPP for PMIPP, then (2) does not follow. All that follows from (1) is

> 2′. At least some of L's proper parts are proper parts of S.

But if we accept (2′) in place of (2), NAT no longer follows. The constraints of WSP are satisfied by the proper parts of L being parts of S. Thus, Bennett has plausibly undermined Koslicki's Master Argument.

I think Bennett has effectively undermined Koslicki's case for (2). However, others think we can bypass Bennett's objection. Patrick Toner (2012: 153 – 4) provides us with a possible amendment to the argument that gets around Bennett's objection. Toner asks us to imagine a

statue, S, made from a single extended mereological simple, L*. In this scenario, S comes into existence from a single preexisting ingredient, L*. And, says Toner, we know that S and L* are distinct because of the standard Leibniz Law considerations. And, crucially, L* is S's *only* material part. If we accept WSP, we can go further by concluding that L* cannot be S's sole proper part. Thus, S has a non-material proper part, i.e., S has a structure as a proper part.

While he seems to save (2), his response raises another problem for the Master Argument. Toner (2012: 154) admits that his modification of Koslicki's argument apparently undermines (10) since L* is a mereological simple. However, Toner claims this is still a victory for NAT-friendly hylomorphists. As Toner notes,

> One might have thought it would have been some kind of glaring category error to consider a structure to be a proper part of a material object. But if we get the bare metaphysical possibility of a structure being a proper part of an object, we show that there's no category error here: that the claim is a perfectly sensible one. (Toner, 2012: 154)

And he is right. If this is metaphysically possible, then it goes a long way to dispelling resistance to NAT. Toner then goes on to ask, if S has a structure as a part, is it really so crazy to think that any other kind of composite could have structures as parts?

What are we to make of Toner's response to Bennett? I'm not entirely sure. His goal, it seems, is to show that it is metaphysically possible for an object to have a formal part. However, it's unclear to me that he's done this. For one thing, it is unclear that the scenario Toner describes is genuinely intelligible. First, there is some debate over whether extended simples are genuinely possible.[44] But even setting that issue aside, it is unclear that mereological simples can change their shapes. Presumably S comes to exist by L* being shaped into a statue, that is, it had one shape prior to S's coming to be and a different one afterwards. But how exactly could that happen? It seems that any change in shape something undergoes is due to

[44] For a discussion of the possibility of extended simples, see Gilmore (2013: §5).

changing the spatial relationships between its proper parts. But by hypothesis L* has no proper parts. So, how could L* possibly change its shape?

Perhaps we can try to understand the idea of an extended simple changing its shape in something like the following manner: While an extended simple does not have proper parts, there are regions of space occupied by the simple that are not occupied by the *whole of the simple*. Upon considering this feature of extended simples, we can then plausibly say that the shape of an extended simple consists in the collective shape properties of its subregions. Accordingly, we can understand the simple's change in the shape of the whole in terms of its subregions changing their shape properties. As such, we need not appeal to talk of changes in parts and their relations to one another.

Does this alternative account of shape change help? It seems not. First, this account of shape change gives rise to the following problem. Let "L*" continue to refer to the extended simple Toner discusses. Let R_1 and R_2 refer to two discreet yet contiguous regions of space the sum of which L* wholly occupies. Finally, let us stipulate that L* is rounded at R_1 and angular at R_2. If L* instantiates different shape properties at R_1 and R_2, one of four things is the case: Either,

A. L* instantiates contrary shape properties at the same time (e.g. L* is rounded and angular),

B. L*'s subregions are actually distinct parts (e.g. L*-at-R_1 is rounded and L*-at-R_2 is angular),

C. L*'s seemingly monadic shape properties are actually relativized to locations, (e.g. L* is rounded-at-R_1 and angular-at-R_2,) or

D. L*'s instantiation of such properties is relativized to locations (e.g. L* is-at-R_1 rounded and L* is-at-R_2 angular).

As a side note, it is worth pointing out that this set of options should look familiar to anyone familiar with the philosophical literature on change over time. These options have roughly the same structure as the solutions on offer for the problem of temporary intrinsics, the only

difference being that there is not an analogue for the presentist solution here. Option B is the analogue of the perdurantist and stage theory solutions, (C) is the analogue of the time-relativization of properties solution and (D) is the analogue to the adverbialist solution.

Options A and B are clearly non-starters for the proponents of extended simples. (A) is clearly impossible and (B) explicitly denies that L* is mereologically simple. Option C strikes me as implausible for the roughly the same reason that Lewis (1986b: 203 – 4) thought that time-indexed shape properties were implausible. Namely, shape properties are paradigmatic intrinsic features and relativizing them in this way would make them relational. Option D strikes me as the best position for Toner to accept. First, it is analogous to what I take to be the best solution to the problem of temporary intrinsics, the so-called adverbialist solution. The basic idea behind adverbialism is that instantiation is relative to a time rather than properties being so or that the subjects of intrinsic properties are temporal parts.[45] Second, this strikes me as the least radical of the various revisions that Toner's thought experiment might require us to make, since it allows us to maintain that shape properties are intrinsic properties.

However, we must ask why we should accept (D) in the first place. If we are only accepting (D) in order to make Toner's though experiment intelligible, then accepting it is *ad hoc*. Here's what I mean: Unlike accepting that instantiation is relative to a location, making instantiation relative to a time is part of a strategy of accounting for an indubitable phenomenon, things having different intrinsic properties over time. By contrast, relativizing instantiation to a spatial location does not seem to be as well-motivated. That is, this revision to our view of instantiation is plausible only given the belief that it is possible for extended simples to have different intrinsic features at different subregions. Accordingly, if the only

[45] For defenses of the adverbialist solution to the problem of temporary intrinsics, see Haslanger (1989) and Lowe (2002: 43 – 9).

reason that we have for accepting this possibility is the desire to make Toner's thought experiment intelligible, we should reject (D) and deny that Toner's thought experiment is intelligible. And there does not seem to be an independent reason to think it is possible for extended simples to have contrary shape properties at the same time. Accordingly, I think we can conclude that Toner's defense of Koslicki's Master Argument fails. Thus, I think we should conclude that Koslicki's Master Argument fails to adequately support NAT.

4. The Case for NAT and Why It Fails, Part Two: NAT and the Grounding Problem

While Koslicki's Master Argument does not work, NAT's defenders have presented other considerations on its behalf. Koslicki (2008: 181 – 2; 254 – 9) and Kit Fine (2008) both argue that NAT presents us with an attractive solution to the grounding problem. In this section, I present and evaluate their claims to solve the grounding problem. First, I will briefly rehearse what the grounding problem is and who it is a problem for. Second, I outline Koslicki's use of NAT to solve the grounding problem. Finally, I show why I think this putative solution fails to substantiate NAT.

4. A. The Grounding Problem and the Hylomorphic Solution to It

Many philosophers believe in coinciding objects, objects that occupy the same place at the same time and share all of their material parts. The rationale for accepting that such entities exist is that outlined above. Things like the statue, S, and its clay, L, fall under different kinds, typically have different historical features and have different persistence conditions. Hence, they have to be different entities that are made of the same matter.

However, the existence of coinciding objects gives rise to the following problem. Since S and L share all their microphysical parts, both of them share all of their non-sortalish properties. To reiterate, sortalish properties encompass kind natures, persistence conditions and other modal features as well as any features that are at least partially grounded in them.[46] S and L's historical properties arguably fall under the category of sortalish properties if objects have their origins necessarily and kind membership at least partially explains identity over time. But if S and L have all of their non-sortalish properties in common, what could explain the differences in their sortalish properties? Think of it this way. We typically think that something is a statue in virtue of its non-sortalish properties, such as shape. However, L is shaped exactly the same way as S in this scenario. In fact, for any non-sortalish property, S and L are qualitatively identical. As a result, it would appear that nothing can explain their differences, but surely *something* should. The fact that coinciding entities are distinct in regards to their sortalish properties while being indiscernible in regards to their non-sortalish properties has led some to occasionally refer to this as the indiscernibility problem.[47] This problem has been forcefully presented by Michael Burke (1992) as well as by Karen Bennett (2004) and Eric Olson (2001) among others.

The grounding problem has been around for decades at this point and as a result several candidate solutions are currently represented in the literature. These candidate solutions can be broken down into three broad categories: eliminativism, monism, and pluralism.[48] Eliminativist positions attempt to solve the grounding problem by eliminating both of the purportedly

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[46] We might ask whether there are modal properties or modal claims express the way in which things have properties. I'm inclined toward the latter view, but nothing important in our discussion turns on it. For ease of presentation, I will stick with the terminology other typically use.
[47] For example, Olson (2001).
[48] None of these terms are original to me. I am borrowing "eliminativist" from Sidelle (1998: 431) for the first class, but I'm borrowing the terminology for the latter two classifications from Fine (2008: 101).

coinciding entities.[49] In this case, eliminativists would deny that S and L exist. Monist solutions come in many varieties, but they all ultimately say that despite initial appearances there is only one thing present.[50] They do this either by claiming that

a) only one of S and L really exists at a given time,
b) S=L despite their apparent differences or
c) there is only one thing, x, that is neither S nor L.

Pluralists accept that there are coinciding entities and try to show why there really isn't a serious problem.[51] Despite the subtle maneuvers made by all the parties involved, all of the solutions on offer have been met with varying degrees of discomfort and skepticism.

Koslicki's account presents us with a different way for pluralists to solve the grounding problem, one that purports to give a satisfying explanation for S's and L's differences in sortalish properties. According to Koslicki (2008: 181 – 2), the differences in L's and S's sortalish properties can more or less be attributed to the fact that S has at least one proper part that L lacks, namely, S's structure.[52] Since mereological facts are plausibly non-sortalish facts, this also means that we can account for these sortalish differences by appealing to non-sortalish properties and facts. Accordingly, it seems that we can maintain that S and L are coinciding entities without accepting that their differences in sortalish properties are brute. This would require us to accept NAT, but that might be a small price to pay given the alternatives.

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[49] These solutions encompass both the mereological nihilist and quasi-nihilist accounts. Nihilists (such as Cameron [2009], Dorr [2003], the current Sider [2013] and Unger [1979]) deny that there are any composite objects. Quasi-eliminativists such as Olson (1995), van Inwagen (1990) and Merricks (2001) think that only a few kinds of composites are real. While they will say the same thing about S and L, their opinions will diverge depending on what supposed entities are coinciding. For example, in regards to the claim that human persons and human animals coincide, nihilists deny that there are persons or animals, whereas quasi-nihilists assert that there is only one thing present that is both an animal and a person.

[50] For examples of monist solutions, see Burke (1994), Gallois (1990), Gibbard (1975), Heil (1998: 189 – 92), Heller (1988), Lewis (1971) and the early Sider (2001: Ch. 5).

[51] For examples of such solutions, see Johnston (2006), Lowe (2003), Moyer (2006) and Rudder-Baker (1997).

[52] Strictly speaking, she thinks S has two proper parts that L lacks, S's structure and L. However, I'm guessing that she would say that her claim that L is a proper part of S is irrelevant to her solution to the grounding problem. Then again, see below.

4. B. Evaluating the Hylomorphic Solution

Before I move forward, I want to pre-empt the charge that I am mischaracterizing Koslicki. While Koslicki (2008: 254 – 6) wants to use NAT to solve the grounding problem, she does not want to place too much evidential weight on its ability to solve the problem. Rather, her main argument for NAT is her Master Argument, and I do not mean to imply otherwise. That being said, Kit Fine (2008) does argue for NAT on the basis of its ability to solve the grounding problem. Moreover, even if Fine hadn't argued for NAT this way, someone else could have tried to argue for NAT on the basis of its potential to solve the grounding problem. That is why I feel the need to treat this line of argument at length.

So, all of that being said, what should we make of this solution? Does it work? I'm inclined to say no. As some have already noted, Koslicki's solution seems to have problems similar to those of the other pluralist solutions on offer. In order to show this, let me make a bit of a digression and discuss one typical pluralist strategy for solving the grounding problem. One common strategy is to accept S's and L's different persistence conditions as brute facts and then explain their other sortalish properties in terms of their persistence conditions. As such, this strategy ultimately denies we need to explain sortalish properties in terms of non-sortalish ones.[53] In other words, proponents of this view do not solve the grounding problem so much as they argue that the lack of explanation for sortalish properties is an acceptable cost to bear. As such, anyone who takes the grounding problem more seriously will suspect that this attempt to address the problem misses the point.

At first glance, it seems that Koslicki's solution does not do this. But this appearance is misleading. Koslicki apparently faces a dilemma in this context. Her account postulates a

[53] For example, see Lowe (2003: 150 – 5), Moyer (2006: 416 – 7) and Shoemaker (2003; 2008: 315 – 8).

difference between S and L in regards to their structures, i.e., S has a structural part that L lacks. Koslicki can either say that the mereological difference between S and L is a brute fact about them[54] or that this difference can be explained in other terms. If she goes the former route, her solution postulates a brute fact that doesn't seem much better than the pluralist alternatives. If she goes the second route, her solution will ultimately either be circular or collapse into a variation of the persistence conditions solution sketched above. Either way, this means that her solution to the grounding problem is not much better than the other pluralist alternatives currently on offer.

Let me unpack my reasons for thinking so. First, let us take another look at S and L. They are putatively numerically distinct, are instances of different kinds and have different persistence conditions, etc. However, they have they have exactly the same microphysical components that are arranged in the exact same way. That is, L and S both check the three boxes in what Koslicki identifies as the "recipe" for being a statue, i.e., they have the right number of ingredients, the right kinds of ingredients and the right manner of arrangement. However, only S has the statue structure as a part. Why?

Sidelle (2010: 374) suggests one possibility: While L need only check these boxes contingently, S must do so necessarily.[55] That is, the statue structure is a part of S because S must follow the S-making "recipe" in order to exist while L could stop doing so and survive. But at this point, it this account apparently becomes circular. As was pointed out above, Koslicki thinks that modal differences between S and L are explained by S having a part that L lacks. But if we want to explain this difference of parts in terms of modal differences, we are

[54] As a side note, as Sidelle (2014: 5 – 7) points out, Kit Fine (2008) effectively takes the mereological difference between L and S to be a brute difference.
[55] This paragraph more or less reiterates Sidelle's (2014) evaluation of Kit Fine's (2008) attempt to solve the grounding problem. However, Sidelle (2010) makes more or less the same points *mutatis mutandis* when evaluating Koslicki.

stuck with a problematic form of metaphysical bootstrapping. As such, it seems that to avoid this circle while still explaining the mereological difference, Koslicki must take persistence conditions as explanatorily prior to this difference in parts. But at that point, her account simply collapses into the persistence conditions based solution sketched above. Formal parts would be explanatorily superfluous in regards to solving the grounding problem. As such, trying to explain S's and L's difference of parts in these terms seems to be a non-starter for Koslicki.

Another way that Koslicki might respond to this charge is to say that S's and L's mereological difference go beyond S's structure. In addition to having the statue structure as a proper part, S also has L as a proper part. As such, they do not strictly exhibit the same manner of arrangement, etc. However, this response fails on two points. As was shown above, the claim that S has L as a proper part is far from obvious and the reasons Koslicki gives in favor of it are inconclusive at best.[56] As such, it's unclear how well-motivated this response is. But let's put that worry aside now and look at the response on its own merits. Would L being a proper part of S really help Koslicki in this regard? It seems not. First, it is unobvious that the "recipe" for a statue requires having a lump such as L among its parts as opposed to, say, a certain minimal number of clay molecules or microphysical particles. At least, that claim requires further argument. Second, I think this suggestion covertly smuggles in a sortalish difference between L and S. In order for L to be a proper part of S, they already have to be distinct from one another. As a result, it seems L and S must already be distinguished in regards to their sortalish properties. So, this response is not relevantly different from the pluralist solutions already on offer.

[56] As a side note, it should be pointed out that some hylomorphists (e.g., Fine [2008: 110 – 2]) claim that L is not a part of S and that they both share all of their material parts.

Another option for Koslicki is to simply say that S's and L's mereological difference is a brute fact. Having a certain manner of arrangement, certain kinds of ingredients, etc. are all necessary yet insufficient for having a structure as a part. As such, that S has its structure as a part while L does not is ultimately inexplicable and does not need explanation. Dan Korman and Chad Carmichael suggest that hylomorphists take this tack and give the following motivation for it:

> Hylomorphists ought to respond that there is no explanation of why Athena-shapedness is a part of Athena and not a part of Piece. This mereological difference is explanatory bedrock. And there is special reason to suppose that mereological differences are sometimes explanatory bedrock. To see this consider "Lefty", the left one-third of a certain brick. In virtue of what is Lefty a part of the brick but not a part of the right two-thirds of the brick? There is no plausible answer; it just is a part of the one but not the other. (Korman & Carmichael, 2016: 18)[57]

In addition to the case of Lefty, Korman and Carmichael point out that perdurantists generally take the fact that four-dimensional objects possess the temporal parts they do as a brute fact. The fact that some four-dimensional entity has the temporal parts it has does not seem like something that can generally be explained or really needs explanation.

They then consider the response that Lefty is a part of the brick because of Lefty's spatial location. That is, Lefty occupies a subregion of the space the brick occupies. (Presumably, Lefty's occupation of this spatial subregion would also explain why Lefty is not a part of the right two-thirds of the brick as well.) This explanation, they think, puts the cart before the horse. Rather, it seems as if the location of a given whole derives from the location of its parts. Moreover, spatial location per se wouldn't be a sufficient reason for Lefty being a part of the brick, since spatial location within a larger whole does not always suffice for parthood. For example, if someone gets a splinter caught under the skin of their thumb, the splinter does

[57] Korman and Carmichael (2016: 44, endnote 68) go on to clarify that they are not saying there are never explanations for why something is a part of another thing. Rather, theirs is the more modest claim that *sometimes* there is no need for such explanations.

not thereby become a part of their thumb. As a result, Korman and Carmichael think that mereological hylomorphists can plausibly say that it just is a brute fact that S has the *statue* associated structure as a part while L does not.

Does this solve the problem? I don't think it does. When deciding whether to accept a theory, *inter alia* we have to decide whether the brute facts in the theory are plausible brute facts. That is, we have to see that it is plausible for those particular facts to be brute. I will grant that mereological facts can plausibly be brute. Moreover, Korman and Carmichael's examples strike me as plausibly brute if they ever obtain.[58] However, those mereological facts are plausibly brute in virtue of the kind of wholes they involve. For perdurantists, an entity that exists over time is a four dimensional entity, each three dimensional being we immediately experience being but one of its many temporal parts. Additionally, and this is key, perdurantists typically endorse the view that a four-dimensional entity is nothing over and above its temporal parts. In this regard, the relationship between such an object and its parts is analogous to that of sets to their members. So, just like it betrays confusion to ask why a set has the particular elements it does, we can see that there does not need to be an explanation of why four-dimensional objects have the temporal parts they do.

In the case of Lefty, something similar is the case. The persistence conditions of bricks make it very difficult, if not impossible, for them to change many of their parts. Granted, it does not seem like brick segments' identities are dependent on all of their components. For example, a brick segment can plausibly lose a few chips here and there while still being the same segment. But overall the materials involved and the bonds that need to hold between them make brick segments rather static in regards what kinds of mereological changes they can

[58] I qualify this because I reject perdurantism and arbitrary undetached parts such as undetached brick segments. However, I will set these concerns aside for the sake of argument.

undergo. As such, the parts brick segments have as their material origins go a long way to determining their identity over time. Thus, there does not seem to be much to say about why Lefty is not a part of the right two thirds of the brick it partially composes.

However, there seems to be a relevant difference between the cases Korman and Carmichael cite and that of formal parts. When we properly understand what four-dimensional entities or bricks segments are, we can see that their natures render the fact that these things have the parts that they do unobjectionably brute. Again, this is analogous to the question why sets have the elements they do. Once you understand what sets are and their relations with their elements, you can see that there is no informative answer about why a particular set has its particular elements. It does seem that the same is the case for statues and lumps. That is, properly understanding what statues and lumps are does not make the question of why they have or lack structures as parts seem equally misguided. For one thing, properly grasping the natures of statues and lumps does not tell us that they have structures as parts. Therefore, the brute mereological facts that hylomorphists would have to postulate are less plausibly brute.

5. Where Do We Go from Here?

In this chapter, I have considered the arguments for and against NAT. I evaluated Mark Johnston's argument against NAT and argued that it fails in its aims. I then looked at two of the arguments given in favor of NAT, Koslicki's Master Argument and NAT's possible role in solving the grounding problem. Both of these arguments strike me as the best ways to support NAT.[59] Since I found these arguments unsatisfactory, it seems as if we have no overriding

[59] Toner (2012: 155 – 61) and Tuomas Tahko (2011: 202) both formulate arguments for NAT on Koslicki's behalf, though Tahko himself does not endorse the argument he formulates. However, I do not find either of the arguments particularly compelling. Toner's argument presents NAT as a way to solve the problems Effingham & Robson (2007) raise for the conjunction of WSP, endurantism and the possibility of time travel. As I discussed in

reason to think that NAT is true. I find NAT to be counter-intuitive, but upon much reflection I do not think that I can formulate a compelling argument against NAT on the basis of that fact alone. As a result, it seems as if this chapter has left NAT's status in limbo.

At this point, I want to make a suggestion about how to move the discussion forward. Despite my misgivings about NAT, I think there are a lot of sensible claims in Koslicki's overall account. I share her desire to formulate a theory of composite objects that rejects nihilism and universalism while remaining "ontologically heavy weight".[60] Moreover, I think that much of what she says gives us a good starting point for formulating an attractive way to restrict composition. So, I want to suggest that we evaluate NAT on the following criterion. In addition to picking up some threads from Chapter Two, I will formulate a version of Koslicki's account that does not make reference to NAT in the next chapter. After this, I will compare and contrast Koslicki's account and the one that does not include NAT. The end result will, hopefully, be a positive view of composite objects that incorporate the strengths of the previous views while avoiding their weaknesses. Most importantly, it will be a view that shows that we do not need to accept NAT.

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§3.B., WSP is not as obvious as one might think and so it is unclear why the endurantist couldn't plausibly reject it. See Donnelley (2010: 239 – 46) for a more detailed discussion of WSP and Effingham & Robson's argument. Tahko's argument relies on the tie that Koslicki posits between formal parts and kinds. As I will discuss next chapter, a similar account of kinds works at least as well without her acceptance of NAT.

[60] I borrow the terminology of "ontologically heavy weight" from David Chalmers (2009). Calling such account ontologically heavy weight is to distinguish such accounts from the "light weight" accounts of individuals like Eli Hirsch (2005), who takes ontological debates to ultimately be linguistic disputes.

Chapter Four

It All Depends: Building, Ontological Dependence and Restricting Composition

0. Introduction: The Road So Far

Let us begin this chapter by taking stock of the discussion thus far. In the previous chapters, I presented and evaluated neo-scholastic and neo-Aristotelian varieties of hylomorphism. In Chapter Two I rejected neo-scholastic hylomorphism primarily on two grounds. First, I argued that its postulation of prime matter is problematic. Second, I argued that it is implausible to think that organisms are intensely integrated wholes. In Chapter Three I argued that the main arguments for and against NAT, the thesis that composite objects have formal parts, are unsuccessful. I then suggested that we can move forward in our discussion of NAT by seeing whether a theory of composition like Koslicki's works without NAT.

While the previous chapters' discussion has been primarily critical, it is time now to turn to the constructive side of my project. In the next section, I will present Koslicki's manner of restricting composition in more detail. In sections two and three, I will refine her account by purging the aspects of her view that depend on NAT. In the process, I will refine her account of kinds and present a more detailed account of structure. In the chapter's final section, I will pick

up some threads from the second chapter and discuss how composites depend on their parts. In the process of doing so, I will clarify the relationship between ontological dependence and what Karen Bennett (2017) refers to as "building relations". In the process of discussing these topics, I will also outline some avenues for future research.

1. A Second Look at RCP

As I said in the previous chapter,[1]Koslicki gives us a few different variants of her principles of restricted composition. Her chisholming is *inter alia* due to her desire to clarify how her restriction applies to different phenomena. For example, she (2008: 189 – 90) provides a time-indexed version of her restricted composition principle in order show how it handles the change of parts over time. Insofar as the second formulation of her restriction encapsulates the basic view, it will suffice for our purposes to start with it. For simplicity's sake, I will refer to it as the "Restricted Composition Principle" (RCP). Koslicki (2008: 173) formulates it thusly:

> (RCP) Restricted Composition: Some objects, $m_1,\ldots m_n$, compose an object, O, of kind, K, just in case $m_1,\ldots m_n$ satisfy the constraints dictated by some formal components, $f_1,\ldots f_n$, associated with objects of kind, K.

In other words, a plurality of objects composes a certain kind of object when they collectively meet the conditions laid out by the formal parts that are characteristic of instances of that kind. As such, what conditions the plurality of objects must meet vary depending on what structure or structures are associated with instances of that kind. I say "or structures" because Koslicki leaves it open whether there is more than one structure associated with the relevant kind's instances. Presumably, this is because doing so allows her to leave it open as to how fine-grained structures need to be. It also leaves it open as to whether structures are more like

[1] Page 86 above.

universals shared by multiple thing or like tropes, which belong to a single individual. In order to see how the account works, we will need to understand both her account of kinds and that of structure.

1. A. RCP and Natural Kinds

In order to see how RCP restricts composition, let's make a slight digression. Trenton Merricks (2009: 301 – 2) makes the following observation about RCP. Koslicki presents RCP an answer to the special composition question, and one of the things RCP is supposed to do is rule out the existence of arbitrary mereological sums. But, Merricks says, RCP doesn't actually do this:

> After all, even standard mereologists, who believe in non-commonsensical sums of ears and dogs, can accept her answer. For the standard mereologists can claim that *arbitrary sum* is a kind of object whose structure dictates that the parts of any arbitrary sum must satisfy the "formal constraint" of existing. And standard mereologists can add that, for every other kind of object, the parts of any object of that kind must satisfy the further formal constraints dictated by the structure associate with that kind of object. (Merricks, 2009: 301)

Accordingly, Merricks says, RCP does not amount to much of a restriction on composition at all. As Koslicki (2008: 233) admits, Merricks is right that RCP per se does not rule out mereological sums without a background account of kinds. Accordingly, we need to understand Koslicki's view of kinds in order to see how RCP is supposed to do its job.

There are two broad sorts of kinds, *natural kinds* and what Koslicki (2008: 201) refers to as *artificial kinds*. We can break down artificial kinds into further sub-varieties, *nominal kinds* and what Amie Thomasson (2003) calls *human kinds*. Nominal kinds correspond roughly to what John Locke (1975: 438 – 9) calls "nominal essences". When we group real entities by means of nominal kinds, we are grouping them in ways that are determined by our preferences

and interests, typically on the basis of superficial surface qualities. A common example of a nominal kind is that of *jade*.[2] What we refer to as jade is actually two different minerals with very different chemical structures, jadeite and nephrite. We initially grouped these two minerals together on the basis of superficial surface qualities such as hardness and color, and through empirical investigation we discovered that this categorization did not mark a metaphysically significant division in nature. Human kinds can be split into two broad varieties, *artifact kinds* and *institutional kinds*. I address human kinds in more detail in §2.B below, so I will simply give a few examples and a rough and ready characterization for now. Examples of artifact kinds include *table*, *chair* and *house*. Institutional kinds include *legal system*, *monetary currency* and *prime minister*. What both type of kinds have in common is that their instances, in some sense, are created by the beliefs, practices or intentions of human beings, though arguably not in the same ways. This is one way human kinds differ from nominal kinds. While instances of human kinds are created by our beliefs, practices, or intentions, instances of nominal kinds are typically not. So, while we created the category of jade, we did not create the samples of jade in the process.

This takes us to natural kinds. Natural kinds differ from artificial kinds in that while the latter depend on us in some significant way, natural kinds do not. That is, if there are natural kinds, they mark genuine divisions in nature that are independent of our beliefs, interests and practices.[3] As one might expect, the best candidates for natural kinds are those postulated in our best scientific theories. Chemical kinds such as *oxygen*, *methane* and *water* as well as physical kinds like *proton* and *electron* are typically mentioned as putative examples of natural kinds.

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[2] This example is taken from Kim (1992).

[3] As Bird and Tobin (2017: Introduction) point out, is unclear where natural kinds end and artifact kinds begin. For example, it seems that natural kinds can have man-made instances, and it becomes unclear at a certain point whether synthetic chemicals count as natural or artificial in the relevant sense. Since nothing turns on this demarcation issue, I will set it aside for the meantime.

Additionally, Koslicki (2008: 202 – 3), like Lewis (1983), thinks naturalness is a feature that comes in degrees. That is, it seems plausible to think that some kinds and properties might be more natural than others. The examples that she gives are yellowness and sweetness. Instances of yellowness and sweetness are more heterogeneous than instances of chemical and physical kinds, but at the same time seem more naturally grouped together than instances of grue-colored things.

I think that taking a moment to draw some important distinctions would be helpful. We can distinguish two sorts of realism about natural kinds, what Bird and Tobin (2017: §1.1.1) call "weak realism" and what I call "robust realism". Both forms of realism contrast with conventionalism about natural kinds. Roughly stated, conventionalism about natural kinds is the thesis that so-called natural kinds do not actually reflect mind-independent divisions in the world, but rather depend on the interests and practices of human beings. Realists of both stripes reject this claim. Weak realism is the minimal thesis that some ways of grouping things reflect genuine divisions in nature. Robust realism goes further than claiming there are there real divisions in nature. Robust realists add the claim that these divisions are in nature in virtue of the existence of real entities we call natural kinds. Robust realism entails weak realism but treats natural kinds with more "ontological seriousness" in that it postulates real entities in virtue of which these divisions exist.

Koslicki is a robust realist about natural kinds. While she thinks natural kinds exist, she is non-committal about what category of being they belong to. Koslicki (2008: 223) considers four candidate categories for natural kinds: sets, wholes, pluralities and abstracta of some sort.[4]

[4] Koslicki (2008: 223, fn. 49) takes the abstract entity option to encompass several further possibilities, such as universals and abstract functions from possible worlds to extensions. She also does not explicitly say that we should understand "abstract" in metaphysical terms, as opposed to epistemological terms. I suspect that what

To make a long story short, Koslicki thinks that the non-descriptive character of natural kind terms leaves it open as to which of the above four categories natural kinds belong. As a result, Koslicki is non-committal about whether natural kind terms refer to the same entity across possible worlds. That being said, Koslicki thinks that other semantic considerations rule out natural kinds being sets or wholes. Natural kind terms are *general* terms while terms referring to sets and wholes are *singular* terms. Accordingly, she seems most open to the idea that natural kinds are pluralities or abstracta of some kind.

We now come to the question of what features characterize natural kinds.[5] Koslicki (2008: 203 – 10) thinks there are three intimately related characteristics that natural kinds share. They are i.) projectibility, ii.) figuring into laws of nature and iii.) factoring into explanations of natural phenomena, particularly causal explanations. Let's discuss them in that order.

A projectable kind or property is a kind or property that grounds legitimate inductive arguments about its instances. Hence, a projectable property's or kind's typical effects or liabilities can be "projected" into the future by observers, so to speak. This distinguishes natural kinds and properties on the one hand from grue-like properties and nominal kinds on the other. Given the typically superficial features we use to distinguish members of nominal kinds, nominal kindhood typically presents us with poor grounds for inductive inferences.

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ultimately matters for this option is that the identities of the candidate abstracta are independent of the identities of their instances.

[5] Let me first head off a potential complication. Following Ellis (2001: 82 – 3), it seems as if we can distinguish *natural kinds of objects*, *natural kinds of properties* (i.e., natural universals) and *natural kinds of processes*. At this juncture the contrast class for natural kinds has been artificial kinds. In the case of properties, there might be some which do not fit into this taxonomy. For example, some moral realists think moral properties are both non-natural and non-artificial. Fortunately, there seem to be no objects that mess with the taxonomy of objects used so far. As such, I set this issue aside for now.

I say "kind or property" because it seems right to say – *pace* Quine (1969: 234) – that projectibility alone is a necessary yet insufficient condition for kindhood. The property *being negatively charged*, for example, is a property whose instances do not form a natural kind. The class of such beings is arguably too heterogeneous to form a kind. At the same time, *being negatively charged* is clearly a projectable property. For example, knowing that a particle is negatively charged allows us to make very strong inductive arguments about how it will behave and interact with other particles. In that sense, it seems right to say *being negatively charged* is a natural property that by itself it does not mark things out as members of a natural kind.[6]

The second feature of natural kinds is that of factoring into the laws of nature. As I said above, nominal kinds typically provide us with poor grounds for inductive inferences. But in principle a nominal kind can have a degree of projectibility if its instances all happen to share a natural property. However, even if a nominal kind had this level of projectibility, scientists would never include them in their theories or their formulations of natural laws. This brings us to the final feature of natural kinds.

Finally, Koslicki thinks that natural kinds underwrite causal explanations.[7] The best way to illustrate this feature of natural kinds is to discuss why natural kinds like *water* differ from nominal kinds like *jade*. Despite these kinds' different statuses, we started out by grouping samples of water and those of jade on the basis of various superficial surface qualities. We grouped samples of water together on the basis of their tendency to be clear, potable, freeze at a temperature of 0° C, able to dissolve salt, etc. We grouped samples of jade together on the basis of their color, luster, density, etc. So, initially at least, the natural kind *water* seemed relevantly

[6] Koslicki (2008: 204).
[7] There is a question of whether kinds or the natural properties their instances possess underwrite causal explanations, but addressing it would take the discussion too far afield. See Bird (2012) for more details.

like the nominal kind *jade*. So why do we think water is a natural kind and jade is not? The answer is the explanations for why samples of water and jade exhibit the relevant qualities. Upon investigation, we discovered that samples of water all shared an underlying chemical structure that explains the qualities and causal powers we associate with water. By contrast, in the case of jade, we did not find a shared underlying feature that explained the features we used to identify jade samples. Moreover, there are differences between jadeite and nephrite that are explained by the lack of such an underlying principle. For example, jadeite's and nephrite's difference of chemical structure allows them to absorb and reflect light in ways that give each of them a different luster. Treating *water* as a natural kind tracks an explanatory principle while taking *jade* to be a natural kind would not. That is, while jade samples sharing the qualities we used to sort them is a kind of coincidence, there is a deeper fact that causally and constitutively explains why water has the features we originally used to identify it.

We can see how this feature of natural kinds is the most important of the three listed. As Koslicki herself points out, natural kinds' roles in causal explanation is what underwrites both the projectibility of natural kinds and explains why scientists use them when formulating theories and laws. Moreover, this also explains why scientists ignore nominal kinds. Even if all of a nominal kind's instances just so happen to share a natural property, the natural property is doing all the explanatory work while the nominal kind just happens to correlate with it.

After discussing the marks of natural kinds, Koslicki turns to the question of whether biological species are natural kinds. While most of us pre-theoretically assume they are, a good number of biologists and philosophers of biology would disagree. They would instead claim that biological species are actually individuals.[8] Koslicki disagrees with this assessment and

[8] See Brigandt (2011: 248 – 51) for a brief overview of the positions, key participants and issues in the debate over the status of biological species.

instead opts to defend the claim that biological species are natural kinds. She (2008: 211 – 9) lists six reasons given for the Species-As-Individuals Thesis (SAI). They are:

Change over Time: As evolutionary theory tells us, species come into being at a certain point in time. They change over time as the traits that characterize their members change, and they almost inevitably cease to exist. Insofar as substantial and accidental changes of these sorts are characteristic of individuals rather than kinds, so the argument goes, we should conclude that species are individuals.

Historicity: Species, it seems, are bound to a particular region of space and time. They have their temporal and causal origins necessarily. So, for example, if God created an organism intrinsically indiscernible from a human being *ex nihilo*, that being would not be human. By parity of reason, species cannot re-evolve after they become extinct. This, it is claimed, supports SAI over the thesis that species are natural kinds.

Cohesiveness: Proponents of SAI claim that individual members of species are causally and functionally dependent on one another in virtue of various genetic and evolutionary relations they stand in to one another. Accordingly, they claim that this cohesiveness and continuity over time means that these organisms are all part of a whole rather than instances of the same kind.

Absence of Laws: There seem to be no biological laws. SAI proponents give three reasons for this claim. First, there seem to be no exceptionless generalizations about species. For example, while the vast majority of swans are white, every so often we find a black swan. Second, the candidate generalizations about species fail to sustain counter-factual reasoning. For example, it's not the case that if something were non-white, it would be a non-swan. Finally, the nature of scientific laws is such that they are supposed to be spatially and

temporally unrestricted. Given the historicity of species, generalizations about them are limited to a subregion of Spacetime. Moreover, the traits of species vary over time without resulting in speciation, which means that generalizations about them tend to hold for a limited amount of time. Since species apparently do not factor into the laws of nature, they apparently cannot be natural kinds.

Lack of Essences: "Essence", to misquote Aristotle, is said in many ways.[9] In the context of the debate over the status of species, an essence is a non-trivial property or set of non-trivial properties that are jointly necessary and sufficient for membership in a kind.[10] Moreover, they are properties that instances of a kind cannot lose without ceasing to exist. There are various species analyses in the biological and philosophy of biology literature, but none of them permit us to find a non-trivial set of properties that belongs to all and only members of species. Some species concepts try to mark out members of species in terms of intrinsic features like morphology or genetic similarity. Others try to analyze the notion of species in terms of extrinsic features like the capacity to interbreed with others or sharing an ecological niche. In the case of intrinsic feature analyses, there simply isn't a set of intrinsic features that all and only members of a given species have. In the case of extrinsic feature analyses, many of the extrinsic features essential to the species seem to be contingent features of the species' members. Thus, SAI proponents claim, we should conclude that species are individuals and not kinds.

Reference to Species: Species' names behave more like the proper names of individuals than general terms in that they apparently don't refer to species in virtue of any set descriptive

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[9] I will be discussing individuals who use the term "essence" differently in §4 below. I will also be using essence in more or less the same way they do later on.

[10] The point about non-triviality is taken from Putnam (1970). This condition is meant to prevent us from stipulating that some term refers to the property of belonging to a specific arbitrary collection of objects and thus trivializing the requirement for an essence.

content. Rather they appear to refer to species directly and rigidly after an initial "baptism" by the researchers who discover them. As such, it is claimed, we should view species' names as proper names instead of general terms.

Koslicki finds these arguments unconvincing. She (2008: 215 – 6) finds the *historicity*, *cohesiveness* and *change over time* considerations to ultimately be terminological disputes. For example, even if species are abstract objects existing outside of space and time, it still seems that we can say they change or go extinct derivatively in virtue of their instances changing over time. Relevantly similar points can be made in response to cohesiveness and historicity.

In regards to the apparent absence of laws, Koslicki makes the following three points. First, it is unclear that the laws in physics and chemistry are genuinely exceptionless. Second, she (2008: 216 – 7) thinks it is unclear that generalizations about species all fail to support counter-factual reasoning. She thinks that genetic and phenotypic variability within species doesn't falsify counterfactuals that are based on properly qualified generalizations about species. Koslicki's example is the color of robin's eggs, a greenish-blue color. It seems possible that various environmental factors could cause robins to start laying eggs of a different color without resulting in speciation. But this state of affairs obtaining would not falsify the generalization "*all things being equal*, robins' eggs are greenish-blue."[11] Moreover, this qualified generalization is not merely an accidental regularity. Rather, these hypothetical changes to robins' eggs would be due to systemic changes to robins' environment. Given these facts, it seems plausible to say that qualified generalizations of this sort in fact ground counterfactual reasoning.

[11] Of course, this raises the question of how to avoid using ceteris paribus clauses in a way that trivializes this generalization. Koslicki (2008: 217, fn. 36) is aware of this issues and points to Marc Lange's (1999) work on this topic.

Finally, Koslicki thinks that reference to specific regions of time and space per se does not preclude a generalization from counting as a law of nature. As she points out, various live scientific hypotheses could be dismissed out of hand if it did. For example, it would automatically have ruled out Paul Dirac's suggestion that the universe's gravitational-force constant is inversely proportional to the time since the Big Bang. As such, it seems premature to rule out the possibility of biological laws of nature merely because they would govern phenomena in only one subregion of time and space. Therefore, Koslicki thinks there is nothing inherently problematic with there being biological laws.

In regards to biological essences, Koslicki grants that there are none. But she denies that this rules out species being natural kinds.[12] First, she cautions philosophers who work at a distance from the discipline of evolutionary biology to not insist on *a priori* grounds that natural kinds must have essences.[13] Her second point is not entirely clear. But she seems to say that it seems reasonable to hold that at least some natural kinds lack essences given the assumption that biological species are paradigmatic natural kinds.[14] She grants that this move might come at a cost, since it requires one to make sure that their views on induction, natural laws, and causal explanation do not ultimately depend on the claim that natural kinds must have essences.

As for reference to species, Koslicki (2008: 218 – 9) points out that species names behaving like proper names does not rule out their being natural kinds. In fact, Kripke's (1980) and the early Putnam's (1975) accounts of natural kinds have these similarities to proper names

[12] However, not everyone agrees. See Ereshefsky (2017: §2.6) for an overview of the debate.
[13] Like, for example, Brian Ellis (2001: 26 – 7). In fairness to Ellis et al, this view is rather intuitive. Note the expression "they differ by degree rather than kind" and its variants. Plus, this view has a long history. Aristotle seems to have endorsed a version of it when he claimed that the category of substance "does not admit of more or less". (*Cat* 5, $3^{b}34 - 4^{a}9$) Porphyry (Spade, 1994: 8) followed Aristotle on this point in his *Isagoge*, as did the rest of the medievals. Finally, Locke (Op. Cit.: 446 – 7) presupposed this view when arguing that our sorting practices reflect only nominal essences due to there being no sharp cut offs between different groups we sort things into.
[14] Brigandt (2011: 250) suggests a similar thesis.

built into them. So, by themselves these similarities between species names and proper names fail to rule out species being natural kinds.

Now we can see how Koslicki's account of natural kinds works with RCP to allow for the reality of composite objects postulated in physics, chemistry and biology while ruling out the existence of mereological sums. This is because the purported kind *mereological sum* is explanatorily useless from a scientific point of view. It is not projectable, no one thinks this "kind" would factor into the laws of nature, and it apparently serves no causal or explanatory purpose. As such, RCP with this view of kinds restricts composition so as to eliminate mereological sums.

However, it seems that this account goes beyond Koslicki's goal of getting rid of mereological sums. It seems as if *mutatis mutandis* the above considerations plausibly apply to more commonsensical "kinds" such as *heap*. *Heap* seems just as explanatorily useless as *mereological sum* from the point of view of scientific inquiry. As such, it seems that RCP rules out the reality of heaps, too. This is not necessarily a bad thing. Proponents of mereological sums often argue that they are relevantly similar to things like heaps.[15] So perhaps we should expect any plausible restriction on composition to rule out things like heaps along with mereological sums. I suspect Koslicki would welcome this result. Heaps create a problem for her solution to the grounding problem, and she (2008: 258) tries to motivate the rejection of heaps on epistemic grounds. However, it seems as if her account straightforwardly entails that there are no heaps.

That RCP yields some revisionary consequences also heads off another potential problem. Sider (2001: 156 – 7) argues that claiming that our conceptual scheme maps perfectly

[15] For example, see Schaffer (2009: 358 – 9, fn. 11).

onto the structure of the world is implausible since that would seem arbitrary. If we want to break with ontological antirealists and say that there is a non-conventional fact of the matter about what composite objects exist, some kind of disconnect between reality and our conceptual scheme seems unavoidable. And it seems as if RCP delivers on this front.

1. B. RCP, "Formal Components" and Constraints on Composition

As we saw last chapter, Koslicki thinks that composite objects have both material parts and formal components, i.e. structures.[16] In addition to being parts, structures play what we can call *ordering* and *selecting* roles in composition. As Koslicki (2008: 235) puts it, a structure "…makes available 'slots' that can be filled by other objects, as long as these objects satisfy certain type restrictions; the objects…, as a result of occupying these slots…, will exhibit a particular kind of arrangement or configuration." So, structure on this view ends up dictating a) what kind of objects can compose instances of K, b) the minimum and maximum number of objects that can compose a K, c) how variable the parts of K's can be over time and d) how these parts have to be arranged in order to compose a K.[17]

Koslicki borrows the following example of structure from Harte (2002) to illustrate how it plays its roles.[18] In the example, the structure is an "alternate by gender seating arrangement" for a dinner party. The structure in this example creates slots for guests to occupy and dictates each slot's type restriction in terms of the gender of the previous slot's occupant. If the prior seat occupant is a man, the seat next to it has to be filled by a woman and vice versa. The particular seating arrangement, however, leaves it open as to the specific individual occupying the seat. As long as the occupant's gender fits the pattern, it does not

[16] Page 87 above.
[17] Koslicki (2008: 172 – 3).
[18] Koslicki gets this idea of structure from Harte's (2002) interpretation of Plato's mereology.

matter who he or she is. As a result, this structure places constraints on what specific patterns the dinner party seating arrangement can exhibit.

It is tempting to identify structure with the way something's material parts are arranged. However, Koslicki never identifies them and seems to indicate that she thinks they're distinct.[19] Moreover, she seems to say that structure is explanatorily prior to the way in which something's parts are arranged. Koslicki's view is that structure is an explanatory principle that somehow provides us with what we can accurately describe as a metaphysical blueprint for composite objects of a certain kind.[20] Given this example and Koslicki's description of structure's conceptual role, we can start to see how it is supposed to do some of the work Koslicki has for it. For example, we can start to get a sense of how it is explanatorily relevant to composite objects' modal profiles.[21]

On Koslicki's account, structures are real entities postulated to play a specific explanatory role in composition. While she thinks that structures are real entities, she hesitates to definitively place them in any particular category of being. However, she entertains the idea that structures are objects of some kind. She (2008: 252 – 4) motivates this speculation primarily by considering linguistic and mathematical structure. Her conclusion turns on the fact that these kinds of structures often operate on other structures of the same type in their respective domains of discourse in order to generate new structures. That is, mathematical and linguistic structures contribute to the generation of new structures by occupying the same role concrete objects do in the case of concrete composite objects. She takes this fact to be sufficient reason to consider the possibility that structures are objects.

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[19] For example, see Koslicki (2008: 235).
[20] Koslicki herself refers to structure as a "recipe" for an object. However, Alan Sidelle (personal communication) pointed out to me that "recipe" seems inapt since recipes often require the destruction of the relevant ingredients. (Sidelle attributes this insight to Karen Bennett [2011b].) Blueprints, by contrast, do not.
[21] Koslicki (2008: 254). I say "partially" since structure seems unable to account for things, for example, like the essentiality of origin for individuals or that the object has its structure essentially.

Before I close out this section, I want to address the relationship between structures and kinds. Koslicki does not say much the relationship between the two things. She does say composites are the kinds of things they are in virtue of exhibiting the structure "associated with" instances of that kind. However, merely saying that they are "associated" does not tell us much about their relationship. It is not very suggestive of what that relationship might be, either. Some critics have suggested that this implies that the relationship is not particularly intimate.[22] While I see where those critics are coming from, I think that her talk of association is charitably interpreted as a neutral placeholder term until more details are filled in. However, that means this relationship needs to be spelled out more explicitly if the theory is to be satisfactory.

2. Filling in the Details on Kinds

Up to this point, my work has been primarily critical. It is now time to stop cursing the darkness and try to light a candle. As I said previously, I find the broad method of restricting composition found in RCP to be a promising alternative to its competitors. Not only does it strike a middle path between mereological nihilism and universalism, it does so without making things seem too easy.[23] And unlike the more austere restricted composition theories of van Inwagen (1990) and Merricks (2001), I think it strikes a nice balance between conservatism and revisionism. This method of restricting composition does require us to assume that objects that are instances of natural kinds are *essentially* instances of those kinds, but this strikes me as a plausible assumption. At least, that assumption strikes me as plausible enough to justify developing the view and seeing how plausible the end result is.

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[22] For example, see McFarland (2011: 4).
[23] *Pace* Hirsch (2005 & 2009) *inter alios.*

As I wrote at the end of the previous chapter, one of my goals is to develop an account of composition like Koslicki's that does not make any reference to NAT. This part of the project begins in earnest here. It is my ultimate contention that we will see that a Koslicki-style account of composition works just as well without the theoretical baggage of NAT.

Before I get to the task of developing this account, I want to head off address a few important issues. In contemporary metametaphysics, there is a debate among realist-leaning metaphysicians about the ultimate goals of metaphysics. Is metaphysics, as Quine (1980b) thought, concerned with asking questions about what exists? Or is it, as Schaffer (2009: 350 – 62) argues, concerned primarily with discovering what is fundamental, which suggests that we should treat existence questions as somewhat trivial? Depending on whose side you take, RCP and similar restrictions on composition end up performing different tasks. However, it is impossible to do this debate justice here. So, rather than settling on one side or another, I will hedge and simply say that I think RCP and the variations I will formulate of it will pick out composites that are *real*.

My assertion that the composites ruled in by an RCP-style restriction are real requires a brief discussion of what it means to say that something is real. We can initially characterize real things as those that exist independently of our mental states. However, this initial characterization is unsatisfactory for two reasons. First, this characterization seems compatible with saying that things that causally depend on our mental states are not real. However, we intentionally cause real events in the world regularly. Thus, reality does not preclude being causally dependent on mental events. As a result, it seems as if we should specify that the relevant kind of independence is a non-causal variety of independence. Second, this characterization seems to suggest that mental states are not real. Our mental states cannot exist apart from our mental states, obviously. But surely they are real.

I think looking at another attempt to define a realist position would be helpful in the task of characterizing reality. Specifically, I want to look at Shafer-Landau's attempt to define moral realism. Shafer-Landau defines his position partially in terms of a feature that he calls "stance-independence". He (2003: 15) characterizes stance-independent moral facts as those that "obtain independently of any preferred perspective, in the sense that *the moral standards that fix the moral facts are not made true by virtue of their ratification from within any given actual or hypothetical perspective*." In other words, according to the moral realist, there are moral facts that do not obtain in virtue of our attitudes toward them.

I want to suggest a characterization of general reality along similar lines as Shafer-Landau's characterization of moral realism. Specifically, I want to suggest that we understand the claim that some kind of entity is real as the claim that facts about whether such things exist/occur/etc. do not obtain in virtue of any of our mental states about them, such as beliefs, intentions, conventions, desires, etc. The expression "in virtue of" should be taken to imply a kind of ontological dependence, not causal dependence.[24] As a result, it seems as if this rough characterization of reality avoids the two factors that rendered my initial characterization of reality unsatisfactory. First, it allows real things to causally depend on our mental states. Moreover, this characterization of reality does not have the implausible consequence that our mental states are not real. Even though our mental states cannot exist separately from our mental states, facts about their occurrences do not obtain in virtue of our beliefs, conventions, etc. about them. The upshot of all of this is that what I mean when I say that composite objects of kind K is real is that facts about whether there are any K's do not obtain in virtue of our beliefs, conventions, etc. about them. This characterization could probably be made more precise, but I think that it is sufficient for my purposes in this chapter.

[24] I say more about the nature of ontological dependence and its connection to the in virtue of relation in §4.A below.

This section will consist of three subsections. First, I will refine Koslicki's account of kinds by ruling out three of her candidates for natural kinds. I will then try to show how nominalists about kinds can still hold on to this account. Second, I will turn to the issue of whether artifacts are real things, and I will argue tentatively that they are.

2. A. Categorizing Kinds

As I said above, Koslicki considers four sorts of entity with which to identify natural kinds: sets, wholes, pluralities and abstracta. She mentions these candidates in her discussion of the semantics of natural kind terms. In her discussion, she concludes that we cannot settle on one candidate solely on semantic grounds. However, she does think that semantic considerations can narrow down the possibilities. Specifically, she argues that natural kind terms being general terms rules out sets and wholes. Such entities are individuals and thus designated by singular terms.

While I think this line of reasoning has some plausibility, I'm unsure how much weight to put on these semantic considerations. Language is rarely conclusive when it comes to metaphysics. Regardless, I think some metaphysical considerations can get us where Koslicki wants to go. Even if we think natural kind terms are non-rigid, the identity conditions for sets make them ill-suited to be natural kinds. That is, it seems as if theories that identify natural kinds with sets runs into a version of what has been called both "The Coextension Problem" and "The Companionship Problem".[25] Assume for the sake of argument that *organism* and *prokaryote* are natural kinds. In the actual world, prokaryotes like bacteria are one of many varieties of organisms. But it seems that evolution could have taken a course that resulted in

[25] The following argument is adapted from one in Manley (2002: 83 – 4). For examples of the companionship problem in the general context of the problem of universals, see Armstrong (1989: 25 – 6) and Moreland (2001: 31, 35).

prokaryotes being the only existing variety of organism. In a possible world where evolution took that course, the set of all organisms and the set all prokaryotes have exactly the same members. Thus, they are the same set in that world. If natural kinds are sets, *organism* and *prokaryote* are the same kind in that world. This seems impossible, since the identities of natural kinds are independent of the identities of their instances. As such, natural kinds cannot be sets. The same, it seems, would hold if natural kinds are wholes. If they are wholes, it seems that they would be some kind of mereological sum. At the very least, they seem to be the only kind of wholes that are capable of playing this role. Since sums have roughly the same identity conditions as sets, the argument against sets applies to sums *mutatis mutandis*.

Note well, however, that this line of reasoning does more than rule out wholes and sets. It seems that the above argument against sets and wholes can be extended to include pluralities as well. In the possible world I described, it is also fair to say that the plurality of all organisms is the same plurality as that of all prokaryotes. So, in that world, we still have the identity of kinds that should be distinct. Thus, identifying natural kinds with pluralities is just as problematic as identifying them with either wholes or sets. As a result, we are pushed toward the claim that natural kinds are abstract objects of some sort.[26]

Insofar as sets, wholes and pluralities are more palatable to moderate and austere nominalists' tastes,[27] someone with nominalist scruples might find my conclusion unwelcomed. To them I say that it is unclear that accepting an RCP-style account really requires them to accept the reality of abstract objects. I want draw attention to the heretofore understated fact that Koslicki's account includes an acceptance of robust realism about natural kinds. That is, Koslicki not only thinks that certain groupings are more natural than others, but that this

[26] Also, this pushes us toward the conclusion that natural kind terms are rigid designators.
[27] For examples of austere nominalists, see Sellars (1963) and Quine (1980). For examples of moderate nominalists, see Campbell (1981), Heil (2003: Ch. 12 & 13) and Williams (1953).

naturalness is grounded, at least in part, in the existence of natural kinds understood as a real kind of entity. While Koslicki assumes robust realism, it is unclear that an RCP-style restriction on composition needs robust realism about kinds in order to work. We can make the first of many reformulations of RCP in order to illustrate this point, namely:

> (RCP_N) Restricted Composition: Some objects, $m_1,\ldots m_n$, compose a K-groupable object, O, just in case $m_1,\ldots m_n$ satisfy the constraints dictated by some formal components, $f_1,\ldots f_n$, associated with K-groupable objects.

On such a view, the fact that things are groupable as Ks need not be ungrounded. It might be due to their "shared" structure or by possessing relevantly similar tropes. But it does not seem as if we must say that there are abstract natural kinds to ground the naturalness of these groupings. This option obviously is very sketchy at the moment, but at the very least this option shows that there is no obvious reason to think that an RCP-style restriction on composition must include robust realism about natural kinds.

2. B. RCP and Artifact Kinds

I now want to turn to the topic of artifacts. Roughly put, an artifact is something at least one relatively[28] intelligent designer intentionally made. Of course artifacts made by committee are possible, too. Artifacts are made by separating, conjoining or reshaping pre-existing elements with the intention of making something new. As a result, it seems that the following dependence principle is true of artifacts:

> (DEP) The existence and some of the properties of an artifact depend on an author's intention to make an object of certain kind.[29]

[28] This is to allow for the possibility of artifacts made by non-human animals like crows or chimpanzees, which most would consider merely relatively intelligent.
[29] Hilpinen (2011: §4).

The careful reader will note that DEP is somewhat vague in regards to how artifacts depend on their authors. Is this merely causal dependence or does this include ontological dependence as well? This is actually a controversial issue, as we shall see.

Artifacts have the odd fate of being common sense objects that tend to fare the best among philosophers who hold the least commonsensical views on composition. While artifacts like tables, chairs and automobiles are no problem for mereological universalists, some of the better-known restricted composition theorists like Hoffman & Rosenkrantz (1997: 166 – 76), Merricks (2001) and van Inwagen (1990) have very famously voiced their opinions that artifacts do not exist. That is not to say that all philosophers who want to restrict composition eliminate artifacts.[30] However, the fact that so many do means that we need to spend some time addressing the question of whether artifacts are real.

I'm fairly conservative by temperament when it comes to metaphysics. Because of that, I'm inclined to say that the reality of artifacts is innocent until proven guilty. Unfortunately, there are a couple of reasons for thinking they may not be real. There are two main problems for my view of artifacts that I'd like to address here. The first problem arises in the context of spelling out how artifacts depend on the intentions of artificers. According to some, it seems that artifacts might depend on our intentions in a way that precludes their being real.[31] Call this *the dependence problem.*

The second problem arises from some of the details of an RCP-style restriction on composition. On such a view, real natural composites are instances of natural kinds. Among other things, natural kinds play an explanatory role in our understanding of the world. Artifact kinds do not seem to play such an explanatory role. That is, artifact kinds seem to stand in a

[30] For example, see Hirsch (2002), Markosian (1998), Korman (2009) and Koslicki (2008: 179 – 83).
[31] For example, see Sutton (2012: 710 – 2).

very different relationship to the scientific enterprise than natural kinds do. So, if real natural composites have to be the kinds of things postulated in or studied by our best scientific theories, why do artifacts get a pass? Call this first issue *the dissimilarity problem.*

Let us start with the dependence problem. The simplest way of motivating this problem comes from John Searle. Searle (1995: 13 – 23) claims that function is what he calls "observer relative". Roughly put, an observer relative feature is one that conscious intelligent beings project onto things. It is an extrinsic feature something has in virtue of how beings with minds treat them. Functions, then, are projected onto things in the world. Though Searle does not explicitly say so, it is plausible to think that the essence of an artifact is its having a function.[32] What makes a screwdriver a screwdriver is that it has the function of screwing and unscrewing things. What makes a piece of metal a paperweight is that we give that piece of metal the function of keeping paper in place. And so on. If something's essential features are had in virtue of our attitudes toward that thing, then the thing itself is not a real entity. Thus, artifacts cannot be real.

Lynne Rudder Baker (2004: 107) tries to argue that this kind of mind-dependence and reality are not mutually exclusive.[33] Rudder Baker presents her opponents as saying that essence of real entities depend on "nature, not on us" while artifacts depend "on us". She thinks that this distinction is somewhat confused. After all, our best theories of human nature take us to be a part of nature and classify mental states as a variety of natural states. As such, dependence on us is still a kind of dependence on nature. Rudder Baker goes on to argue that technological advancements blur the line between artifact and natural object to the point that

[32] Rudder Baker (2004: 102) thinks this.
[33] At least I think that she is concerned with showing they are real in the sense that I am concerned with. That is, I think that something is real if "…any full account of the furniture of the world will have to include reference to" it. (Rudder Baker, 2004: 105) If her concerns lie elsewhere, then read the objection as coming from an imaginary philosopher, Rudder-Baker*.

there seems to be no ontologically significant distinction between them.[34] For examples, she points to things like a "bacterial battery", batteries that use microorganisms to convert matter into electricity and computer simulations that behave like organisms do.

Rudder Baker is technically right that something depending on us is still a kind of dependence on nature. However, it seems that some of the things that depend on us clearly are not real. Fictional entities are not real. For example, as much as someone might wish things were otherwise, the Avengers are not real people, vibranium is not a real substance and Wakanda is not a real place. The reason, I would suggest, is because the facts about fictional characters primarily obtain in virtue of our beliefs or practices. Rudder Baker might disagree with my characterization, but she then owes us an account of why some things that ontologically depend on our mental states are real and others are not.

Moreover, she fails to illustrate that technological advances blur the line between organisms and artifacts. This is because all of her examples can easily be sorted into one category or another. That is, they can all plausibly be described as computer-generated simulations of organisms, organisms with artifacts added to them or artifacts with organisms as parts. Thus, I think Rudder Baker's response fails to undermine the Searle-inspired argument for the non-reality of artifacts.

I think the argument can be resisted because this view of function has some implausible consequences. For example, it follows from this view that human organs do not have natural functions. Rather, their functions are projected onto them by humans. This is a conclusion that Searle himself seems happy to endorse:

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[34] Ibid., p. 117.

> …except for those parts of nature that are conscious, nature knows nothing of functions. It is, for example, intrinsic to nature that the heart pumps blood, and cause it to course through the body….But when, in addition to saying "The heart pumps blood" we say, "The *function* of the heart is to pump blood," we are doing something more than recording these intrinsic facts. We are situating these facts relative to a system of values that we hold….Even when we *discover* a function in nature, as when we discovered the function of the heart, the discovery consists in the discovery of the causal processes together with the assignment of a teleology to those causal processes. (Searle, 1995: 14 – 5)

This, of course, is a little hard to accept. If this account is correct, it forces us either to say that organs like hearts do not have functional essences or that hearts do not exist. I think Searle would, rightly, say hearts exist, and would have to say that their nature is causal or structural rather than functional. However, it seems exceedingly plausible to say that the essences of organs are functional in nature. Accordingly, Searle's conclusion strikes me as implausible enough to question whether Searle has made a mistake somewhere.

Searle's mistake, I think, is his insistence that functions must be projected onto things by intelligent beings. This is not to say that nothing gets their functions in a manner like this. Instances of institutional kinds, such as *president* or *monetary currency*, have their functions in virtue of the beliefs and practices of other people.[35] That is, as Searle (1995: 32) and Thomasson (2003: 585 – 6) point out, instances of institutional kinds generally need to be viewed as having their function in order to have it. However, it seems more likely that this is because of the nature of institutional kinds rather than the nature of functions *per se*. Because of this and the fact there are alternative views of function,[36] it seems better to reject Searle's view of functions.[37]

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[35] Institutional kinds like *president* and *monetary currency* complicate my characterization of reality. The fact that there is a president is determined by our mental states. Does this mean that presidents are not real? Here is my initial response: the person who occupies the role of president is real since facts about their existence are not determined by our mental states. But the facts about the instantiations of *being president* obtain in virtue of our mental states, so there is a plausible sense in which the property of *being president* is not a real property.

[36] For example, see Dennett (1995) and Millikan (1989).

[37] Part of the reason why Searle thinks function is a observer relative feature seems to be his aversion to the idea that value can be a mind-independent feature of the world and the claim that function's are inherently value-laden.

As I said at the beginning of §2, we can distinguish causal dependence from ontological dependence. As a result, we can distinguish something being causally dependent on human mental states and being ontologically dependent on our mental states.[38] Accordingly, it seems that we can say that artifacts have functional essences, that they get their functions from the intentions of the people who make them, but that this dependence is merely causal dependence. Here is an analogy. Hearts have the function of pumping blood through an organism's circulatory system because they were naturally selected for that activity. However, it does not seem that the series of events that lead to hearts being selected for that function are anything more than causally responsible for hearts having their functions. By parity of reason, it is unclear to me that we need to say anything more than that artifacts are causally dependent on human intentions. So, the fact that artifacts get their functions from human artificers does not preclude artifacts being real.

While the dependence problem strikes me as relatively easy to solve, the dissimilarity problem seems more difficult. In order to express the full weight of the problem, allow me to flesh out the details a little bit. The attraction of RCP is that it presents us with a principled way to rule in natural composites as real while ruling out things like mereological sums. It does this by tying the composition of natural entities to being instances of natural kinds. Due to the nature of natural kinds, p*rotons* and *carbon atom* get ruled in and *sum* gets ruled out. Natural kinds, however, have certain causal and explanatory features that artifact kinds lack. Artifact kinds seem irrelevant to scientific investigation. For example, no one would ever think artifact kinds would factor into the laws of hard sciences like physics, chemistry and biology. Since it is plausible to say that natural composite entities are paradigmatic of what composite entities are,

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However, since value being mind-independent strikes me as perfectly plausible, I see no significant problem that comes with rejecting this presupposition. For an example defense of the claim that value is mind-independent, see Railton (1986: §III).

[38] I say more about the nature of ontological dependence in §4.A below.

the fact that artifact kinds are so different from natural kinds might make someone wonder whether an RCP-style restriction on composition ends up ruling out artifacts with mereological sums.

I do not currently have a fully convincing solution to the dissimilarity problem. Here are the beginnings of a potential solution. Artifact kinds differ from natural kinds *inter alia* in that they lack the exact kind of explanatory utility that natural kinds have. That is, it seems that denying the reality of artifacts will not make much of a difference to our scientific investigation while denying the existence of natural kinds would. At the same time, it seems as if artifacts are relevantly similar to some natural composites. As was outlined above, artifacts are instances of functional kinds and as such are relevantly similar to certain organic structures and objects. While organs have underlying structures that allow them to perform their characteristic functions within the things that have them, the essences of such organs allow for them to be multiply realizable in physiologically distinct organisms. Despite their vast dissimilarities, both chimpanzees and lobsters have hearts. The functional properties that characterize artifacts have some kind of explanatory import. This is not to say that all artifact kinds will be the subjects of some kind of scientific study or that those kinds will factor into the "laws" of some science. While some artifact kinds, like those studied in computer science and engineering, could perhaps factor into the "laws" of those sciences, some, like furniture kinds, clearly won't. Rather, my point is simply that the functions of such artifacts allow us to explain in part why such things behave the way they do and why they have many of the relevant features they do. This seems to be a relevant similarity between artifacts and natural entities ruled in by RCP that is not shared with purported kinds like *mereological sum*. I want to suggest that further consideration of this similarity might ultimately justify including artifact kinds

with natural kinds. As a result, it does not seem entirely clear that artifacts run into as much trouble with an RCP-style restriction on composition as mereological sums.

This response is rather sketchy and at best programmatic. I am unsure how successful this program will ultimately be in justifying the claim that artifacts are real. But at the same time, I think this initial response shows that RCP-style restrictions on composition could potentially deliver a somewhat commonsensical account of composite objects. This wraps up this chapter's discussion of kinds, but this brings us to the next important topic: structure

3. Formal Constraints: Structure and Beyond

This chapter subsection will mark a shift in gears from those previous. In addition to clarifying some concepts, I will start revising Koslicki's account in earnest. First, the initial amendment will be the elimination of RCP's NAT-inspired elements. While structure will be relevant to the account going forward, I will be dropping any language implying that structures are parts of objects. That is, RCP should be amended in the following manner:

> (RCP′) Some objects, $m_1,\ldots m_n$, compose an object, O, of kind, K, just in case $m_1,\ldots,m_n$, satisfy the formal constraints dictated by the structure(s), $f_1,\ldots f_n$, associated with objects of kind K.

RCP′ is a step in the right direction, but it is not quite satisfactory. Among other things, I need to say more about the nature of structure. In this section, I discuss the role structure plays in this account of composition. The first two subsections of §*3* will focus on the nature of structure and whether it is sufficient for the job it is being required to play. I will also address Koslicki's suggestion that structures might be objects. I will fill in the details on structures that Koslicki left open. In the course of doing this, I will argue that a notion broader than structure

is necessary to play the role Koslicki gave to structure. Finally, I will close out the section by presenting some applications of the revised account.

3. A. The Category of Structure: On the Structure as Objects Hypothesis

As I said in §1.B. above, Koslicki considers but does not endorse the idea that structures are objects of some kind. Call this the "Structures as Objects" hypothesis (SAO). She does this because of how linguistic and mathematical structures behave. As Koslicki writes,

> …mathematical structures themselves count as elements within the domain of discourse over which the operations, relations and properties described by the axioms of a particular system are defined; thus, a group, for example, may consist of elements which are themselves groups. In this way, mathematical structures may act as both the inputs and outputs of the "generative rules" specified by a particular axiom system. (Koslicki, 2008: 253)

That is, some linguistic and mathematical structures act as the "matter" of other linguistic and mathematical structures respectively. She does not explicitly endorse SAO, but she takes the mathematical and linguistic considerations to be sufficient reasons to take the thesis seriously.

I am skeptical of SAO for two reasons. First, recall the alternate-by-gender seating arrangement example that Koslicki borrows from Verity Harte. The description that Koslicki gave of it does not make this structure seem like an object. Rather, this structure seems to be an *arrangement* of people. That is, it seems more like a relation or set of relations that various objects stand in to one another, not an object itself. Second, if we endorse SAO, we cannot identify structures with properties and relations. This seems to be a problem because, as Koslicki (2008: 252) admits, structures are always "closely linked" with various properties and relations. If structures are not identical with these properties and relations, what exactly is their relationship that leaves them so closely linked? Is it composition? Constitution? There

seems to be no obvious answer. This second concern is not necessarily fatal, but it seems preferable to avoid this question if we can. And, I think we can.

I doubt Koslicki's considerations lend much support to SOA. Koslicki grants that her considerations are inconclusive. However, it's unclear to me how much these considerations justify taking SAO that seriously. Let us look a little more closely at Koslicki's (2008: 252 – 3) "test case", that of syntactic structure. She notes that various linguistic structures have constituents that stand in various structure-generating relations such as precedence, dominance, binding and so on. But, other structures can be generated from prior structures when the latter are embedded in the former by means of various generative rules. The example that she gives is how the structure exemplified by "John loves Mary" can be embedded in various that-clauses of other structures such as that of "Bill doubts that John loves Mary." In this case, we see that the linguistic structure exemplified by "John loves Mary" behaves like objects do in cases of concrete composite objects.

So, what does this show? Not much. The fact that these structures partially compose other structures does not necessarily suggest anything about the category of being they belong to. Consider structural properties. David Armstrong describes them this way:

> A structural property involves a thing instantiating a certain pattern, such as a flag. Different parts…of the thing that instantiates the structural property will have certain properties. If the structural property involves relations, as a flag does, some or all of these parts will be related in various ways. (Armstrong, 1989: 92 – 3)

Examples of structural properties include the shape and weight of composite objects. When we accept that structural properties are genuine properties, we will want to know what exactly the relationship is between a given structural property and the properties of the parts involved in it. One way of cashing out their relationship is saying that the properties of the parts are parts

of the structural property.[39] So, given this understanding of structural properties, the properties of the object's parts stand in the same relation to the structural property as objects do to the composites they are parts of. In other words, properties behave like objects when composing structural properties. Would this suggest that properties are objects? I'm inclined to say no. And by parity of reason, Koslicki's linguistic structure example does little to support SAO.

So, Koslicki's case for SAO is weaker than she takes it to be, and given that her examples of structure do not seem like objects, I would suggest that we set SAO aside. At this junction, I want to make a suggestion about the category structures belong to. I want to suggest that a structure is a kind of property. The question of what kind of property it is takes us to the next topic.

3. B. Structure, Composition and Kind Membership

Koslicki's account makes structure central. Accordingly, it seems incumbent on us to figure out what structure is and whether structure by itself can play the role Koslicki gives it. It might be helpful at this point to reiterate Koslicki's examples of structure. In particular, I want to look at her (2008: 244 – 6) discussion of chemical structure, the only structure of concrete objects she considers. Koslicki points out that molecular structure has two parts, a formula and a configuration. A molecule's formula specifies the component atoms it is made out of. For example, in the case of water, its formula specifies that water molecules are composed by one oxygen atom and two hydrogen atoms. As we can see, chemical formulae consist of both the *types* of components as well as the *number* of those components in which those molecules consist. Chemical structures also include the way that their components are arranged. This is important

[39] For example, see Robb (2005: 476 – 7).

because some molecules, referred to as isomerisms, have the same formulae but have different causal powers in virtue of having different configurations. Koslicki cites the example of silver cyanate and silver fulminate, both of which are composed of one silver atom, one carbon atom, one oxygen atom and one nitrogen atom. However, despite their identical formulae, they have very different causal powers. It was later confirmed that this difference of powers is due to the different ways these atoms are arranged. These two features of chemical structure are reminiscent of the dinner party seating arrangement example that Koslicki borrowed. In that case, we also have a type-restriction on the "components" in the seating arrangement that corresponds to the chemical formula. Moreover, we see a relatively specific way that these components must be arranged.

When looking at these examples, we can start to get a picture of what Koslicki meant by saying that structures "creates slots" for parts to occupy and that structure acts as a recipe for a composite object. The blueprint, as I called it, for these objects tells us what kinds of components and how many of them are necessary to build that kind of object. I want to suggest that structures are simply structural properties. We can characterize structural properties this way:

> A property, S, is structural if and only if, at some level of decomposition, proper parts of particulars having S have properties not identical with S and jointly stand in relation R, and this state of affairs is the particular's having S.[40]

I need to say a couple of things about this characterization of structural properties. First, as I hinted at the end of §3.A, there are a few different ways of characterizing the relationship between structural properties and the properties of the relevant parts. I went with this formulation since it is neutral on this question and thus avoids some of the thorny issues that

[40] This characterization is a modified version of a formulation in O'Connor & Wong (2005: 663).

come with saying their relationship is mereological.[41] Second, this characterization rules out the possibility of mereological simples having structural properties, which seems to be a plausible constraint on the nature of such properties. Finally, this characterization is compatible with an instance of a structural property being partially determined by smaller instances of the same structural property. For example, this characterization is compatible with the color property of an entire red square being determined by the colors of the top and bottom halves of the square. All this characterization states is that at some level of decomposition the parts of the composite lack the relevant structural property.

It is worth pointing out that structural properties are individuated (at least in part) by the types of properties they involve. Take the example of color properties, by which I mean the surface properties of objects that cause our experience of colors. A color property is a structural property that is individuated by its ability to absorb and reflect certain spectra of light. Accordingly, the properties such structural properties involve are limited to those that contribute to those causal powers. Relevantly similar restrictions are generally applicable to structural properties.

Insofar as the identity of a structural property partially consists in the kinds of parts its bearers possess and those parts' properties, having this sort of property dictates that its possessor has certain kinds of objects as parts and that those parts are arranged a specific way. Given an identification of structure with structural properties, we can see start to see why some kinds of objects can have different kinds of components, different numbers of components and a somewhat variable arrangement of parts. Going back to the dinner party example, the seating arrangement is compatible with different arrangements of specific people, specific distances

[41] For example, given structure's role in composition, does saying that structural properties have parts result in a vicious regress?

between people at the table, etc. In the case of chemical structure, while the bonds between the components of molecules are relatively static, they are not static strictly speaking. As Koslicki (2008: 246) points out, the atoms all vibrate to some degree or another, and so the components of molecules do not quite have fixed positions relative to one another. However, whether these atoms are still parts of a molecule is determined by whether their positions relative to one another are compossible with their standing in the relations that the relevant structure involves.[42] Moreover, some structural properties have stricter constraints on object kinds or relations than others. Sometimes the natures of these properties have these constraints built into them, as is the case with chemical formulae. Sometimes these restrictions are entailed by a conjunction of the property's nature and further facts about the environment, such as the laws of nature. As a result, some structural properties are compatible with more qualitative or quantitative variety than others.

There is one drawback to identifying structures with structural properties. If we want to say that biological species are kinds, structures seem insufficient for making something an instance of those kinds. Being a member of a biological species consists in instantiating what have been called homeostatic property clusters.[43] Roughly put, a homeostatic property cluster is a grouping of properties that are typically co-instantiated in virtue of either one of the properties favoring the presence of the others or an underlying causal mechanism that tends to produce the clustered properties.[44] As a result, it seems plausible to think that members of a species are conspecific in virtue of sharing a loose range of morphological features, a relevantly similar genetic code, phylogenetic decent, ecological niche, etc. Thus, structural properties can

[42] I leave it open whether the kind of modality expressed here is metaphysical or merely nomological modality. While I am very sympathetic to views like Ellis (2001: 103 – 22) and Shoemaker's (1998) which take natural modal facts to be almost exhaustive of metaphysically modal facts, I am not entirely convinced those views are correct.
[43] See Boyd (1999 & 2010) and Wilson, Barker & Brigandt (2007) for defenses of this claim.
[44] For a more detailed description, see Boyd (1988: §3.8).

only be part of the reason that things are members of a biological species. Due to this problem, I suggest that we should amend RCP′ by removing the term "structure" and replacing it with the term "principle property".[45] We can formalize the notion of a principle property thusly:

> (PP) For any composite object, *x*, some property, F, is a principle property of *x* if and only if a) *x* is F, b) *x* is a categorical instance of some kind, K, and c) *x* is a categorical instance of K in virtue of having F.

A few things should be said about PP for clarity's sake. First, we should understand "is a categorical instance of a kind" along the lines of Rea (2000). That is, a categorical instance of a kind, K, is being a K and having the essential properties, such as persistence conditions, associated with K. Second, I want to be clear that I am not putting (PP) forward as an analysis, since I do not want to commit myself to denying that mereological simples have principle properties. Rather, this is only supposed to be some identifying characteristics of principle properties for composite objects.

This characterization of principle properties seems satisfactory for now, though I suspect more chisholming will be necessary to get the idea perfectly right. Now I have sufficiently clarified the notion of a principle property, we can modify RCP′ like so:

> (RCP″) Some objects, $m_1,\ldots,m_n$, compose an object, O, of kind, K, if and only if $m_1,\ldots,m_n$ satisfy the formal constraints dictated by some principle properties, $F_1\ldots F_n$, associated with objects of kind K.

(I want to note that, as Koslicki left it open as to whether more than one structure can be associated with a kind, I also want to leave it open as to whether more than one principle property can be associated with a kind.)

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[45] The term "principle property" is a nod to Aristotle's discussion in *Met* Z.17 1041^b28 - 31 where he says "[Form] is the substance of each thing; for this is the primary cause of its being; and since, while some things are not substances, as many as are substances are formed naturally and by nature, their substance would seem to be this nature, which is not an element [i.e. a material part] but a principle."

There is one last issue I want to address before I move on from revising Koslicki's account. Andrew McFarland asks the following question in his review of Koslicki (2008):

> What…role ⌜does⌝ structure ⌜play⌝ in individuating kinds? Shouldn't the structural arrangement of material constituents bear a stronger relationship to the kinds of which they're parts than merely being "associated" with those kinds? (McFarland, 2011: 4)

The question suggests the following objection. Just saying that structures are "associated" with a kind's instances suggests that structures play no individuating role either for the kind or its instances. However, given the role that structures play for Koslicki, it seems that the relationship between kinds and structures should be more intimate than that.

I can see why McFarland asked this question, but I think it is due to an understandable misunderstanding. But given the claim that structures play an important role in grounding the modal profiles of kind instances and the plausible view that kinds are individuated by the persistence conditions they bestow, it seem plausible to think that they play some kind of role in individuating kinds. So, given that principle properties have to play some role in individuating kinds, what exactly do they do? I am not entirely sure at the moment. The exact answer you give to this question seems to depend on how you answer other questions about the nature of kinds. For example, should we follow Loux (1978: 158 – 78; 2006: 107 – 17) and Lowe (2006: 25 – 8) in treating kinds as a fundamental sort of attribute in addition to properties like shape and weight? Or should we follow Bird (2012) and Heil (2005, 2012) and reduce kind membership to having some combination of properties? It is hard to say. I lean toward Loux's and Lowe's views, but I doubt my reasons would force Bird or Heil to change their minds. The reason I bring this up is because the relationship between kinds and principle properties change depending on how we answer it. If we follow Bird and Heil in reducing kinds to properties, then it is tempting to identify the kind with a principle property or disjunction of them. If we

go the fundamentalist route of Lowe and Loux, the identification option cannot get off the ground. So, it seems as if more work on the metaphysics of kinds is necessary before endorsing a detail account of the relationship between principle properties and kinds.

That being said, it would be helpful to find a less misleading description than "associated with". The previous discussion tells us that principle properties make composites the kinds of things they are and unite their parts into a single individual. So while we cannot currently say that principle properties individuate kinds, we can plausibly say that they play individuating roles for kind instances. And, for clarity's sake, I will make explicit what sorts of kinds RRC takes to be real object kinds, natural kinds and artifact kinds. As such, we can describe them in the final modification of RCP in this chapter, the Revised Restricted Composition Principle (RRC):

> (RRC) Some objects, $m_1,\ldots,m_n$, compose an object, O, of a natural or artifact kind, K, if and only if $m_1,\ldots,m_n$, satisfy the formal constraints dictated by the principle properties, $F_1\ldots F_n$, that individuate Ks.

This ends my discussion of how to revise Koslicki's account. Now that I have revised her account to my own satisfaction, I want to close out this section by presenting some applications of the revised view.

3. C. Composition, Reality and Coincidence

RCC's primary purpose is to act as a restriction on composition. Insofar as that is its purpose, I will begin by showing what kinds of composite objects RCC rules in and what composites it rules out. After that, I will argue that while this view does not obviously rule out the possibility of coinciding objects, its restrictions on composition limit the potential for coincidence. Finally, I close out this chapter section by comparing and contrasting my revised account and Koslicki's

NAT-affirming account. I then conclude this discussion by saying what I think this shows us about the plausibility of NAT.

3. C. 1. Real Composition

The upshot of my account is that composites are instances of natural kinds and artifact kinds are the only real composite objects. So, organisms, tables, carbon atoms, semi-trucks and quarks etc. are ruled in as real composite objects by this account. And, as I argued previously, accounts like mine and Koslicki's rule out the reality of mereological sums and heaps.[46] The reason why is because purported kinds like *mereological sum* and *heap* are causally and explanatorily irrelevant. As such, they are not natural kinds. And since they are not artifact kinds either, RCC rules out such things being real composites. However, sums and heaps are not the only purported kinds of objects that RCC rules out. In this subsection, I will argue that this view rules out the existence of arbitrary undetached parts, gerrymandered objects such as David Lewis' infamous trout-turkey, as well as lumps of stuff. I will address these purported kinds of objects in that order.

Let us begin by discussing arbitrary undetached parts. Examples of arbitrary undetached parts include the left two thirds of Le Arc de Triomphe, the purported part of Tom Cruise that includes all of him except for his left thumb and the infamous cat-tail compliment known only as Tib. If there are arbitrary undetached parts, they are either instances of natural kinds or they are parts of artifacts. While it seems less obvious in this case than it was in that of *mereological sum*, arbitrary undetached parts do not seem to be instances of natural kinds. In order to see this, I ask the reader to recall the case of Jamie and J-minus from Chapter Two. It is not entirely obvious what kind of thing J-minus would be, but one plausible candidate is *right*

[46] See §1.A above.

hand compliment. (A "compliment" of a part is the whole the part belongs to minus that part.) But, *right hand compliment* does not seem to be a natural kind. Here's why: Assuming that *human organism* is a natural kind, it has the status of a natural kind because *human organism* tracks an underlying property or principle that explains the various properties that we use to group humans together. By contrast, there seems to be no such principle that is tracked by the supposed kind *right hand compliment*. Hence, *right hand compliment* does not seem to be a plausible natural kind. Insofar as *right hand compliment* seems relevantly similar to the purported kinds that arbitrary undetached parts fall under (e.g. *cat-tail compliment*), it seems as if we can conclude that none of them are instances of natural kinds. Additionally, there is apparently no good reason why artifacts would have real arbitrary undetached parts while natural objects do not. Thus, RCC apparently rules out the reality of arbitrary undetached parts.

Let us move on to gerrymandered objects. Gerrymandered objects are objects the parts of which lack any of the intuitively composition-relevant features we associate with composite objects, such as spatial proximity of parts or communication of motion between parts, etc. A common example of such an object is the trout-turkey, which is purportedly composed by the undetached front of a trout and the undetached back of a turkey. RCC undermines the reality of such objects because it seems that the only way that such objects could possibly be real is if mereological sums were real. At the very least, since there is no apparently significant causal or functional connection between the parts of gerrymandered objects, mereological sums seem to be the most plausible things they would be. However, as we have seen, RCC rules out the existence of mereological sums. As a result, this account rules out the existence of gerrymandered objects.

Let us move on to one last kind of object that RCC rules out, lumps of matter. If lumps of matter are real objects, then they are instances of natural kinds. While lumps of matter can be intentionally made by intelligent beings, they lack the functional essences that characterize artifacts.[47] However, *lump of matter* seems just as explanatorily useless as *mereological sum*. This so-called kind does not seem projectable, and there seems to be no causal or explanatory benefit to postulating it as a natural kind. Accordingly, like the others listed here, lumps of matter are not real.

This last conclusion should strike us as a little surprising. Part of Koslicki's motivation in developing her view is to provide a more common sense ontology of objects. However, the more we work out the details of her account, it seems more revisionary than she seems to realize. After all, her formulation of the Master Argument for NAT includes the assumption that lumps are real.[48] Common sense would seem to endorse both heaps and lumps, but Koslicki's account and those relevantly like it apparently tell us that these things are not real. I am unsure how Koslicki would respond to these results, but they do not strike me as particularly problematic. As I said towards the beginning of this chapter, some revisions to common sense seem unavoidable, since it is implausible to think the structure of the world would just so happen to perfectly match our pre-theoretical conceptual scheme. Accordingly, I am willing to accept these findings as interesting consequences of the view.

3. C. 2. There's (Almost) No Such Thing as Coincidence

Now that we have a good idea of what objects RCC rules in as real and those it rules out, we

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[47] Moreover, natural objects can be synthesized by intelligent designers, such as when scientists synthesize naturally occurring chemical compounds. Thus, the mere fact that something can be made by intelligent designers does not entail that it is an artifact by nature.

[48] This is not fatal to her argument, since this view apparently permits other relevantly similar kinds of coinciding objects. See the discussion in §3.C.2.

can begin to assess its consequences for other mereological phenomena, such as the possibility of coinciding objects. I will argue here that while my view does not eliminate the possibility of coincidence, it does limit the conditions under which it can occur. In order to illustrate this, let's consider some commonly supposed instances of coinciding objects: mereological sums and artifacts;[49] lumps of tissue and organisms;[50] lumps of clay and statues;[51] human persons and human animals;[52] and a sweater made from a single piece of yarn.[53]

From the previous discussion, we can see that RCC rules out the possibility of the first three varieties of coincidence, since it rules out the reality of mereological sums and lumps of matter. However, this account by itself does not seem to rule out the possibility of coincidence in the case of the sweater made from a single piece of yarn or in the purported case of human persons coinciding with human animals. While I think that we can plausibly argue against the latter case on independent grounds,[54] the sweater and the yarn case is more difficult to deal with.

Insofar as my view seems committed to the possibility of coinciding objects, I will ultimately have to deal with the grounding problem. I must admit that the current details of my view give me no obvious advantage over its competitors in regards to this problem. In §2.B, I presented a sketchy way of beginning to fill the details of how artifacts can be real composite objects. If that method of filling in the details is later discovered to be untenable, then it would eliminate the possibility of the yarn and the sweater coinciding. As of now, however, I will have to add solving the grounding problem to my future research project.

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[49] For example, see Rudder Baker (2004: 100 – 1).
[50] For example, see Rea (1997: 367 – 8).
[51] For example, see Koslicki (2008: 179 – 81).
[52] For example, see Rudder Baker (2007: 266 – 9).
[53] For example, see Sidelle (2002: 119).
[54] For example, see Olson (1997: Ch. 5).

3. C .3. What Does This All Mean for NAT?

At the end of Chapter Three, I concluded that the direct arguments for and against NAT fail. In light of this, I said that I would address the plausibility of NAT indirectly by seeing if we can get by without it. It seems that we can. By my lights, my account works just as well as Koslicki's NAT-inclusive account. The work of restricting composition is done by the account's view of kinds, and, as a result, RCP's inclusion of NAT does not make it more useful than RCC for restricting composition. One potential place where Koslicki's account could conceivably do better than mine is in regards to the grounding problem. While my account does not give us any new resources to solve it, Koslicki claims that accepting NAT helps us solve the grounding problem. But, as I argued in the previous chapter, it does not seem like NAT really help solve the grounding problem. Thus, my view can apparently do everything that Koslicki's can without having to justifying a principle that most philosophers find questionable. Thus, I am inclined to think that my view comes out ahead of hers in regards to plausibility points.[55]

So, what does this ultimately mean for NAT? I want to make sure not to overdraw my conclusion here. I think that it is safe to say that the above considerations and the fact that the arguments for NAT fail give us reason to be suspicious of NAT. However, I will not say that these considerations are conclusive reason to think that NAT is false. But I think that they show that the burden of proof is fully on NAT's proponents to justify its acceptance to us.

While this ends my discussion of how to best restrict composition, there is still work to be done. In particular, there are issues raised in earlier chapters that I have not answered to my

[55] I'm borrow the expression "plausibility points" from David Enoch (2011: 267).

satisfaction. Accordingly, I now return to the question of what kind of dependence relations hold between composites and their parts.

4. Substance, Dependence and Composition

I now turn to the task of tying up some loose ends from Chapter Two. One claim I discussed at length in that chapter is that organisms are intensely integrated wholes. The rationale for this view has two parts. The first part is the claim that organisms are fundamental beings. The second is the insight that fundamental beings cannot have separable parts. In Chapter Two, I outlined two strategies that could be used to undercut the argument for Toner's view: We can reject the claim that organisms are fundamental beings or we can reject the claim that substances must lack separable parts. I will close out this chapter by arguing for the first strategy.

This section has two subsections. In the first, I will argue that composite objects are not fundamental beings. The argument turns on the claim that composition is a metaphysically explanatory relation. In the course of that discussion, I will clarify the relationship between ontological dependence and metaphysical explanation, as well as what their relationship means for the task of defining the notion of substance. Finally, I will show that while we are not fundamental beings, we can still say that humans and other organisms are still substantial in some sense.

4. A. Building a Better Theory: Composition, Dependence and Explanation

This subsection's main argument will be for the claim that composite objects are not fundamental entities. In order to substantiate this conclusion, I will argue that a) composition is

what Karen Bennett (2017) calls a "building relation," i.e., a metaphysically explanatory relation; b) in the case of humans and other real composites, the direction of explanation is from the components to the composed (i.e. "bottom-up" explanation); and c) building relations imply some variety of ontological dependence of the built on the builder(s).

Since I stated a good part of my case for (b) in a previous chapter,[56] I will just briefly summarize my case first. I argued in Chapter Two that the organic and non-organic parts of organisms can exist independently of a given organism and can at least temporarily exist apart from any organism at all. Therefore, they are ontologically independent of the wholes they happen to belong to. It will become clear when discussing (c) that independence implies that they are not built by their organisms. The arguments I made for the parts of organisms can be extended *mutatis mutandis* to non-organic composites. Accordingly, if composition is a building relation, the direction of explanation is from the parts to the whole. After I make my case for (c), it will become clear that (a) is incredibly plausible.

Before I move on to (c), I want to make a terminological clarification. For the rest of this subsection, I will refer to metaphysically explanatory relations by Bennett's terminology of "building" and variants thereof. There are two reasons for this. First, this will make my discussion of Bennett's theory of building easier, since I will be using her terminology anyway. Second, referring to building relations as building relations is less cumbersome than the clunky expression "metaphysically explanatory relations" and less confusing than "grounding", since "grounding" is often used to refer to one specific building relation. Now that the terminological issue has been settled, let's get to the case for (c).

[56] Chapter Two §2.B.

I think the best way to argue for (c) is by making a slight digression. I want to start by looking at Karen Bennett's (2017: 136) recent attempt to analyze the notion of absolute fundamentality.[57] For Bennett, absolute fundamentality is independence, which she (p. 105) defines thusly:

Independence x is independent if and only if x is not built by anything.[58]

As I teased above, "built" and variations thereof are technical terms Bennett has coined. She uses talk of building to refer to a variety of explanatory relations that non-fundamental entities stand in to more fundamental ones. She (2017: 8 – 13) gives us a non-exhaustive list of building relations[59] that includes composition, constitution, set formation, property realization, microbased determination and grounding.[60]

One might initially think that building is ontological dependence. The inclusion of grounding in Bennett's list might suggest this, since philosophers often use "grounding" and "dependence" interchangeably in the literature.[61] However, that would be a mistake. As Bennett (2017: 37) herself points out, ontological dependence and building are distinct.

To see why they are different, we need to take a closer look at Bennett's account of what makes a building relation a building relation. Bennett (2017: 60) defines building thusly:

Relation R is a building relation if and only if

1) For all x, $\sim Rxx$, and

[57] I make it a point to specify that this is her attempt to analyze absolute fundamentality, since she (Ch. 6) goes to great lengths to clarify the relationship between absolute fundamentality and relative fundamentality.
[58] Bennett (2017: 105).
[59] One of Bennett's (2017: 71 – 83) more controversial claims is that causation is a building relation, which at the very least blurs the intuitive line between metaphysical and causal explanation. I don't accept her claim, since I am skeptical of her claim that causes necessitate their effects in the relevant way. However, addressing her views on causation would take the discussion too far afield.
[60] The listed building relations partially overlaps with Jessica Wilson's (2014: 557) list of "small-g" grounding relations, though I bet Wilson would be loathe to include a generic grounding relation in her list.
[61] For examples of this, see Jenkins (2011: 267), Rosen (2010: 109), Schaffer (2009: 350 – 4, 373 – 9) and Wilson (2014: 539).

2) For all x and y such that $x \neq y$, if xRy, then $\sim(yRx)$, and
3) Let C be some to-be-specified set of background circumstances that includes neither y nor anything that fully builds y. For all x and y, if x fully R's y, $\Box\ulcorner(x+C)\rightarrow y\urcorner$.
4) For all x and y, x's R-ing y licenses explanatory and generative claims to the effect that y exists or obtains in virtue of x.

The first two conditions are fairly straightforward exclusions of reflexive and symmetric relations from being building relations. Condition 3 stipulates that building relations necessitate their effects and also clarifies what that means. I will address this claim in more detail below when I discuss the relationship between dependence and building in depth.

This takes us to condition 4. This condition states that building relations are *explanatory* relations. If a building relation holds between two things, one of them at least partially explains why the other exists or is instantiated etc. As a result, pointing out that a building relation holds between different entities will give us a greater understanding of the built entity. And, for reasons I give below, building relations imply a level of dependence of the built entity upon its builder(s). For example, mind-body physicalists express the claim that minds depend on bodies by saying that the properties of the latter realize those of the former. Non-reductive moral realists might make analogous claims about how moral facts are grounded in natural facts.

While building relations entail dependence, dependence does not imply building. Consider the instantiation of Aristotelian universals. Imagine there is a particle that instantiates a determinate charge universal. Let's stipulate for the sake of argument that this charge property is a non-structural property. Let us also stipulate that the particle is a mereological simple, a substratum in which the universal inheres (as opposed to being a bundle of universals). Finally, let us say that this particle is the only thing that happens to have this property. Given these stipulations, it seems right to say that this property is ontologically dependent on the particle. However, it seems wrong to say that the particle explains or builds

the universal. Think of the other examples of building that Bennett gave us, such as grounding, property realization or microbased determination. Saying that something's macro-properties are determined by the micro-properties of its parts or that a higher-level property is realized by a lower-level one seems to express something very different than what we are expressing when we say that the particle has the property. Intuitively, it seems right to say that the particle supports the property rather than, say, "generating" the universal. Therefore, we cannot identify building and ontological dependence.

The fact that dependence and building can come apart also tells us something important about Bennett's analysis of absolute independence. Independence as she construes it presents us with a plausible way to identify the fundamental members of an ontological category. That is, it allows us to point out the fundamental objects, the fundamental properties, the fundamental events, etc. However, it seems as if we can say that some category or categories are more fundamental than others. I think that this kind of fundamentality is what Aristotle had in mind when he said that substance was the category that all of the others depend on.[62] It seems, however, that Bennett's analysis of absolute fundamentality does not allow us to determine what is fundamental in this latter sense. As a rule, the different building relations Bennett lists hold between members of the same categories.[63] Realization holds between properties, constitution holds between objects, grounding holds between facts, etc. But it seems as if most of the building relations Bennett lists do nothing to tell us what category or categories are more fundamental. It seems, for example, that tropes are potentially just as fundamental as objects in the sense of being unbuilt, despite the category of trope plausibly depending on that

[62]Aristotle, *Cat* 5 2^b 7.
[63] Of course, there are at least two exceptions here. First, set formation holds between sets and their elements, the latter of which can be of any arbitrary ontological category. Second, we have whatever relation builds facts out of objects and properties. However, insofar as they seem to be exceptions rather than the rule, I think my general point still stands.

of object. So, while it seems Bennett's analysis succeeds at describing one kind of fundamentality, call it *building fundamentality*, we should not consider Bennett's definition as an attempt to analyze what we might call *categorical fundamentality*. Therefore, insofar as they are trying to capture the notion of substance found in Aristotle, it seems that neo-scholastic hylomorphists would deny that substance can be defined solely in terms of building.

While building is distinct from dependence, it seems right to say they are very closely related. In order to see how, we need to get a better understanding of ontological dependence. Ontological dependence should be distinguished from what some have called "modal-existential dependence".[64] Saying that one thing modal-existentially depends on another roughly means that it is impossible for the former to exist without the latter.[65] In the early post-positivist days, attempts were made to analyze ontological dependence and other essentialist notions in terms of modal logic. However, Kit Fine's (1994 & 1995) work on essence and ontological dependence has plausibly shown that modal-existential dependence is too coarse grained to capture the nuances of ontological dependence. For example, it fails to capture the asymmetric nature of ontological dependence.[66] As a result, it is somewhat unfashionable[67] to try to analyze ontological dependence merely in terms of modal-existential dependence.[68]

A more promising strategy for understanding ontological dependence is to characterize it in terms of what Lowe (2005: §4) and Tahko (2015: 98 – 104) call "essential dependence". The basic idea is that something is essentially dependent on something else if and only if it is

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[64] I'm borrowing this terminology from Lowe (2005). Lowe (ibid: §1 – 3) distinguished a few varieties of modal-existential dependence, but for our purposes we can ignore these distinctions.
[65] See Simons (1987: 294 – 301) for an important example of attempting to analyze ontological dependence in terms of modal-existential dependence.
[66] For details, see Fine (1994: 4 – 5).
[67] That is not to say contemporary attempts are unheard of. For example, Correia (2007) formulates a modal analysis of essence. See Fine (2007a) for a response to Correia.
[68] Some (e.g. Lowe, 2005) count modal-existential dependence as one variety of ontological dependence. But, as Correia (2008: 1023) points out, there are significant doubts about whether modal-existential dependence relations genuinely count as ontological dependence relations.

part of the former's essence that it exists only if the latter does. In other words, in cases of essential dependence, it is part of what the dependent thing is to exist only if the latter does.

Of course, this characterization is a little rough. And as with every philosophically interesting thesis, the devil's in the details. First, what is an essence, anyway? What category of being do they belong to?[69] Are they properties? Kinds? Propositions? Are there individual essences or are there simply general kind essences different things share? Most importantly, what does it mean to say that "it is part of the essence of x that…"? Due to space considerations, I will have to ignore the questions about the nature of essence. And unfortunately I will only be able to give a slightly less rough sense of what it means to say that something is a part of something else's essence by elaborating examples.

As Koslicki (2012: 198) points out, a real definition is a proposition that expresses the essence of a thing. When a real definition is correct, it will either be a non-trivial identity statement or at the very least entail such an identity statement. The standard example of a real definition is Aristotle's definition of human beings, "Man is a rational animal." It seems intuitively right to say that being an animal is "part of the essence" of being human according to this definition.

By looking at putative cases of building, we can see that even if ontological dependence fails to imply building, the latter implies the former. Consider the non-reductive physicalist schema. On such an account, mental states are distinct from neurological states with the former being grounded in the latter. Neurological states are the grounding base for mental states in virtue of their causal powers and causal histories. The reason why these factors are salient to the occurrence of mental states is because of what non-reductive physicalists think the real

[69] That is assuming that they exist at all. See Lowe (2012).

definitions of mental states are. That is, for non-reductive physicalists, mental states are identical with specific kinds of *functional states*. That a given mental state is built by a neurological state is at least partially because of the essence of that mental state.

Once we understand that building is connected to essences in this way, we can plausibly see why building entities *necessitate* the existence (or instantiation, or occurrence, etc.) of what they build. Before I discuss this, I feel I should clarify how building entities necessitate built entities. Remember Bennett's third constraint on building relations in her definition. She includes the variable "C" in it to account for the fact that various background facts are relevant to whether or not a building relation holds. For example, whether a given neurological state realizes a mental state depends on various background circumstances, such as the laws of nature being a certain way, the relevant neurological components being connected to the brain properly, etc. Given the existence of the building entity and the obtaining of the right circumstances, it is metaphysically impossible that the built entity not be there. This necessity constraint is intuitively plausible because the lack of this kind of necessitation is often taken to imply that building relations do not hold. For example, Kripke's (1980: 144 – 55) and Chalmers' (1996: 94 – 9) anti-physicalist arguments attack physicalist theories of mind by purporting to show that there is no such necessitation relationship between phenomenal states and neurological states.

So why do building entities necessitate what they build in this way? The only thing I can point to is that it is part of the built entity's essence.[70] That is, it is part of what the built entity is that the builder(s), or something relevantly similar to them, exist if it does. Going back

[70] I want to make clear that while I think that some modal facts are grounded in essential facts, it is unclear to me that all modal facts are grounded in facts about essences. For example, it is unclear to me that essential facts by themselves can explain why something is what it is necessarily. However, I think it suffices for my point that at least some modal facts are grounded in facts about essences.

to the mental state example, physicalists think the essence of a human mental state requires the existence of neurological states that are caused in the right way and have the right kinds of typical effects.[71] That is, building requires the built entity to be ontologically dependent on what builds it. Given the dependence relations that hold between builder entities and built entities, being built is sufficient for being ontologically dependent. Thus, all substances *qua* fundamental beings must be unbuilt.

This takes us to the claim that composition is a building relation. I have to say that composition seems to be a paradigmatic building relation. For example, it seems very natural to say that composites exist because their parts stand in the composition relation to it. Moreover, given how intimately composites are related to their parts and what properties they inherit collectively from their parts, what else could composition be? I'm inclined to think that there is a presumption in favor of (a) being true. Accordingly, my case for (a) will mainly consist of defending it from objections to it.

The first objection might be called *the independence objection.* This objection states that composition is not a building relation because at least some composites do not depend on their parts. Most of us think that composite objects gain and lose parts over time. Tables can get new legs, cars can get new tires, organisms lose and replace the vast majority of their cellular components over time due to metabolic turnover. Given that composites can exist apart from their components, one might think they are ontologically independent of them. Thus, they are not built by their parts.

If the independence objection were sound, it would prove too much. While composites can lose and gain parts, it does not follow that they are ontologically independent of their parts.

[71] To be clear, I do not mean to deny the possibility of non-physical building bases for mental states generally. Rather, this is a claim restricted to human mental states.

Consider the analogous case of Aristotelian universals. Aristotelian universals are immanent to their instances. Among other things, this immanence entails that universals depend on their instances.[72] However, while they depend on their instances for their existence, they do not depend on any one of them for their existence.[73] Rather, they depend on having one instance or another for their existence. If the view of dependence implicit in the independence objection were correct, Aristotelian universals would be contradictions in terms, but they clearly aren't.

What the independence objection fails to take into account is the distinction between *rigid ontological dependence* and *generic ontological dependence*. Rigid ontological dependence can be understood as equivalent to what Tahko (2015: 101) calls Rigid Essential Dependence, which he formulates in the following manner:

> **Rigid Essential Dependence** (RSD) x depends for its existence upon $y =_{df.}$ It is part of the essence of x that x exists only if y exists.

In other words, something is rigidly dependent on another thing when it is dependent on *that* thing and cannot exist without *it*. Tropes, for example, are rigidly dependent on their bearers.

We can understand generic ontological dependence as being equivalent to what Tahko (2015: 102) calls Generic Essential Dependence. We can formulate this notion this way:

> **Generic Essential Dependence** (GSD) x depends for its existence upon $y =_{df.}$ y is an F and it is part of the essence of x that x exists only if some F exists.[74]

In other words, something is generically dependent on another thing when it is dependent on that thing and cannot exist apart from something of the same type as it. Aristotelian universals, if such things exist, are generically ontologically dependent on their instances.

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[72] Lowe (2006: 98 – 100).
[73] *Pace* Armstrong (2004).
[74] Tahko leaves it implicit in his formulation that y is an F. I am simply making this assumption explicit.

When we distinguish these kinds of dependence, we can see where the independence objection goes wrong. While the above argument shows is that composites are not rigidly dependent on their parts, it does not show they are not generically dependent on their parts, which they plausibly are. Thus, it fails to show that composition is not a building relation.

This takes us to the next objection. Call it the *direction objection.* All explanatory relations have a direction of explanation. For example, causation has a specific explanatory direction. Causes explain their effects. Moreover, the direction of explanation is essential to such relations. Causes explain their effects and never vice versa. The same holds for building relations. Realizers are never explained by what is realized, grounded facts do not explain what grounds them, and so on. Composition, this objection goes, does not have a set direction of explanation. It seems that there are at least two kinds of composites possible, integrated wholes and mere aggregates.[75] In the case of integrated wholes, the parts ontologically depend on the whole, while in aggregates it is the reverse. Since the direction of explanation does not hold fixed across instances of composition, it follows that composition is not a building relation.

This objection is more challenging than the previous one, but it seems as if there are two promising responses to it. First, one might question whether integrated wholes are genuinely possible. I want to be careful with this response to avoid begging any questions. I am not asserting that integrated wholes are in fact impossible, since that assertion or any of the arguments I can think of against them would beg the question. I am, however, asking why we should think that they are possible. Given that it seems intuitive to think composition is a building relation, it seems as if the burden of proof is on those who say that integrated wholes are possible.

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[75] Schaffer (2009: 374). Schaffer also allows for mixed cases of composition.

Jonathan Schaffer thinks that integrated wholes are possible because common sense tells us that they are actual. He writes,

> I think common sense distinguishes *mere aggregates* from *integrated wholes*.... Common sense probably does endorse the priority of the parts in cases of mere aggregation, such as with the heap. Yet common sense probably endorses the priority of the whole in the case of integrated wholes, such as with the syllable. Thus consider the circle and its semicircles.... Intuitively, the circle seems prior – the semicircles represent an arbitrary partition on the circle. Or at least consider an organism and its organs....Or consider the myriad details of a percept. Here it seems the percept is prior – the details are just particulars of the overall gestalt. (Schaffer, 2010: 47)

Schaffer goes on to list the universe among the integrated wholes postulated by common sense in order to argue for his favored version of priority monism, the thesis that the universe as a whole is prior to all its parts.[76]

What do we make of these examples? I think that if they are integrated wholes, the fact that they are is not a part of common sense. First, if it is a deliverance of common sense, I think there might be arguments in favor of revising common sense in at least some of the cases Schaffer lists. For example, I argued previously that organisms should not be considered integrated wholes. Perhaps there are arguments for why we should do the same in the case of circles and percepts.

This takes me to the second and more important response. I suspect that Schaffer is running together two senses of the word "integrated". One of them is the technical sense of "integrated" that he gives in his (2009). The second sense is indicated by the passage from Paul Davies he (2010: 48) cites, which says, "'That the universe is ordered seems self-evident. Everywhere we look..., we encounter regularity and intricate organization.'" That is, the universe is integrated in the sense of the parts being ordered together and behaving regularly. While those two notions are plausibly related, they are not the same thing. It is one thing to

[76] Schaffer (2010: 48).

say that the cosmos is ordered and exhibits regularity. That is commonsensical. It is another thing entirely to say the cosmos as a whole is prior to its parts. That is a further claim Schaffer cannot just help himself to.

This leaves us with Schaffer's examples of the semicircle and the percept. I think these are at best inconclusive. We can describe a semicircle as either a semicircle or as a curved line. The fact that such a figure is a semicircle depends on it being a part of a circle. Hence, its status as a semicircle is posterior to the circle. But if we think of a semicircle as a curved line, it does not seem that we have to treat it as posterior to the circle of which it is a part. In regards to the example of the percept, it is unclear what to make of Schaffer's assertion. He does not argue for it, and he does not really cite any sources in the psychological literature for the claim. Insofar as he hasn't argued for this claim, I can't really say anything in response except that I don't see it. As a result, I think he fails to show that the actuality of integrated wholes.[77] Hence, I do not currently see a reason to think they are really possible.

The tentative nature of the above response might make someone uneasy. If so, it seems possible to accept Bennett's (2017: 27) take on Schaffer's priority monism instead. She presents us with an alternative construal of Schaffer's priority monism. She describes it as the view that the parts of the whole are grounded in the whole while the whole is composed by the parts. In this scenario, we have two distinct building relations in play, grounding and composition. Bennett suggests that we understand this scenario as showing us that fundamentality and priority are relative to building relations. So, in this scenario, the whole is prior to the parts relative to grounding while being posterior to them relative to composition.

[77] Schaffer (2010: 50 – 7) gives other arguments for this claim. He argues for the universe being an integrated whole because of the nature of quantum entanglement. I don't address this argument in the text above, since due to my lack of understanding of quantum mechanics, I am not in a position to evaluate it.

I am not entirely comfortable with this response. For one thing, it apparently forces us to make one of two moves. The first option is denying that ontological dependence is asymmetric. If building relations entail the dependence of the built on the builder(s), then Bennett's scenario seems to tell us that the universe and its parts are mutually dependent. Some have defended this kind of view,[78] but I find it a hard to shake the conviction that ontological dependence is asymmetric. The second option is to deny that there is a single dependence relation that holds generally between builders and what is built. Bennett uses her take on Schaffer's view to motivate the claim that there is no generic Building relation that holds between all built entities and what builds them. If there were a generic Building relation, her interpretation of Schaffer would be contradictory. So, one might argue that the same holds for ontological dependence by parity of reason.

While these responses fail to conclusively refute the direction objection, I think we can say they are qualified successes. At the very least, I think they show that the direction objection is currently inconclusive. Therefore, we can tentatively conclude that it fails to undermine the claim that composition is a building relation.

Given my defense of (a) – (c) above, I'm confident in the claim that composite objects are at least generically dependent on their parts. Among other things, this entails that human persons are dependent beings and thus not substances in the relevant sense. If this is the case, what are we to make of the considerations given in favor of saying we were? This brings us to the last part of our discussion.

4. B. Substantial Commitments: What to Make of People

[78] For example, see Barnes (forthcoming).

I have just argued that composite objects are not fundamental beings. While I have answered this question to my satisfaction, there are other questions to be answered. For one thing, what kind of ontological commitments do we take on when we accept the existence of dependent entities? One view is that dependent entities are derivative beings whose existence is "nothing over and above" their dependence bases. I argued in Chapter Two that this claim is not obviously true.[79] Tropes and non-natural moral properties plausibly seem as if they could be something over and above their dependence bases. In that chapter's discussion, I distinguished being a dependent being from being a derivative being, the latter of which is a dependent being that is nothing over and above what it depends on. So, we now have to ask whether composite objects are derivative beings or merely dependent beings. I will argue that we are dependent and not derivative. In doing so, I will show why the considerations Patrick Toner gave for thinking we are substances is mistaken.

The first thing we need to do is try to nail down the slippery phrase "nothing over and above", at least for when it is said about composite objects. Jeroen Smid (2017: 2 – 5) lists six distinct uses that crop up in the literature.[80] His list includes:

> ⌜No Condition⌝ X is nothing-over-and-above$_{NC}$ the Ys: The (mere) existence of the Ys is sufficient for the existence of X.
>
> ⌜No Other⌝ X is nothing-over-and-above$_{NO}$ the Ys: X is the only object that is R-related to the Ys.
>
> ⌜No Additional Commitment⌝ X is nothing-over-and-above$_{NAC}$ the Ys: X is not an additional ontological commitment relative to the ontological commitment to the Ys.
>
> ⌜Reduction⌝ X is nothing-over-and-above$_{R}$ the Ys: The properties of X are reducible to the properties of the Ys.
>
> ⌜Identity⌝ X is nothing-over-and-above$_{I}$ the Ys: X is identical with the Ys.

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[79] See pages 72 – 5 above.
[80] To see Smid's arguments for the independence of these different senses of "nothing over and above", see his (2017: §3).

> ⌜Constitution⌝ X is nothing-over-and-above$_M$ Z: X is materially constituted of (but non-identical with) Z.

Of the six disambiguations listed above, three of them strike me as non-starters. First, ⌜Constitution⌝ is about constitution, not composition. Insofar as they are different relations, ⌜Constitution⌝ is irrelevant to this discussion.[81] Given RRC or any restriction on composition, ⌜No Condition⌝ and ⌜No Other⌝ are plausibly false. Restricting composition just is putting conditions on when a plurality of objects compose another. Moreover, ⌜No Condition⌝ has the implausible implication that composites never come into existence. ⌜No Other⌝ is also false given RCC. First, if a plurality of objects meets the right formal constraints, it composes a K regardless of it ever having composed a different object. Second, as we have seen, RCC apparently permits the existence of coinciding entities, entities that share all of their parts at the same time. Thus, RCC rules out ⌜No Other⌝

This leaves us with ⌜Identity⌝, ⌜Reduction⌝ and ⌜No Additional Commitment⌝. ⌜Identity⌝ is a version of what is called the Composition as Identity Thesis (CAI). As A.J. Cotnoir (2014: 9) points out, CAI comes in varying levels of strength.[82] He lists three strength levels:

> **Weak CAI** The relationship between the parts taken collectively and the whole is *analogous* to identity.
>
> **Moderate CAI** The relationship between the parts taken collectively and the whole is *non-numerical* identity.
>
> **Strong CAI** The relationship between the parts taken collectively and the whole is *numerical* identity.

[81] See Evnine (2010) for a discussion of the distinction between composition and constitution as well as a critical survey of the various ways they are taken to be related to one another.

[82] The levels of strength are plausibly more fined-grained than those found on the list. For example, McDaniel (2014) points out that Strong CAI comes in a super-strong version as well. However, for our purposes, we can avoid this level of complexity and limit our discussion to the three grades listed above.

The observant reader will note that ⌜Identity⌝ is equivalent to Strong CAI. There is much that could be said in defense and objection to Strong CAI. However, I will point out the following: At best, ⌜Identity⌝ seems to fit poorly with RRC. If a composite is identical with the Ys, then it would seem as if it would be so regardless of whether they met the constraints in RRC.[83] As a result, it seems as if RRC implies that ⌜Identity⌝ is false.

This brings us to ⌜Reduction⌝ and ⌜No Additional Commitment⌝, which I will address in that order. As Smid (2016: 4) points out, it is unclear what exactly ⌜Reduction⌝ tells us about the relation between the properties of composites and the properties of their parts. Does being a non-reductive physicalist about mental properties mean that you reject ⌜Reduction⌝? Does saying that composites have extrinsic features that are not built by the features of their parts make ⌜Reduction⌝ false? If we're being charitable, then we should say probably not. In order to move the discussion along, let us be charitable and say that ⌜Reduction⌝ merely means that all the intrinsic properties of a whole are built in some way from the properties of their parts.

It seems right to say that Toner (2008: 285 – 6) targets ⌜Reduction⌝ in his brief argument that we are substances. He argues that we have non-redundant causal powers in virtue of having free will. Specifically, he thinks that we have free will in the sense that libertarians understand it. Moreover, he thinks that this requires that we have causal powers that are not built by the properties of our parts. Whether we read ⌜Reduction⌝ in its stronger or weaker senses, Toner's claims would undermine it if true. The specific case he makes, however, is a hard sell. While I am sympathetic to libertarianism, I have qualms about its

[83] Merricks (2005: 629) makes a similar argument about the relationship between CAI and restricted composition.

ultimate plausibility. Libertarianism is notoriously plagued with both philosophical and empirical problems.[84] As a result, I find Toner's case against ⌜Reduction⌝ inconclusive at best.

Does this mean that ⌜Reduction⌝ is true? For most composites, it probably is. For example, it seems implausible to think that tables or cars have any intrinsic properties that are not built from those of their parts. I currently think the jury is still out in regards to humans and other entities with psychological states. While libertarianism strikes me as unlikely to be true, there is still the question of whether property dualism is true. According to the most common of such views, human beings have conscious mental features that are not built from any of the features of their parts. If we did have such features, it seems that we would be "something over and above" our parts in the sense of having intrinsic properties that are an addition to those built from our parts. It is unobvious, however, that this is inconsistent with our otherwise being completely built from our parts.

I am currently undecided about whether we can ultimately come up with a plausible physicalist-friendly account of phenomenal states. While physicalist views about the mind are most dominant in contemporary philosophy of mind, some prominent physicalists have admitted that the arguments against dualism have been over-hyped.[85] There is no way to do justice here to the debates over Kripke's (1980: 147 – 55) Cartesian argument, Jackson's (1981) Knowledge Argument or Chalmers' (1996: 94 – 9) Zombie Argument over the past decades, but it seems fair to say that one can reasonably conclude that the mind-body problem is still "wide open and extremely confusing."[86]

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[84] For some recent philosophical critiques of libertarianism, see Dennett (2003: Ch. 4) and Pereboom (2005). For some recent defenses of it, see Clarke (2003), Kane (1995), Lowe (2008), O'Connor (1995a) and van Inwagen (2000).
[85] For example, see Lycan (2009).
[86] Kripke (1980: 155, fn. 77).

So, ⌜Reduction⌝ may or may not be true. What about ⌜No Additional Commitment⌝? Philosophers who say that composites are no additional commitment over and above their components seem to mean one of three things. First, they could be taking what Ross Cameron (2014: 100, fn. 22) calls the deflationary view of derivative entities. Philosophers who accept this view of derivative beings take Armstrong's (1997: 12) talk of being "no addition in being" literally in that they think derivative entities do not really exist. Interestingly enough, Cameron's (2010: 249) old view about the truthmakers for propositions about composites plausibly counts as such a view. On this interpretation of "no addition in being", the composites ruled in by RRC do not count as derivative since they actually exist. Accordingly, such composite objects are something over and above their components on this interpretation of ⌜No Additional Commitment⌝.

This brings us to the second interpretation. When some philosophers say that composites are no addition in being to their components, they mean to assert some version of CAI. Given the claim that composition is identity, it is easy to see why composites are no addition in being. They *are* the old beings. I've already argued that ⌜Identity⌝ does not fit with RRC. As a result, it seems that any composite object ruled in by RRC cannot literally be identical with their parts. This plausibly rules out RRC-friendly composites from being identical with their parts in the senses found in Strong CAI or Moderate CAI. As for Weak CAI, when we give up the claim that composites are literally identical with the parts collectively, it becomes unclear how composites are no addition in being.[87] At the very least, it is unclear how they are any less of an addition in being than what the next interpretation says about composite objects.

[87] That being said, some have argued for how they *might* be. For example, see Hawley (2014).

This brings us to the final way of understanding ⌜No Additional Commitment⌝. The basic idea is that while composites are non-identical with their components, they are not new beings in the relevant sense of "new". As Cameron (2014: 100) puts it, "Derivative beings do not *lack* being, but their being is *inherited* from their grounds, and so…these things ⌜are no⌝ *further* ontological commitment over…their ultimate grounds." The idea, it seems, is that composites "borrow" the being of their parts while they have them. They are no addition in being because they literally do not have any being beyond that of their parts.

Talk of composites inheriting the being of their parts paradoxically sound *prima facie* intuitive, but seems very vague upon reflection. What does it mean to say that something "inherits" the being of something else? Does each of something's parts have its own being and the composite's being is the aggregate of these "beings"? I'm not sure, but here's an attempt to understand it. Talk of inheriting being is reminiscent of talk of property inheritance.[88] Physicalists often say that mental events inherit the causal powers of the neurological events that realize them.[89] One thing they can mean by that is that mental events inherit these properties by being token identical with neurological events. They have these powers not in virtue of their status as mental events but by their intimate relation with neurological events. In such circumstances, a mental event's causal powers literally are the powers of the neurological event that realizes them.

However, it is unclear to me that being inheritance could work the same way as property inheritance. In the case of property inheritance, we have the identity of inherited property instances between property heir and original bearer. But if this is literally what

[88] Cameron (2014) compares his thesis to analyzing a concept in terms of a theoretical primitive. In that context, it seems plausible to say that the analysis inherits its content from the primitive notion. I'm inclined to think that the property inheritance analogy I use above is relevantly similar to Cameron's but in an ontological rather than conceptual context.

[89] For a more detailed discussion, see Kim (1992: 18).

happens with being, it seems problematic. There is a close connection between being and identity in that whatever individuates something in this way plausibly confers its being, at least in part. As such, it seems impossible for something to wholly inherit the being of several different things over time while maintaining its identity over time. Insofar as at least some composites maintain their identities over time while changing their parts, then it would seem as if their beings are not wholly inherited from that of their parts. Perhaps their being is partially inherited from its parts, but it seems that they cannot only have the being of their parts. Accordingly, it is unclear how we can avoid saying that composite objects have being of their own independent from that of their parts.

Perhaps I am being too hasty here. Going back to property inheritance, it seems as if we can say that something keeps its properties over time while inheriting those properties from their changing parts. For example, it seems plausible to say that composites "inherit" their mass from the masses of their parts, but we can still have the same mass despite changing parts over time. So why can't we say the same thing about being?

Does this response work? It seems not, since the response fails to adequately appreciate the importance of the type-token distinction. In the case of a composite's mass, it seems plausible to say that while composites can instantiate the same mass *universals* over time, having the same token mass instantiation, the same mass trope, seems to require an identity of parts over time. A composite's structural tropes are plausibly said to depend on the identity of the parts involved in them for their identity. Consider something's color tropes. If you removed the surface of the object and replaced it with an indiscernible surface, it seems right to say that the object instantiates a different color trope then it did previously. The reason why is because the composite has changed in regards to the relevant parts. Insofar as it makes sense to talk of token beings and the "type" being, I have to conclude that the previous paragraphs

considerations do not apply to the case of being inheritance. As such, it seems unclear what Cameron is actually suggesting.

I considered three ways of understanding ⁅No Additional Commitment⁆. On the first two interpretations, I concluded that RRC-friendly composites are plausibly an addition in being beyond their parts. I currently consider the third interpretation unintelligible. As such, I tentatively conclude that composites – at least those ruled in by RRC - are an additional ontological commitment beyond their parts. And in that sense, we can say that such composites are not substances, but they are still substantial in a sense.

This brings me to the end of my dissertation, but also to the beginning of what is (hopefully) a fruitful research project. I started by looking at attempts to motivate hylomorphic view of objects, attempts that I concluded were unsuccessful. I then turned my attention to refining and defending what I thought was right about these views and correcting them where they went wrong. My positive view is that composition is restricted, that composites like us are not fundamental beings, and that we are also something over and above our parts. While there are issues with this view, I feel confident that it is at least a step in the right direction. And for now I'm content with that result.

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