

# WHENCE THE FORM?

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Hylomorphists claim that substances—human beings, oak trees, chemical compounds—are compounds of matter and form. If a house is a substance, then its matter would be some bricks and timbers and its form the structure those bricks and timbers take on. While hylomorphism is traditionally presented as a theory of change, it only treats the coming-to-be and passing-away of matter-form compounds. But many hylomorphists understand forms to be entities in their own right, as parts or constituents of substances. So, a neglected question arises: how, when, and from where do forms come to be? I take up the view of one prominent and representative hylomorphist, Kathrin Koslicki, and argue that she cannot answer these questions satisfactorily. I close with a proposal for an account of the generation of forms based on machinery many hylomorphists already accept, namely, causal powers, that points to a deflationary metaphysics of form.

**Keywords:** Hylomorphism, form, matter, generation, substance

When and how and whence is a share in reason acquired by those animals that participate in this principle? [...] It remains, then, for the reason alone so to enter [from without] and alone to be divine...

- Aristotle, *Generation of Animals*, II.3

## 1. Introduction

Hylomorphism is the Aristotelian theory according to which substances—human beings, oak trees, and chemical compounds—are composites of matter and form. If a house is a substance, then its matter would be a collection of bricks and timbers and its form something like the structure those bricks and timbers take on. While there is plenty of intramural debate about the scope, commitments, and overall contours of the theory, hylomorphists generally say something like the following. There are important differences between a pile of bricks and timbers and a house: a house is a single thing but a pile of bricks and timbers is a plurality of

things, you can shelter in a house but not in a pile of bricks and timbers, and a house can survive a change in parts but a pile of bricks and timbers cannot. What explains these differences is the presence of a special, non-material entity—a form—in the house that the pile of bricks and timbers alone does not possess. So, according to hylomorphists, substances have two kinds of parts: material parts and formal parts.<sup>1</sup>

This paper presents a challenge for contemporary hylomorphists regarding the generation of forms. More precisely, I ask *how*, *when*, and, most importantly, *from where* forms come to be and argue that there are no good answers to these questions.

Aristotle claimed, in some places (1043b 15-19), that forms do not truly come to be or pass away—only the compound of matter and form does that.<sup>2</sup> But if forms are entities of some sort ‘in’ substances, they must have temporally bound careers, and so, are generated in *some* sense.<sup>3</sup> Despite receiving scant attention from contemporary hylomorphists, questions regarding the generation of forms plagued ancient, medieval, and early modern hylomorphists. Robert Pasnau (2011: 664) reports some thinkers took the generation of forms to be ‘the very most vexed of questions in natural philosophy.’<sup>4</sup> To address the generation of forms, Augustine and Bonaventure posited seminal reasons, Albert the Great posited inchoate forms, and Avicenna argued that forms emanate from an intellect associated with the moon.<sup>5</sup> Even Aquinas, who, like Aristotle,

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<sup>1</sup> It is a matter of significant debate whether forms should be understood as parts or constituents of substances. Contemporary hylomorphists that understand forms to be parts of substances include Brower (2014), Fine (1999), Koons (2014, 2019), Koslicki (2008, 2018), Stump (1995, 2012), and Toner (2013). Hylomorphists that deny this include Evnine (2016), Jaworski (2016), Johnston (2006), Marmodoro (2013), Rea (2011), and Shields (2019). My focus in this paper is on the former group.

<sup>2</sup> More precisely, Aristotle claims that forms come to be and cease to exist without undergoing a *process* of generation or corruption; see *Metaphysics* VII.15 1039b20-27. (Thanks to an anonymous reviewer for bringing this point to my attention.) For an account of Aristotle’s view on the generation of forms, see Shields (1990). Henry (2009) provides a nice overview of the problem as it arises in Aristotle’s biological works.

<sup>3</sup> I set aside the possibility of eternal forms—forms that always are and never cease to be—and forms whose careers are without beginning but eventually end. I simply find Platonism about forms (or, anything) too high of a cost. However, it is important to note that a Platonic or Neo-platonic conception of forms would obviate the worries presented here. If forms are eternal exemplars, and material beings are akin to imperfect reflections of forms, then there is no worry of providing an account of how the form of the imperfect reflection came to be. For, the reflection is not, in any sense, *composed* or *constituted* by the form; it is simply an instantiation, participant, or imperfect version of the form. For contemporary discussion of platonic versions of hylomorphism, see Dumsday (2021) and Shields (2019). Thanks to an anonymous reviewer for bringing this important point to my attention.

<sup>4</sup> Robert Boyle, e.g., devoted an entire treatise—*The Origin of Forms and Qualities*—to the question of how forms were generated.

<sup>5</sup> For discussion of these and other ancient and medieval accounts of the generation of forms, see Hasse (2012) and König-Pralong (2011).

seems to deny that forms are truly generated (*ST I.q65.a5.co*), claimed that God must directly create some forms (*ST I.q90.a2*). Needless to say, contemporary hylomorphists ought to develop a *plausible* story about how, when, and from where forms come to be.

I first look to one prominent and representative hylomorphist, Kathrin Koslicki. After laying out the relevant details of her view, I formulate my challenge more precisely and explore ways in which she might respond to it. Through a consideration of three different kinds of generation, I show that Koslicki has few palatable ways of explaining the generation of forms. In place of her mereological conception of form, I propose an alternative metaphysics of form that answers how forms are generated straightforwardly. Overall, I suggest that hylomorphists abandon a mereological conception of form in favor of one where forms are taken to be collective manifestations of certain powers of matter.

## 2. Koslicki on Forms

Kathrin Koslicki has defended hylomorphism on two fronts: as an account of restricted composition (2008) and as a metaphysical account of substances (2018). On both fronts, she has argued that forms are proper parts of substances in just the same way that material parts are proper parts of substances (2008: 179-186, 2018: 114-119). So, a complete inventory of a house is complete only when we count all the bricks and timbers serving as its matter and one other item, the form of the house.

Koslicki is fairly ambivalent about the ontological status and nature of forms. She has claimed that forms are object-like, but also very much like relations (2008: 252-254). She has claimed that forms seem like universals (2008: 257-258), but has more recently argued that they are particulars (2018: 76-103), despite not saying *what*, exactly, they are. (For a clear and detailed review of Koslicki's work, see Peramatzis 2019.)

But she is perfectly clear on what forms do, and how they do what they do. Principally, her forms unify material parts into a single substance, and they do so by acting as *formal recipes*. A formal recipe is something

like a set of criteria a collection of material parts must satisfy to compose a distinct and unified substance of a kind corresponding to the recipe.<sup>6</sup> She writes that:

[W]e may think of the formal components associated with a particular kind of whole...as the sorts of entities which provide “slots” to be filled by objects of a certain kind: thus, the formal components belonging to a particular kind of whole will generally specify not only the *configuration* to be exhibited by the material components in question, i.e., how these objects are to be arranged with respect to one another; they will also usually specify the *variety* of material components of which the whole in question may be composed, i.e., what sorts of objects can go into the various “slots” provided by the formal components. (2008: 169, emphases original)

So, forms are something like blueprints that collections of matter must follow to yield a new and unified substance. We have a house—something that is one and not many, something that we can shelter in, something that can survive a change in parts—only when the bricks and timbers are structured in a certain way, only when the formal recipe for a house is followed and so *present* in some matter.

### 3. The Generation of Forms

Hylomorphists of Koslicki’s stripe claim that both matter and form are parts of substances. If matter is something like a collection of substances from which a new substance is fashioned, it is clear how and from where it comes to be: the bricks were generated from clay fired in a kiln, and the timbers were generated from trees ran through a mill. But things are not so obvious regarding form: how does a formal recipe or structure come to be?

First, it is important to separate three distinct questions. How are forms generated? When are they generated? And, where do they come from? There’s an obvious answer to the first question: forms are generated by

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<sup>6</sup> It is important to note that Koslicki is focused primarily on material or natural substances. Some have discussed hylomorphic analyses of abstract entities, e.g., Novaes (2012), but, like Koslicki, my focus is on material substances. I register this point here to make clear that the proceeding discussion and account of form is meant just for material substances. Whether hylomorphism applies in cases beyond those of material substances is not something I consider here. If it does, however, Koslicki and I both may have something of a disjointed account of form. Thanks to a reviewer for pointing this out to me.

structuring matter according to a formal recipe. But that question isn't the most interesting; the last is. Before considering where forms come from though, we should consider when they are generated to make clear an important point about the mereological status of form itself.<sup>7</sup>

A carpenter builds a house. When did the form of the house come into being? It either came into being before the house was finished, at the very moment the house was finished, or after the house was finished. It couldn't come into being before the house was finished because we would have the form of the house before the house. Since forms are not free-floating entities—they exist only in connection with matter—there can be no form without a matter-form compound. The form couldn't come into being after the house was finished either because then the form would be epiphenomenal; we would have a house without the help of form. But it couldn't come into being at the very moment the house was finished either, as we clearly have something of intricate structure prior to the last bit of matter being arranged and incorporated. A house minus one shingle is a highly-structured something; plausibly, it is an incomplete house.<sup>8</sup>

Note, however, that these responses assume that forms are simple, that they are either all there or not there at all. But forms could be complex, and, indeed, Koslicki (2008: 192-198) seems to think they might be (cf. Koons 2019, Oderberg 2011, Skrzypek 2021a). If forms are complex, a fourth answer to the question about when they come to be presents itself: forms come to be, bit by bit, as material components gradually follow the recipe called for. When the carpenter lays a brick, part of the form associated with that brick comes to be, and so on for all the material parts of the house, until the last brick is laid and the whole form exists. So, forms themselves might be mereologically complex.

With this under our belts, we're in a position to consider where it is that forms come from. That is, when the carpenter lays a brick, where does the part of the form associated with that brick come from? There are three

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<sup>7</sup> A distinct question that is relevant for my argument is whether forms are particulars or universals. For, if forms are universals, then it is unclear why accounting for their generation could be problematic. However, Koslicki takes forms to be particulars (2018: 76-103), as do many other contemporary hylomorphists. Thanks to an anonymous reviewer for bringing this point to my attention.

<sup>8</sup> Forms could have a range of completeness wherein they might be capable of instantiation. So, a house minus one shingle would be a house, and once the final shingle is installed, would still be a house. Or, perhaps the incorporation of each parcel of matter brings an entirely new form into being. I am happy to acknowledge these options here, but note that I am concerned mostly with the preceding discussion of the mereological status of form itself.

options. Forms come from the agent of generation, for example, the carpenter; they come from nowhere, that is, they come to be *ex nihilo*; or they pre-exist in matter.

The first answer is implausible. The carpenter surely has a *representation* of the form in their mind, but the form *itself*—as it purportedly exists as a part of the house—isn't in them in. If the form itself were in the carpenter, the carpenter would be a house, not a carpenter. But perhaps the form exists in some attenuated sense in the carpenter, not as a mere representation, yet not as it purportedly exists in the house either?

Aquinas, in developing Aristotle's theory of cognition, claims that forms can exist in one of two ways.<sup>9</sup> First, forms can enjoy a *natural* or *in re* existence, connected with matter, as when the form of the house is compounded with some bricks and timbers. Second, forms can enjoy an *intentional* existence, in the mind of an agent, as when the carpenter thinks about the blueprints for the house. So, perhaps the form of the house enjoys an intentional existence in the mind of the carpenter, and is somehow transmitted to the bricks and timbers.<sup>10</sup>

Even granting the notion of intentional existence, it is unclear that this proposal will work. First, when the carpenter lays bricks and hangs timbers, they are not transmitting any non-material parts into the would-be house. They are simply arranging material components. It is unclear how following a formal recipe could amount to implanting a non-material component into the house. Second, this proposal seems unable to account for cases where a substance, and so, form, is generated without knowledge or is generated unintentionally. Perhaps the form of the house exists in the mind of the carpenter, but it may not exist in the mind of their apprentice, or in the mind of someone aimlessly arranging materials until they serendipitously build a house. So, when the apprentice lays a brick or hangs a timber, how could it be that they transmit part of the form of the house, given they do not possess the form of the house intentionally? And consider cases

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<sup>9</sup> See, for example, *ST* I.14.a1.co, and, for recent discussion, see Moser (2011). Of course, the core of this view is present in Aristotle too; see, e.g., *De Anima* III.4.

<sup>10</sup> Many thanks to an anonymous reviewer for bringing the distinction between natural and intentional existence to my attention.

where an agent creates something unintentionally: I may not know the formal recipe of chlorine gas, but I can certainly clean my bathroom with a mixture of bleach and vinegar.

The second answer—that forms come from nowhere—is similarly implausible. First, this move entails that a prodigious number of entities are created *ex nihilo* constantly. For any and every arranging of matter that follows a formal recipe, a new being comes into existence, namely, the part of the form corresponding to that arrangement. While there is nothing odd about a new substance coming to be—it comes from something plainly tangible, namely, matter—there is something odd about a non-material component of an object coming into being from nothing.

While I find the idea that forms are generated *ex nihilo* odd, depending on one's theological inclinations, it spells further trouble. If you're a theist, it seems you must admit that substances besides God can create; the bleach and vinegar somehow co-create the form of chlorine gas. Perhaps a theist could block this result by claiming that God directly creates forms as matter is arranged, but this demands an unreasonable amount of divine intervention. Surely the carpenter can build a house without God's help.<sup>11</sup> And, if you're not a theist, the current proposal demands that you countenance creation *ex nihilo*, something I suspect atheists are unwilling to admit.

If this has all been on track, then the only option remaining is to claim that forms pre-exist in matter somehow. That is, formal parts exist concomitantly with matter; the parts of the form of a house come from, and so exist in and alongside, the material parts of the house. When all the material, and so, formal, parts of a substance are arranged, the whole form comes to exist.

The carpenter begins to build a house, laying bricks. But bricks can serve as the matter for a whole host of things: fire pits, pizza ovens, and patios. If the current proposal is to be workable, parts of the forms for all these substances must also exist in the bricks; if they didn't, then how could it explain where the forms of these various substances come from? So, in every substance that can serve as matter for another substance

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<sup>11</sup> This won't trouble Occasionalists, but I think it should trouble the rest of us.

there exists an innumerable number of formal parts. Now, as the carpenter continues to lay bricks, it becomes clear that a foundation is being built rather than a fire pit. So, what happens to those formal parts in the brick associated with the fire pit? They can either remain in the brick or not. If they remain, it is unclear how a foundation is being built and not a fire pit, or both. For the presence of a form is what makes some matter into a distinct substance; if parts of both the form of a foundation and the form of a fire pit are present in the brick, even as it is being laid as part of a foundation, it is unclear how forms could do any work. One might object that the fact that bricks are being arranged into a foundation is what explains why there's a foundation and not a fire pit. But this misses the point thathylomorphists of Koslicki's stripe take forms to be parts of substances. Simply appealing to the relations between the bricks in the foundation is to abandon such a mereological conception of form. (For a relational conception of form, see Paoletti 2021.)

So, the formal parts of the fire pit in the bricks must leave as the foundation is being laid. With this in hand, thehylomorphist can explain why there's a foundation and not a fire pit, or both: only those formal parts associated with the form of a foundation exist in the bricks as they're fashioned into a foundation. Good enough, but we've got a whole new problem now: how is it that those formal parts that leave the brick 'know' that they need to take a hike? What mechanism dictates which formal parts are to stay and which are to go? Again, thehylomorphist cannot appeal to the obvious fact that a foundation is being built, because this is just to appeal to *relations* between the bricks, not a formal part of the foundation. Put differently: if form is what makes the bricks a foundation, and forms are parts of substances, then relations can't do the work forms are supposed to do because, well, relations are not parts of substances.

The carpenter can't toss out the formal parts of the fire pit as they build the foundation, for all they're doing is laying bricks. By my lights, the mechanism for selecting which formal parts stay is mysterious, brute.

Perhaps it's the result of some pre-established harmony but, obviously, this is something thehylomorphist should want to avoid.

#### **4. Reproduction**



So far, I've considered just one kind of generation—a carpenter building a house—but there are several different kinds of generation. In this section I see whether a view like Koslicki's can make headway in providing a plausible account of the generation of forms in cases different from the one above.

The case of a carpenter building a house is importantly different than other kinds of generation. First, the entity doing the generating, the carpenter, and the entity generated, the house, are of different kinds. But not all generation is like this. In reproduction, a member or members of a kind generate another member of the same kind. Second, the carpenter is a rational agent capable of thinking about the form of the substance their fashioning. But not all generating entities are agents in this sense. For example, a free proton and free electron can generate an atom of hydrogen. While the particles might be agents of some sort, they're not rational agents. Third, some cases of generation are natural and some are not. A house is an artifact, a kind of non-natural entity, but plenty of generated entities are natural, like human beings and atoms of hydrogen.<sup>12</sup> Lastly, when a carpenter builds a house, they act on materials extrinsic to themselves that will become the matter of the house, but not all cases of generation are like this. When a free proton and free electron generate an atom of hydrogen, they become the matter of the atom. And, in sexual reproduction, the generating agents provide, from themselves, the initial matter of the generated entity.

Consider now reproductive generation, such as the generation of a human being, where the substance generated is (or is potentially, at least) of the same kind as, and receives its matter from, the generating agents. As before, the truly interesting question is where forms come from, how they're transmitted, and not how or when they come to be. And, initially, in reproduction, the prospects don't look too bad. The form of the generated substance *clearly* comes from the agents of generation, and so, unlike the case of a carpenter

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<sup>12</sup> Some hylomorphists, myself included, deny that certain artifacts, such as houses, hammers, and chairs, are substances. Usually, these entities are classified as *accidental unities*, objects that enjoy some degree of unity, but one that falls short of the unity enjoyed by substances. (For discussion of accidental unities, see Loux 2012 and Matthews 1982.) Should one make this distinction between substances and accidental unities, then they would have reason to posit at least one other factor that differentiates what kinds of generation there are. However, since I deny that all artifacts are accidental unities (see Rota 2004), and my overall argument doesn't rely on this distinction, I do not discuss it.

building a house, needn't pre-exist in matter somehow, as the matter of the generated substance is from the already formed parents.

On some interpretations of Aristotle's theory of reproduction, the male gametes are identified with form and the female's contribution is identified with matter, and the two combine to generate a substance. (For further discussion of Aristotle's theory, see Henry 2009.) But this can't be right, as gametes are substances, not forms.<sup>13</sup> If forms are entities that combine with portions of matter to yield a unified substance of a given kind, then they cannot exist on their own without a subject, as gametes do, and we cannot identify them with substances, form-*matter* composites. Now, some interpret Aristotle such that the gametes are not themselves forms, but rather, serve merely as vessels for forms. On this sort of view, forms exist in a sort of secondary, attenuated sense in gametes and enjoy a full-blown existence only after conception (see Furth 1988, in Evinine 2016: 7-9). While this sort of view avoids identifying forms with form-matter compounds, it seems to require us to countenance entities with a merely attenuated existence and needs to be supplemented with an account of how attenuated existents come to enjoy full-blown existence.

Now, if gametes are substances, themselves composites of matter and form, then perhaps figuring out where *their* forms come from will help us build an account of where a zygote's form comes from. Obviously, the form of a gamete comes from the generating agent, as the form of an ovum comes from the mother. One plausible model of the transmission of a form from parent to gamete is one where the parent 'cuts off' a part of themselves, resulting in a new substance with the same form of the parent, and a portion of the parent's matter. Just think of an amoeba splitting, where one substance divides in two: a form-matter composite yields a new form-matter composite, not by transmitting its form through some mysterious medium, but through division. On this model, a generated form is not identified with a form-matter composite, a substance, nor

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<sup>13</sup> It is controversial whether gametes ought to be understood as substances. Any account of the nature or powers of a gamete must make reference to the form of the parent, and so, it is unclear that gametes have forms of their own. And, if a gamete doesn't have its own form, it may be understood best simply as a part or instrument of the parent. However, I take it that gametes are unified to the same extent as their parents (and other substances) and enjoy (a brief) independent existence. Because of this, I find it most plausible to understand gametes as substances. Thanks to an anonymous reviewer for bringing this point to my attention.

need it exist as cargo in a vessel-substance. A gamete's form is identical to its parent's, as it used to be the parent's form.

With this model in hand, consider the generation of a zygote's form when two gametes join. We have three options: the zygote has two forms, one from each gamete; the zygote has only one form, as the form of one of the gametes is destroyed upon union; or the union of the gametes generates a wholly new form, the form of the zygote. The first option conflicts with the doctrine of the unicity of form, which many hylomorphists hold, according to which a substance has only one form, and leads to a sort of formal over-determination.<sup>14</sup> So, set it aside. The third option is uneconomical as it involves a needless formal generation. The forms of the parents and gametes are of the same kind, and the zygote's form will be of the same kind too. Given the union of the gametes is something like the opposite of the generation of the gametes, there is no reason to posit a novel form for the zygote that requires its own generative account. So, that leaves the second option, where the zygote's form is just one of the gamete's forms, the one that survived the union of the gametes.

While it might seem odd that one of the gamete's forms is *destroyed*, I don't think this should or would worry many hylomorphists. If a substance has only one form, then in any case where a substance is generated from two or more pre-existing substances, at least one form will be destroyed. When bleach and vinegar mix, we no longer have bleach and vinegar, and so, we no longer have their forms; rather, we have chlorine gas and its form. To deny that forms might be destroyed in the generation of a new substance, then, is to deny generation *tout court*.

So, it seems hylomorphists have an account of the generation of forms in cases of reproduction: generated forms come from parents, from pre-existing instances of the very same form. Unfortunately, this account has limitations and cannot be applied in other cases of generation. One issue is that we need an account of the origins of the form generated in reproduction. Human beings make human beings, but human beings didn't always exist. Where did the forms of the original human beings come from? Plausibly, from something that

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<sup>14</sup> For discussion of the doctrine in Aquinas and Aristotle, see Stump (2012). For recent defense, see Piwowarczyk (2021). For discussion of over-determination, see Skrzypek (2017).

wasn't a human being. At some point in a lineage, new forms crop up, and so, their generation cannot be explained in the way above.

### 5. Novel-Kind Generation

Consider now a case of novel-kind generation, such as when an atom of hydrogen is formed from a free proton and free electron. Unlike reproduction, the form of the generated substance is not the same as either of the forms of the generating agents. So, we cannot explain the generation of the hydrogen atom's form as we did the gamete's form, as a sort of replicative generation through division.

So, from where does the form of the hydrogen atom come to be? None of the options considered so far seem plausible. But one considered above briefly, in reproductive change, seems plausible in cases of novel-kind generation. Why not think the form of the hydrogen is generated by the forms of the proton and electron? When the proton captures the electron, their forms unite to produce a new form, the form of hydrogen. In reproduction, it seemed like the generation of a new form was uneconomical, as offspring are of the same kind as parents. But that's not true in novel-kind generation, and so this option seems promising.<sup>15</sup>

While there is something very natural about this sort of proposal, it won't work. Should the proton and electron somehow co-generate the form of the hydrogen atom, it looks as if the form of the hydrogen isn't doing any unifying work. Notice that for the form of hydrogen to come to be, the proton and electron need to be properly mingled. Protons and electrons do not form atoms of hydrogen unless they can interact with one another, unless the proton can capture the electron. So, the proton and electron need to be suitably united before they can generate the form of hydrogen. But a suitably united proton and electron looks a lot like an atom of hydrogen; when the two are mingled, the result just is an atom of hydrogen. Given that forms are meant to explain the unity of substances, it is unclear what unifying work the hydrogen's form could do if

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<sup>15</sup> You might also think that a new form is just the forms of a substance's material components structured thus and so. While this is a straightforward and initially plausible way to think about new forms coming to be, I think it suffers two issues. First, it paints a reductive picture of substances that some hylomorphists may be unsatisfied with. If forms are just other forms structured thus and so, then it seems like substances are material components structured thus and so. The bigger issue, I think, is that this view simply abandons the mereological conception of form Koslicki and other hylomorphists defend. As noted in above, forms are taken to be parts of substances, but the relations holding between material (or formal) parts are not parts of substances. Thanks to the editor for bringing this idea to my attention.

its existence depends on the unity of the proton and electron, the very unity it is marshalled to explain. In other words, we have a bootstrapping problem: for the form of the hydrogen to get on scene to do its unifying work, we first need the proton and electron to unite, but this is just what the form of the hydrogen atom is responsible for. And it doesn't matter if the form of the hydrogen and the hydrogen atom are generated concomitantly. Since forms depend for their existence on a connection with matter, they are ontologically posterior to the substances of which they're parts; forms *belong to* substances. And something that belongs to or depends on another in this way can't do the work forms supposedly do. So, if forms are generated by the union of the parts that they are meant to explain the unity of, then it looks like forms are explanatorily impotent.<sup>16</sup>

At this point, you might charge me with having confused and run together problematically *formal* causation and *efficient* causation. What distinguishes a house from a pile of bricks and timbers is a form. What brought the house about, however, is the carpenter, an efficient cause, along with the capacities of the bricks and timbers to be fashioned into a house. Of course, the form didn't bring the house about, it didn't somehow act on the bricks and timbers. Forms just aren't the kinds of things that push and pull in the world so as to generate substances. Rather, their presence explains, once a new substance is on scene, why the substance is unified. But my argument seems to suppose that forms must be entities that push and pull matter to generate, and so explain the initial unity of, a substance. Specifically, I've argued that since forms can only get on scene after matter unites into a substance, and are ontologically dependent on substances, that they cannot explain the unity of a substance. But, the objection goes, forms aren't supposed to explain the unity of substances in this way. So, I've mistaken the nature of the explanatory role of forms.<sup>17</sup>

In response, I suspect that forms, construed along the lines of formal causes above, just don't do the explanatory work we should want, or need, done. Put bluntly: I think efficient causation is doing the only unifying work we need done, and forms, conceived as special parts that explain the unity of a substance once

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<sup>16</sup> Fiocco (2019) has made, in my eyes, a similar argument against hylomorphism based on the nature of explanation. See also, Renz (forthcoming).

<sup>17</sup> Many thanks to several reviewers for pushing me on this point, especially on making clear the distinction between (1) the coming-to-be of a unified substance and (2) the unity of an already on-scene substance.

it is already on scene, are unnecessary. So, I think the bootstrapping problem is a serious issue for hylomorphists inasmuch as I think hylomorphists need focus only on what efficiently causes matter to unite, not what formally causes an already united substance to be one. So, whether I've thought of forms as efficient causes rather than formal causes isn't the issue, formal causation is.

This sounds deeply un-hylomorphic, but the reason for focusing on efficient causation is simple. The proton and electron unite into an atom of hydrogen when mingled because they have the capacities to do so. Part of what it is to be a proton is the capacity or ability to capture electrons. So, we can think of the capacities of matter as something like the efficient cause of the coming-to-be and so unity of the hydrogen. The proton and electron themselves push and pull in the world such that the two unite into a distinct substance. And, plausibly, the capacities of the proton and electron can account for the continued existence and unity of the hydrogen. For, if the exercise of these capacities got us the hydrogen in the first place, why could their continued exercise not secure the existence and unity of the hydrogen across time? On this picture, there is a unity that is generated at and through time, and it is explained by the exercise of the capacities of matter, not some special formal component that gets on scene only after the capacities of matter do their initial unifying work. At this point, it is unclear what unifying work formal causes need to do. Formal causation doesn't get us the initial unity of a substance, and it doesn't seem necessary to keep that unity in place through time. The rest of the paper explains how, despite the eschewing of formal causation, we can develop a hylomorphic picture of substances, one that neatly deals with the generation of forms.

## **6. A Different way Forward**

Koslicki and other hylomorphists of a similar stripe must admit of some strange consequences if they are to provide an account of how and from where forms come to be. These consequences can be obviated though, so long as we're willing to alter our conception of form.

In the cases considered above, I've sketched a number of ways in which one might account for the generation of a non-material part of a substance. Setting aside the idea that forms are generated *ex nihilo*, we have tried to build and so generate forms out of some pre-existing forms, or parts of forms. But this led to positing parts

of forms with a merely attenuated existence, and allowing for forms to come on scene only after the unity they are meant to explain was accounted for.

We can account for the generation of forms without these troubles, however, and we can do so, as intimated above, with an appeal to causal powers. A power is a capacity or ability, a property, or an aspect of a property, that *enables* a substance to behave in certain ways.<sup>18</sup> For example, a ball possesses the property of being round, and so, has the power to roll. The ball can roll, but only does in fact roll should it be set in the right circumstances, should it be mingled with another substance of a certain sort, say, an uneven floor.<sup>19</sup> When the ball does roll, it's manifesting its power to roll, it's engaging in the activity of rolling.

So understood, powers are properties or aspects of properties *directed* at manifestations. Solubility is that in virtue of which sugar is *ready to* dissolve; solubility just is a causal readiness to dissolve. There are several ways to cash out the directedness of powers. Some understand the directedness of powers to be essentially relational, and so, posit entities to stand in the 'directedness' relation with powers (Tugby 2013). However, I take the directedness of powers to be primitive. The sugar is soluble, ready to dissolve, not because there is some entity, 'dissolving,' at which the sugar's power is directed, but just because it is part of the intrinsic nature of sugar to dissolve should it be mixed with a solvent. As John Heil puts it:

Imagine a key with a particular shape. The key would open locks of a particular (complementary) shape. This power is intrinsic to the key. If the key 'points beyond' itself to locks of a particular sort, it does so in virtue of its intrinsic features. This is what it is to be a key of this shape. The key is (as [C.B.] Martin would put it) 'ready to go'. We can say this without committing ourselves to the

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<sup>18</sup> So, following Heil (2003: ch. 11; 2012, ch. 4), Martin (2008: ch. 6), Jacobs (2011), and others, I take it that properties are *powerful qualities*. On this view, a substance possesses some quality, like being round, that empowers it in various ways. So, a substance possesses the various powers it does in virtue of the qualities that characterize it. How to best conceive of the relationship between qualities and powers is controversial however, hence, my disjunctive formulation. For further discussion, see Giannotti (2021).

<sup>19</sup> Most believe powers are individuated by the type of manifestation they are for and their stimulus conditions. For instance, solubility is the power to dissolve (type) when placed in a solvent (stimulus condition). But some, for example, Heil (2003: 83-84, 2012: 72-75), Martin (2008: ch. 1, 48-51), and Williams (2019: ch. 3), discard talk of stimulus conditions and prefer talk of mutual manifestation partners: other powers properly mingled with the power of interest. So, for example, the power to dissolve possessed of some sugar mutually manifests with the power to dissolve solutes possessed of some hot coffee, resulting in a dissolving. Others still, for example, Vetter (2015: ch. 3), do without stimulus conditions altogether.

existence of possible locks. The truth-maker for ‘this key would open a lock of kind  $K$ ’ is not the key, a possible lock of kind  $K$ , and a relation between the key and  $K$ . The truth-maker for the assertion is just the key itself’s being a particular way: its being rigid and its possessing a particular shape. (2003: 124)

So, on my view, a power is a property, or aspect of a property, directed at some type of manifestation, where this directedness is a wholly primitive and non-relational affair.<sup>20</sup>

How does the machinery of causal powers help us in accounting for the generation of forms? Imagine once more the proton and electron. The proton has the power to capture and so unite with the electron into an atom of hydrogen, and the electron has a complementary power.<sup>21</sup> For, this is just what we’re capturing when we say of the proton and electron that they *may* or have *the capacity* to unite into an atom of hydrogen. When the proton and electron are mingled, their complementary powers manifest, resulting in the generation of an atom of hydrogen, a new and unified substance. On a view like Koslicki’s, we need to account for the generation of a formal part in the hydrogen, but, on my view, there is no need. That’s because we can identify forms, not with non-material parts of objects, but instead with the manifestations of the powers of matter to unite. The form of a substance is not something distinct from and existing alongside its matter, but a collective activity *of* matter. And if forms are activities of matter, then there is no pressing need to account for how they come to be; they are simply the activities that matter is *primitively* directed at, ready to engage in. So, asking from where the form of hydrogen comes to be is like asking from where the rolling of the ball comes to be: the rolling of the ball is the exercise of capacities already present in the ball and the floor.

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<sup>20</sup> The general view of powers described here is not idiosyncratic. Heil (2003, 2012), Martin (2008), Martin and Pfeifer (1986), Molnar (2003), Place (1996), and Williams (2019) defend broadly similar views.

<sup>21</sup> Do the proton and electron really have the ‘power to unite in an atom of hydrogen’? I do not think so. While nearly all powers theorists take it that powers are individuated by the types of manifestations that they are directed at, many hold that one and the same power can be directed at numerous different types of manifestations. For example, the sphericity of a ball empowers the ball to both appear round visually and to leave a circular impression on a pillow. So, the proton has the property of positive charge which empowers it *both* to repel other protons and, we’ve come to discover, unite with electrons. In short, my view doesn’t require the positing of special uniting powers. For further discussion of the multi-track nature of powers, see Williams (2011).



A few things to note. First, the ingredients on my account include substances (the proton and the electron) and their powers, not formal parts or parts thereof. Second, since the directedness of powers is primitive we needn't posit any relata for the proton or electron's powers to be related to. Just as we don't need to posit in the proton or electron parts of the form of hydrogen, we don't need to posit, in a Platonic heaven or realm of *possibilia*, the form of hydrogen. Third, the powers under discussion are *powers to unite into an atom of hydrogen*, not powers to produce a formal part that is then tasked with explaining the unity of the hydrogen atom. Why? As I argued above, a form produced by the union of the proton and electron seems to accomplish little; its existence depends on the very unity it is meant to explain. The proton and electron, on their own, have what it takes to unite into an atom of hydrogen. So, if we're to countenance the powers of material components and acknowledge the role they play in generating a new substance, it seems we have little reason to posit formal parts construed as special unifiers, and so, we have no need to provide an account of where those formal parts come from.

But, is my view even a version of hylomorphism? Does it account for the generation of forms only insofar as it abandons forms? By my lights, we don't need forms construed as special unifying components of substances. With powers, efficient causes, we can get all the unity we want.<sup>22</sup> So, on my view, there are no forms inasmuch as there are no formal causes. But that doesn't mean there are no formal features of substances; it just means that efficient causation plays the role of formal causation. While the powers of material components bring about and maintain the unity of a substance, the manifestation of those powers—the unity of the new substance—is its form, its being unified. So, substances are composites of matter and form in the sense that they have material and formal features. The hydrogen atom is a proton and electron—matter—manifesting their powers of charge—form.<sup>23</sup> While this is no orthodox hylomorphism, I'm not the

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<sup>22</sup> Can my account actually secure the diachronic unity of substances though? I think so. The continued manifestation of the powers of matter secures the unity of substances through time. So long as the material components of a substance manifest their powers to unite, the substance exists. This allows for a fairly intuitive account of persistence conditions. A house can survive a change in parts because removing and replacing one brick leaves a sufficient number of other bricks to carry out the activity of being a house. Of course, in some cases, this won't be so. Should we remove the electron from the hydrogen, the hydrogen will cease to exist. Thanks to an anonymous reviewer for prompting me to mention this.

<sup>23</sup> My account doesn't apply neatly to mereological simples, for example, electrons, since they are not composed of other substances (so far as we know). As I see it, I could either reject a hylomorphic analysis of such objects (see Koslicki

first hylomorphist to identify forms with manifestations, processes, or activities (see Austin 2020 and Skrzypek 2021b, forthcoming), and I think such an identification sits nicely with interpretations of Aristotle and Aquinas on which matter is potentiality and form actuality (see Kosman 2013 and Pasnau 2018, respectively).

With my own account on the table, let me consider a few objections.

(1) I've considered the possibility that forms or parts of forms might pre-exist in the matter or agent of generation, for example, the form of hydrogen exists in some attenuated sense in the proton and electron. My worry was that positing attenuated existents was odd. But you might think that I've overlooked a plausible way in which forms or parts of forms might pre-exist in matter. Perhaps forms or parts of forms pre-exist in matter virtually, or only *potentially*. That is, the form of hydrogen doesn't exist in the proton and electron in some Anaxagorean sense, as an actualized, but latent or hidden, entity. Rather, the form of hydrogen pre-exists in the proton and electron inasmuch as the form is an entity that the proton and electron have the power to bring about. On such a view, when matter is configured appropriately, a pre-existing form is brought from potentiality to actuality, or *educed*, and comes to partly constitute a new substance.<sup>24</sup> Given that my own view relies on powers, what trouble might I have with this?<sup>25</sup>

In response, if the potential existence forms enjoy is one just where matter has the power to bring about the form, then there really is no pre-existence. If a power is a primitive, intrinsic, and non-relational causal readiness or directedness, then there is no entity at which it is genuinely directed. Likewise, a power does not contain its manifestation in any ontologically weighty sense. Just because I have the power to learn French doesn't mean that I *have* potential knowledge of French. It means that I *can* possess actual knowledge of French.<sup>26</sup> So, if we're being ontologically serious, we shouldn't take the existence of a power to imply the

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2008: 174), or posit prime matter to act as a sort of 'ultimate substrate' (see Brower 2014). But I don't see this as particularly worrisome, as any hylomorphic view must make one of these two moves. For further discussion, see Renz (2018).

<sup>24</sup> Aquinas defends a view like this in places. See *ST I.91.a2.ad4* and *ST I.45.a8.co*.

<sup>25</sup> Thanks to anonymous reviewers for pushing me to expand my discussion here and make my own view clearer.

<sup>26</sup> Aristotelians often distinguish between first and second potentiality. Prior to learning French, I have merely a first potentiality for French knowledge; I *can* learn French. However, once I've learned French, I have a second potentiality

existence of its manifestation, either beyond or within itself. While pre-existence talk may very well be true, it's made true by powers, not potential existents. If this is right, then the current view is one where forms are generated by the powers of matter, not pre-existing formal parts with a merely potential existence.

However, even if we ditch serious talk of pre-existence, this view faces the bootstrapping issue raised above: if forms are parts of substances that only get on scene after material components unite, then it seems a substance is unified by something besides a formal part. On my view, the powers of matter do the unifying work, and so there is no need to generate an entity distinct from matter to secure the unity of a substance. Once more, it seems like matter itself has what it takes to generate and so explain the unity of a substance.

(2) My account locates the grounds of unity in the complementary powers of matter to unite. So, in a way, the grounds of unity are *dispersed* among the material components of a would-be substance. But you might think that what grounds the unity of a substance needs to be unified itself. Robert Koons has argued it then looks like my view needs to be supplemented by a sort of cosmic luck:

Why can't unity come about or emerge as a result of the unified *cooperation* of the many parts? To take a simple example, why couldn't there be two simple things *A* and *B*, such that *A* has the natural power to unify under certain circumstances with *B*, and *B* has the complementary natural power to unify in those same circumstances with *A*? In this picture, there doesn't have to be a single unifier [or form]: instead, the many unified things are themselves mutual unifiers. However, this would require a very improbable and ad hoc pre-established harmony among the powers of the many mutually unifying parts—a coordinated distribution of mutually exercisable powers. This problem ramifies as

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for French; speaking French is something I'm *ready* to do. Might thinking of the pre-existence of forms as second potentialities help here? I don't think so. The shift from first to second potentiality is the acquisition of a power. The exercise of my power to learn French has gotten me a different power, the power to speak French. But just as my first potentiality for French didn't include potential knowledge of French, my second potentiality for French doesn't include pre-existing French utterances. While there exists something new in me—the power to speak French—I have not brought any pre-existing potential existences into actuality. Thanks to an anonymous reviewer for bringing this point up.

the number of components to be unified increases. It becomes quite untenable when billions of components must unite with each other. (2018: 8, emphases original)

I don't find this objection particularly troubling. First, I don't think it is implausible to account for the unity of a substance by appealing to its parts, rather than some unified unifier, for reasons similar to those one might find a trope theory of properties, and so similarity, plausible compared to realism about properties and similarity. More importantly, however, on a powers-based approach, it is no cosmic coincidence that a proton has the power to unite with an electron. The proton is positively charged, and the electron is negatively charged, and those properties empower their possessors to unite, among other things. Part of what it is to be positive charge is to empower its possessor to unite with substances with negative charge. If a power just is a readiness for some type of manifestation then it should be no mystery that a proton and electron can unite, or at least no more of a mystery than why protons and electrons have the properties and so powers that they do.

(3) I've identified powers with properties, or some aspect of properties, but I haven't said what, exactly, manifestations are. So, what, ontologically speaking, is a manifestation? We might posit the category of 'process' or 'activity' to house manifestations in (see Skrzypek 2021b), but I take them to be properties (see Martin 2008). If this is the case though, then it looks like manifestations, which I've identified forms with, are properties, and properties are often taken to be metaphysical parts or constituents of substances. Does this mean my account explains the unity of substances by appealing to the presence of a special formal part, exactly what I took issue with above?

A few points in response. First, we needn't take properties to be parts of substances. While bundle-theorists, such as Keith Campbell (1990) and L.A. Paul (2004), and certain substance–attribute theorists take properties to be parts or constituents of substances, there are respectable non-mereological accounts of properties. For instance, E.J. Lowe (2006) claims that properties are either *exemplified* by or *characterize* substances, depending on whether they are universals or tropes, but denies these relations are mereological. And John Heil (2003, 2012) defends a view on which properties are *ways* that substances are, but are not entities that, in any way,

constitute substances. (For a critique of mereological accounts of properties that I am sympathetic with, see Olson 2017.)

However, even if we do take properties, and so manifestations, to be parts of substances, I am not in the tough spot I claim other hylomorphists are. This is for two reasons. First, the ingredients from which manifestations are fashioned are powers, not formal parts or parts thereof with a merely attenuated existence. But there is nothing strange with positing, for example, positive charge and the corresponding power to unite with substances with negative charge. There is, however, something odd with positing the form or part of the form of hydrogen in a proton or electron.

Second, on my view, the powers of matter do the real unifying work. While I take it that substances have formal features, they lack formal parts that do real unifying work. Efficient causation, on my view, does the work traditionally associated with formal causation. Because of this, my forms can be resultant, ontologically posterior to the substances they are the forms of, without issue. So even if my forms are parts of substances, they aren't special unifying parts that get on scene only after the unity they're meant to explain is accounted for.

(4) On my view, a substance is a collection of material components manifesting certain powers. You might think this sounds too reductionistic, or at least doesn't capture the traditional hylomorphic conception of substance. Many hylomorphists take substances to be genuinely unified wholes, fundamental entities with novel, non-redundant powers of their own. But, on my view, it looks like a substance is unified no more than a pile of laundry. So, can my view of form and so substance capture the traditional hylomorphic conception of substance? And do I have the resources to distinguish substances from non-substantial unities like piles of laundry and other heaps?<sup>27</sup>

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<sup>27</sup> Thanks to an anonymous reviewer for pushing me to consider this objection, and also for the wonderfully vivid pile of laundry example.

First, while my substances may not be ontologically emergent or mereologically seamless entities, as they are for otherhylomorphists, they are certainly something over and above the mere sum of their material parts.<sup>28</sup> Substances have powers that their parts alone do not. Hydrogen can be used as fuel, but neither protons nor electrons can. Human beings can think, feel, and will, but their various material components cannot. While some hylomorphists accommodate this by positing emergent subjects and powers, I opt to do so by appealing to the idea that powers can manifest in different ways when in the company of certain other powers (see Koslicki 2018: ch. 7 and Martin 2008: ch. 3). A proton on its own lacks the power to be used as fuel, but, when manifesting its power of charge with an electron, the two in tandem unlock their power to be used as fuel. In other words, perhaps the proton has the power to used as fuel, but can only manifest that power when manifesting its power to unite with an electron. So, inasmuch as the material components of a substance have powers that can manifest only in tandem, only as members of a substance, I take it that my view can capture the traditional idea that substances possess novel powers, and so, ought to be treated as genuine or fundamental entities.

Second, substances are unified to a degree that other entities, such as piles of laundry, are not. This is because only certain powers are substance-making powers. Hydrogen is a substance, but the sum of two protons is not, because positive charge and negative charge manifest in a more robust and stable unity than two positively charged substances. A pile of laundry is not a substance because the powers its material components manifest are those simply of mass. So, substances are distinguished from non-substances inasmuch as the powers of a substance's material components are of a particular sort. Why is this so? Because the natures of such powers are so. Part of what it is to be positive charge is to unite robustly with entities that possess negative charge. That's just what positive charge is, and so on for other powers. So, like other hylomorphists, I take it that only certain material components, interacting in certain ways, make for a substance.

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<sup>28</sup> Important to note is that my view is not *incompatible* with emergence. It might be that certain material components, when properly mingled, generate a metaphysically emergent, higher-level but fundamental, substance. My view simply doesn't require this be the case with all substances.

## 7. Conclusion

Hylomorphists that take forms to be special unifying parts of substances run into odd consequences when trying to give an account of the generation of forms. But this doesn't mean we should abandon hylomorphism. Given that there are other accounts of the generation of forms that don't lead to odd consequences—such as the deflationary, powers-based approach just briefly sketched—hylomorphists should just abandon a constituent view of forms. And while there's still plenty of work to do defending my own approach, I think providing an account of how forms come to be is something hylomorphists ought to devote more attention to.

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