HYLOMORPHISM RECONDITIONED[1]

Michael C. Rea
University of Notre Dame

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Hylomorphism is traditionally understood as the thesis that every material substance is a structured entity with *matter* and *form* as its primary constituents. Informal explanations of the italicized terms commonly encourage the thought that matter is the (quantity, or lump of) stuff out of which something is made whereas a form is a kind-property, like humanity or felinity. It is furthermore common to characterize forms as abstracta--either immanent universals or particular tropes. For Aristotle and Aquinas, the two pillars of the hylomorphic tradition, the matter of a substance of kind K is something in the substance that, taken on its own, is *merely potentially a K*. If the substance came into existence at some time, then its matter is whatever *was potentially a K* and ultimately *came to be a K*. The form is that thing in the substance that *actualizes* the matter's potential to be a K. Obviously enough, these more technical characterizations do not strictly identify matter with stuff and form with kind property, but it is easy enough to see where those identifications come from.

Hylomorphism has strong intuitive appeal and a remarkable pedigree. It dominated medieval thought about the metaphysics of substance, was endorsed in some form or other by a

variety of Enlightenment thinkers, and seems to be garnering increasing support from contemporary metaphysicians.[2] But it is up to its neck in controversial commitments.

Suppose we take the informal characterizations of matter and form seriously. Then we (hylomorphists) must accept a universal-particular distinction and embrace some form of realism about universals or tropes. We must also believe that properties stand in a *constituency* relation to concrete particulars, and that their doing so somehow locates them *in* material objects. Furthermore, the relations referred to by the words 'constituency' and 'in' must either be taken as primitive or analyzed in terms of more familiar relations. Taking the former route raises the ideological costs of the view. Taking the latter route raises other problems. For example: Universals and tropes are clearly not *in* material objects in the way that water is in a cup, nor in the way that antibodies are in your blood stream. We might say that constituency is (a kind of) parthood, and so universals or tropes—at any rate, the ones that play the role of form—are in substances as parts.[3] But surely they would be odd sorts of parts. Down at the auto plant, there is no place on the assembly line for the installation of universals, and last night's lasagna did not seem to have universals or tropes among the ingredients. Worse, if the lasagna did have such things as ingredients, it seems that the natural candidate ingredients would be things like the *whiteness* of the pasta and the *tomato-basil flavor* of the sauce, rather than the *lasgana-ness* of the whole dish or any other property that might be thought of as its form or nature. Moreover, treating forms as parts leaves them ill-suited to serve as principles of unity, thus stripping them of one of their traditionally most important roles. For how can a form unify (all of) the parts of a

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[2] See, e.g., Brower 2010, Brower & Rea 2005, Fine 1999, 2008, and 2010, Johnston 2006, Koslicki 2008, Oderberg 2007, and Rea 1998a
[3] Cf. Koslicki 2008: 176 - 81. Fine (2008) also suggests that forms are parts, but not the sorts of parts that are joined by *fusion*.

thing if it is itself one of those parts?[4] So perhaps we should deny that forms, construed as universals or tropes, are parts of substances. If we do, and if we continue to maintain that they reside in substances as constituents, then we must take constituency or the "in" relation as primitive or else identify them with other, as yet unnamed, relations.[5]

Suppose instead we go with the more technical characterizations of matter and form. Then we face the burden of specifying what it is in a material object that "taken on its own, is merely potentially a K", and what it is in a material object that "actualizes the matter's potential to be a K". This is no easy task, and it will likely either take us back into the neighborhood of the informal characterizations, or force us to posit primitives like 'pure potentiality', 'essential whatness', and the like. Moreover, there is the looming danger of disconnecting our metaphysics of material objects from empirical reality. Where in physics, or chemistry, or biology do we find something answering to the description "something in a material object that actualizes its potential to be a dog [or a hydrogen atom, or a sodium chloride molecule]"? We can *begin* to answer, of course, by noting (again controversially) that physics, chemistry, and biology all make use of natural kind terms, and that it is the natural kind *properties* that are supposed to answer to the relevant description. But there is, again, the word 'in' to reckon with. In the straightforward senses of 'in', nothing *in* a hydrogen atom looks like a kind property.

Despite these familiar worries, hylomorphism is on the rise in contemporary metaphysics.

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[4] This objection is developed persuasively in Johnston 2006: 672 – 5. Koslicki (2008: 176 – 81) provides an argument for the conclusion that we must admit that things have "formal" parts. However, the argument depends on the claim that, where one material object *constitutes* another (i.e., the one shares all of its material parts with the other), one of the two is a *proper part* of the other. I take this as evident partly from Koslicki's explicit remarks in the book, especially at pp. 180 – 181, but also from her reply to Bennett 2011 (given in personal communication). The assumption is not unreasonable—it follows from some very intuitive premises (which I accept) together with the axioms and definitions of classical extensional mereology. However, those who believe that distinct objects can constitute one another need not endorse the axioms of classical *extensional* mereology and then go on a hunt for formal parts. We can instead simply endorse a *non-extensional* mereology. (Cf. Rea 2010b.)

[5] The difficulty of making sense of inherence and, correspondingly, of the distinction between constituent and relational ontologies was brought most forcefully to my attention by David Squires (Unpublished MS).

But none of its contemporary defenders have remedied, all together, what I take to be its three central drawbacks: (i) commitment to the universal-particular distinction; (ii) commitment to a primitive or problematic notion of inherence or constituency; (iii) inability to identify viable candidates for matter and form in nature, or to characterize them in terms of primitives widely regarded to be intelligible. Identifying forms with kind properties, and kind properties with immanent universals or tropes, for example, characterizes forms in terms of primitives widely regarded to be intelligible; but it still leaves us with the first two drawbacks.[6] Dropping the identification of properties with universals or tropes deals with the first drawback but, absent the development of a brand new theory of properties, leaves us with no hope whatsoever of explaining inherence or constituency. Similarly, identifying matter and form with potency and act, respectively, leaves us with the third drawback in spades, even if it manages to avoid the first two.

My goal in this paper is to develop a theory of natures that allows us to define matter, form, and constituency in a way that avoids all three drawbacks. The first four sections motivate and develop the theory of natures. The fifth offers the promised definitions. Along the way, I try to explain why the present theory fares better with respect to (i – iii) than the theories offered by three important recent proponents of hylomorphic ontologies, Kit Fine (1999, 2010), Mark Johnston (2006), and Kathrin Koslicki (2008).

1. Motivation

As already noted, apart from the sheer intuitive appeal of hylomorphism and the understandable desire to locate matter and form in nature (if possible), the two primary moti-

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[6] And maybe the third, insofar as the proposed identifications don't yet suggest any way of characterizing 'matter' in terms of a primitive widely regarded as intelligible.

vations for the theory developed in this paper are dissatisfaction with the universal-particular distinction and unwillingness to posit an inherence relation (or predicate) that is either taken to be primitive or explained by appeal to primitives about which there is widespread skepticism. These latter two motivations are intertwined; and I take it that, unlike the former two motivations, they are in need of some further comment.

There are well-known difficulties with existing attempts to provide an account of the universal/particular distinction.[7] Efforts to ground it in something like a subject-predicate distinction run aground on the fact that names of universals can function as subjects and names of particulars can function as predicates (compare: 'redness is warm' and 'x is Socrates'). Universals are multiply locatable, but many metaphysicians are, for various reasons, happy to say that particulars are multiply locatable as well. Some have suggested that universals, but not particulars obey the law of the identity of indiscernibles. But this view is untenable for those who believe in haecceities, because then particulars obey the law too. Most promising is the view that universals but not particulars are *instantiable*, or that universals but not particulars *inhere* in things. But if properties are universals, this view commits its proponents to the non-existence of uninstantiable properties.[8] It presumably also involves commitment to primitive instantiation or inherence, otherwise we could invoke the analysis of instantiation directly in drawing the universal-particular distinction.

Still, one might ask, why not take instantiation or inherence as primitive? To my mind, that is the wrong question. The right question is, why *should* we do so? What pressure is there to

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[7] See, for starters, MacBride 2005 and Ramsey 1925.
[8] At any rate, it does if we say something so strong as "what it is to be a universal is to be something that can be instantiated." One might say something weaker, though, e.g.: *typical,* or *normal* universals are instantiable; and then one might go on to acknowledge the existence of abnormal universals which are uninstantiable. But then one wonders why the abnormal universals count as universals at all. It is hard to see how there could be an answer to that question if our only means of characterizing the universal-particular distinction is in terms of instantiability. So, then, we are left right back where we started.

preserve the universal-particular distinction by positing primitive relations (or non-relations) to account for it? So far as I can see, there is little, if any, pressure to preserve the distinction. We do not seem to need it for any important theoretical purpose. So we have no particular need for the primitive relations or non-relational ties that one might invoke to account for the distinction.

This is not to say that there is no good reason to believe in things like wisdom, redness, and the like. My point is just that there is no need, theoretically speaking, to say that such things belong to a different ontological category from familiar particulars like you and me. Indeed, I am inclined to think that whatever necessary work can be done by an ontology of universals and particulars can also be done by an ontology of powers, together with a primitive location relation (or predicate) and entities reducible to these things. If this is right, then the latter ontology is to be preferred for the simple reason that, unlike the notions of *universal*, *particular*, and *instantiation*, we already understand and need for other purposes the notions of *location* and *power*.

I will not defend here the idea that an ontology of located powers can do everything that an ontology of universals and particulars can do. To do so, it would be necessary (and almost sufficient) to defend two other views: that properties can be identified with powers, and that what we would normally think of as objects can be reduced to or identified with properties, or properties plus locations. Both have been defended by others.[9] I will simply note that denying

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[9] On behalf of the view that objects can be reduced to or identified with properties, see, e.g., Paul 2002 and, rather differently, Paul (unpublished MS). In citing Paul's work here, I do not mean to suggest that I endorse exactly the views that she defends. In particular, I would resist "identifying objects with properties" in such a way as to yield the result that *everything is a property*, and I would deny that a view resulting from the obliteration of the object-property distinction is a "one-category ontology". Note too that going this route opens the door to saying that there is no particular reason to favor a property-construal of forms over an object-construal. (I thank Kathrin Koslicki for encouraging me to consider the latter option.) Nevertheless, I prefer the property-construal for the same reason I prefer to speak of reducing objects to properties rather than the other way around: powers seem intuitively a lot more like what we think of as properties than what we think of as objects.

There is a sizable literature speaking on behalf of the view that at least some properties are to be identified with causal powers or dispositions. For starters, see Shoemaker 1980, Bird 2007, Heil 2004 and Whittle 2009.

that powers are universals and supposing that they can be located helps us to avoid some of the intuitive difficulties associated with the view that objects can, in some sense, be reduced to or identified with them. For this reason, it also helps us to see how our use of 'part' in the claim that properties are parts of things could be intelligibly related to more ordinary uses of the term 'part'.

In sum, I think that, in order to promote understanding, it is important to minimize the number of things that we take as primitive, and to try to explain everything else in terms of primitives that we find readily intelligible. But hylomorphists have not done this yet. So, in a very important sense, people just don't know what the hylomorphists are talking about. Kathrin Koslicki, for example, is explicitly neutral on the question whether forms (or structures) are objects or properties. (2008: 254) She thus avoids some of the controversial commitments noted earlier, but at the cost of, in effect, treating notions like form and structure as primitive. Fine and Johnston posit *principles of embodiment* (Fine) or *principles of unity* (Johnston) as the occupiers of the form role. They tell us that these principles are properties or relations; but they tell us nothing further about what they are, nor do they tie their hylomorphic theories to any particular view about the nature of properties and relations. One might think that either 'property' or 'relation' ought to be an acceptable primitive, or even that both could be acceptable. But the history of theorizing about the nature of properties and relations strongly suggests otherwise. Moreover, we would not be helped by taking either of those notions as primitive. For if we identify forms with properties or relations and say nothing further about the nature of properties,

Whittle claims that her defense of the *properties as powers* view differs from others in that her defense alone does not presuppose that properties, and so powers, are *universals or tropes*. (2009: 284) I am skeptical. But if she is right, then perhaps I would have to adopt a view more like hers than, say, Heil's in order to avoid commitment to the universal / particular distinction. Although I have indicated that I want to identify properties *in general* with powers, I acknowledge that there are real difficulties with such a view as applied to second-order properties, haecceities, and mathematical properties—none of which I am willing to give up without a fight. At this point, I can only say that I

we must then either leave open or settle by fiat questions about whether there is any meaningful sense in which they 'inhere' in or enter into 'constituency' relations with substances. Doing the former leaves open the question whether we have a hylomorphic theory at all.[10] Doing the latter simply avoids the very questions that I have said that hylomorphists need to address.

My proposal, then, is to try to characterize everything that the hylomorphists want to say in terms of *location* and *power* and a few other easy-to-understand concepts. The core, under-lying ideas are that (i) there is no universal / particular distinction, (ii) properties are powers, (iii) powers can be located in spacetime, and (iv) objects can be reduced to or identified with powers.

My theory of natures has three central theses:

(T1)   Natures are powers; the natures of *substances* are fundamental powers.

(T2)   The natures of composite objects *unite* other powers (in particular, the powers that are the natures of their parts).

(T3)   Natures can enter into compounds with *individuators*, and play the role of form.

The chief primitives of the theory are the concepts of *power, location, ground,* and *numerical sameness*. I have a bit to say about the nature of powers, but nothing approaching an analysis. Similarly, I have no theory about what location is. In particular, I have no theory about whether it is to be construed as a relation between objects and spacetime. I do talk about things being

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am much more optimistic about the prospects for dealing with such properties within a broadly causal theory of properties than I am about the prospects for accommodating them (plausibly) within any other framework.

[10] This is true, at any rate, given the understanding of hylomorphism in play in the present paper. It is likewise true on Fine's conception. Fine (1999) counts his theory as hylomorphic because it "takes seriously the idea that there is both a formal and material aspect to most material things." (62) (See also Fine 2008.) But if we leave open questions about inherence and constituency, what sense remains in the claim that material objects have a *formal aspect*? (Fine does not himself address those questions; but presumably that is not because he thinks they can be forever left open. As he indicates repeatedly throughout the paper, he intention was only to offer a sketch of a theory, not one fully worked out in all details.) Others, however, characterize hylomorphism differently. Thus, for example, Johnston (2006) says that hylomorphism is '[t]he idea that each complex item will have [a] canonical statement [of the following sort] true of it': "What it is for ___ to be is for ____ to have the property or stand in the relation ___', where the blanks are filled in with singular terms referring to an item, some parts, and the principle of unity. If this is all there is to hylomorphism, perhaps there is no problem leaving open questions about inherence and constituency.

located *in spacetime,* but I mean for such talk to be netural with respect to theories about the nature of spacetime and the nature of location. The unanalyzed notion of ground is invoked primarily in my characterization of fundamentality. I do not claim to have an analysis of fundamentality either, but I think that I say enough about what I mean by the term 'fundamental' to justify leaving it off of the list of primitives. (But for those who disagree, I have no objection to adding it to the list.)

Regarding numerical sameness, note that I am not assuming that this relation is identity. Identity is one species of numerical sameness; but (in my view) it is not the only species.[11] (I do not believe that one has to endorse this latter view in order to endorse my theory of natures, but I will develop the theory under the assumption that there is such a thing as numerical sameness without identity.) If I were to try to explain the concept of numerical sameness, I'd say something like this:

> *x* and *y* are numerically the same if and only if *x* and *y* are to be counted as one K, for some kind K—where the phrase 'are to be counted' is to be understood as having metaphysical force rather than simply expressing a norm of linguistic practice.

But, of course, this just explains the concept in terms of a new, rather unwieldy primitive: *being (metaphysically) such as to be counted as one F*. Better just to stick with numerical sameness as a primitive. Some readers might object that numerical sameness is as bad a primitive as instantiation, and is as ill-understood as well. I don't believe this. I think that numerical sameness is about as well-understood as identity (and is typically identified with identity), and I think that identity is about as well-understood a primitive as any that we have. But I need not press this point. For not everyone will raise this objection and, for those who do, the consequence is simply

that "better primitives" may not be as strong a reason, or any reason at all, for them to accept my theory. Nevertheless, it might well turn out that the theory scores high for them on other criteria.

The other interesting terms that show up in T1 – T3—'unite' and 'individuator'—will be defined, as will the terms 'matter' and 'form'. Each of theses T1 – T3 requires extended comment, which I provide in the remainder of this section and the next two. I'll take each in turn.

2. Natures as (Fundamental) Powers

Let me begin with the concept of power. It is perhaps tempting to think that powers are just universals. As I have already noted, I do not want to say this. But I am happy to say that powers are in some ways *like* universals: they can be present in multiple regions, for example, and our talk about powers resembles our talk about universals. (We say, for example, that objects 'have' them.) Likewise, powers also in some ways resemble particulars. They enter into causal relations, for instance. The sharpness of a sword is among the powers of the sword and is likewise among the causes of the wounds inflicted by it.[12] Similarly, it seems natural to believe that the presence of a power in a region is a matter of its being *located* there. The sharpness of a sword is located where the sword is, presumably along the blade. If you ask where, precisely, along the blade we find its sharpness, it is hard to know how to answer. But it seems clear that the sharpness is along the blade, and not on the hilt, or at the bottom of the sea, or simply nowhere at all in spacetime. Furthermore, it seems plausible that our inability to say precisely

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[11] On this notion and its utility see Rea 1998a, as well as Brower 2010 and Brower & Rea 2005.

[12] I have several times encountered the objection that *sharpness* does not seem like a power; rather, the relevant power in the neighborhood is something more like the ability to cut or the capacity for cutting. I take this just to be an objection, or the start of an objection, against the view of properties with which I am working in this paper. My own inclination is simply to identify the sharpness of the sword with a complex kind of capacity or ability that includes its various cutting capacities.

where the sharpness is resembles our inability to say precisely where *anything* is, due to vagueness. Thus, I am inclined to take the talk of location at face value.

Although I deny that powers are universals, I do not deny that they are properties. Indeed, for purposes here I shall assume the truth of *dispositional monism*, according to which all properties are dispositional, which, I take to imply that all properties can be construed as powers. There are, of course, well-known difficulties for dispositional monism, not least of which are the threat of infinite regress and the (related) problem of ungrounded dispositions. I cannot possibly hope to articulate and defend my own responses to these problems here; but I can at least refer interested readers to promising responses already available in the literature.[13]

T1 says that the natures of substances are fundamental powers. For purposes here, I leave open the question whether there are material objects other than substances. Given my understanding of *fundamental power*, together with the rest of the theory of natures laid out here, the thesis that there are no material objects other than substances corresponds roughly to the view, defended by Trenton Merricks (2001), that to be (a concrete object) is to have non-redundant causal powers. It is unclear to me just how many "commonsense objects" like tables, hornets, and bouquets of flowers would have to be ruled out by such a view. Merricks argues that a great many of them are ruled out, but that is not an issue I wish to take up here. Suffice it to say that a view like this will, at any rate, be less ontologically permissive than a view which admits the existence of non-substances—i.e., objects with natures that are *not* fundamental powers.[14] I take it as an advantage of my theory of natures that it facilitates a substance / non-substance distinction and is compatible with divergent views about the ontological status of non-substances.

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[13] See Molnar 2003 and Bird 2007

So what does it mean to say that substance natures are *fundamental powers*? Here I mean three things. First, the natures of substances are perfectly natural properties—not in the sense that contrasts with 'supernatural', but rather in the sense of marking objective similarities and joints in nature.[15] (Cf. Lewis 1983) Second, they are not reducible to other powers. The power to tell a lie, for example, is reducible (if it is a genuine power at all). It is nothing over and above the more basic powers involved in its exercise: the power to form beliefs, the power to speak, the power to entertain false propositions and to intend to report them as true, and so on. Negative charge, on the other hand, is plausibly non-reducible, and so fundamental. Third, they ground non-natural powers or, if there are no such things, they explain the truth of (putative) non-natural power-attributions. For example: Fundamental particles have the power to repel other fundamental particles. If there really is such a thing as *the power to repel other fundamental particles*, presumably it is a non-natural power that is grounded in one of two plausibly fundamental powers—negative or positive charge. On the other hand, if there is no such thing as the power to repel other fundamental particles, still, the claim that fundamental particles have that power will be made true by facts about fundamental powers; and so the fundamental powers will explain the truth of that power-attribution. I take it that the difference between reducible powers and non-reducible non-natural powers roughly corresponds to the difference between conjunctive properties and irreducibly disjunctive properties.[16]

One might wonder what it means to say that one power grounds another. As I have already indicated, however, I have nothing very illuminating to say about this. George Molnar

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[14] I myself am partial toward the much more prodigious ontology of the sort embraced by Fine (1999). See, e.g., my 1998b.

[15] Insofar as naturalness comes in degrees, I take it that fundamentality comes in degrees as well. But to say that a power is fundamental, *period,* is (in part) to say that it is *perfectly* natural, which is not a degreed concept.

[16] This is not to say, of course, that there is no overlap between the two. I.e., if there are indeed both conjunctive powers and irreducibly disjunctive powers, then surely too there are irreducibly disjunctive conjunctions as well.

characterizes grounding as follows: "The ground of a power, *P*, is the set of properties (all of which are conceptually distinct from *P*) by virtue of which a thing has *P*." (2003:147) But this just introduces another primitive: the "by virtue of'" relation. Although I think it is certainly true that some primitives are better understood than others (indeed, this paper is in part motivated by that fact), I am skeptical that the "by virtue of relation" is any better understood than grounding. Thus, I stick with the latter notion as my primitive.

I should also say what I *do not* mean by the claim that substance natures are fundamental powers. Most importantly, I do not mean to say that natures are "basic" in the sense of being entities upon which all other things depend for their existence. Nor do I mean to say that they are themselves ungrounded. (This is, then, a departure from at least one common way of using the term 'fundamental'.) For example, it might turn out that the natures of composite objects depend in some sense on the natures of their parts; and, as I shall note below, I think that at least some natures are emergent properties, and are therefore grounded in other natures, or their manifestations. Thus, at least some natures are not basic in the sense described above. Also, I intend the theory of natures to be neutral on the question of whether there are fundamental empirical properties beyond those investigated by physics. If there are, then perhaps there are biological and chemical natures as well as physical natures; or perhaps there are purely mental natures. Unsurprisingly, I do have views on these issues; but, so far as I can tell, they are motivated by considerations wholly independent of the theory of natures here being offered.

In saying that natures are powers *and* that natures can play the role of form, it might seem that, from the point of view of traditional hylomorphism, I have got my metaphysics upside down. For I have already acknowledged that powers are dispositions; and dispositions are generally regarded as potencies, not "acts" or "manifestations". But the role of "potency", as we

saw earlier, is traditionally associated with *matter*, whereas the role of 'act' is commonly associated with form. Addressing this concern in detail would take us too far afield; but let me offer just two brief remarks. First, Aristotle himself distinguishes between *active* (causal) power and mere potentiality, and it is the latter, not the former, that is associated with the matter role.[17] This makes intuitive sense, too. *Being feline*, for example, might just be a certain complex power or capacity to develop and behave in certain ways, even if, at the same time, *being feline* is also the actualization of the potentiality on the part of some matter for being a cat. Second, given that I am assuming dispositional monism (which, again, posits dispositions "all the way down"), it is not clear that the act / potency distinction can be meaningfully drawn. Hence, I do indeed sacrifice that element of the tradition; but I do so only by undermining a distinction that it rests on, not by *inverting* the claims of the tradition.

3. NATURES AS UNITING OTHER POWERS

Thesis T2 is meant to express and do justice to that part of traditional hylomorphism that says that natures are principles of unity. The relation of *uniting* is to be understood roughly as follows: one power *P* unites some other powers just in the case that *P* is so connected to the other powers that its manifestation depends upon the cooperative manifestation of the united powers and, furthermore, the latter do not confer any powers on the object that has **P** that are both intrinsic to the object and independent of **P**.

It is perhaps fruitful to think of *uniting* in comparison with *emergence*. Emergent properties are, roughly, properties that depend on but are not reducible to the properties from which they emerge, and which play causal roles that do not duplicate the roles played by the relevant lower-level properties. Thus, not all uniting powers, and hence not all natures, will be

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[17] Witt 2003, esp. Ch. 2.

emergent (since it is possible to satisfy the description I've given of a uniting power without being irreducible and without making non-redundant causal contributions). But the natures of substances will be emergent since those are supposed to be fundamental powers. Not all emergent powers will be substance natures, however, since some emergent powers of a thing might be such that other powers of the same thing are not grounded in, reducible to, or identical with it. (E.g., the power to think and the power to act freely are plausibly both distinct and emergent. But surely it is not the case that each is grounded in or reducible to the other.)

We can try to capture the notion of unification more precisely with a definition; but we should be under no illusions about what the role of the definition is in this paper. The rough and intuitive characterizations just given are not attempts to gloss the definition; rather, the definition is an attempt to precisify the intuitive characterizations. Successful counterexamples to the definition, then, will show only that the intuitive characterization has not been made sufficiently precise. They will not, absent further argument, show that the concept of *uniting* is bankrupt.

That said, here is the definition:

A power p_0 of an object x unites distinct powers $p_1 - p_n =_{df}$ (i) p_0 is intrinsic to x,[18] (ii) each of $p_1 - p_n$ is a nature of at least one of x's parts, (iii) p_0 is grounded in or identical to a certain sort of cooperative manifestation (CM) of $p_1 - p_n$,[19] (iv) every power intrinsic to x that is at least partly grounded in CM is identical with, reducible to, or at least partly grounded in p_0, and (v) there is no power intrinsic to x that is distinct from both p_0 and CM and that grounds p_0.

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[18] This might be a problem if, as some think, dispositions—and therefore powers—turn out to be extrinsic. Jennifer McKitrick (2003), for example, argues for the thesis that dispositions are extrinsic. Molnar (2003), on the other hand argues that they are intrinsic, and Bird (2007) provides replies to McKitrick's arguments. Obviously I am taking sides with Molnar and Bird.

[19] In other words: Let CM be a property such that, necessarily, CM is had by an object x iff $p_1 - p_n$ manifest in a particular sort of way. Then x's having p_0 is grounded in or identical to x's having CM.

By way of illustration, consider a human organism, and suppose that *humanity* is a biological nature. (I do not know whether humanity is a biological nature, or whether there are any biological natures. The answer depends in part upon whether properties like *being human* are reducible.) The manifestation of humanity in a region depends causally upon the cooperative manifestation of the natures of the simple parts of the human organism. Not just any sort of cooperative manifestation will do, however. Take all of the simple parts of a human and force-fit them into a one-quart cylindrical container and you will not have a human organism, even if, at that time, the natures of the erstwhile parts of the human are engaged in some sort of cooperative manifestation. Thus, the presence of humanity in a region depends upon a particular *sort* of cooperative manifestation of the natures of the relevant parts. Furthermore, every power intrinsic to a human being, excepting *humanity*, whose manifestation depends upon the relevant sort of cooperative activity—e.g., the capacity for rational thought, the power to grow and develop as a human organism, the power to run and dance—is plausibly dependent upon the power that is humanity. And the humanity of an organism is not itself so dependent upon some further power that also unites the organism's parts.[20] Thus, humanity unites the natures of the parts of a human being in the sense described above.[21] This is the sense in which I think that humanity is a 'principle of unity', and it is part of what is involved in its being a nature.

Let us now contrast this understanding of principles of unity with the rather different conceptions one finds in the work of Mark Johnston and Kit Fine. Consider a relation such that,

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[20] I don't, of course, mean to suggest that these powers are *unique* to human beings; only that they are intrinsic.
[21] In this vein, compare Johnston:

> A paradigm case is a living thing whose organic matter is unified into an organism by some categorical basis of a multi-track disposition to such life-functions as ingestion, assimilation, excretion, growth, metabolic repair, and so on and so forth. In this case, the principle of unity is a complex structure of biochemical relations, whose holding of the organic matter of the living thing provides the categorical basis for the multi-track disposition in question. (2006: 664)

Despite our similarity with respect to remarks like this, however, Johnston's principles of unity are not generally suited for the role of 'nature'. (On this, see below.)

for some objects the *x*s, the expression *the xs standing in R* refers to a whole (*y*) whose parts are the *x*s. For Johnston, this will suffice for R's being a principle of unity. For Fine, it will suffice for R's being a principle of (rigid) embodiment.[22] On the present view, however, R counts as a principle of unity only if R is a power intrinsic to *y* that (roughly speaking) is grounded in the natures of *y*'s parts and grounds all of the other intrinsic powers of *y*.

Thus, let the *x*s be the particles that compose me now. The *x*s are arranged manwise; they are also arranged seated-manwise, man-thinking-about-hylomorphism-wise, and a myriad other different ways. Let us call these diverse relations 'the *r*s', and let us name the first three '*r1,*' '*r2,*' and '*r3*'. Now, it does not directly follow from either Johnston's theory or Fine's that the *r*s are principles of unity. We would need to add the premise that expressions like *the xs standing in* r*1* all refer to wholes. Johnston says that 'certain' relations are item-generators, suggesting that he might balk at calling literally all of these relations principles of unity. But nothing he says suffices to distinguish generative relations from non-generative ones. Fine says that the 'most plausible development' of his theory leads to a massive proliferation of items, suggesting that he'd be happy to say that each of the *r*s is item-generating. (1999: 73 – 74) I would be perfectly content if my own ontology turned out to be as prodigious as Fine's, but the main thing I want to call attention to is that, whereas Johnston and Fine are silent on *the conditions under which* a relation counts as a principle of unity, my own theory is not. One suspects that on Fine's view, whenever some *x*s stand in any relation whatsoever, the relation constitutes a principle of rigid embodiment. On Johnston's view, for every object there is a relation that is its principle of unity; but what makes one relation rather than another *the* principle of unity is not clearly specified. On

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[22] Fine's theory also recognizes principles of "variable embodiment". The difference is roughly this: A principle of rigid embodiment is a relation that obtains between the 'timeless' (i.e., permanent) parts of a thing—e.g., the particular atoms that compose a molecule. A principle of variable embodiment is a function that picks out the

the present theory, specific conditions must be satisfied in order for a relation to count as a principle of unity (i.e., a nature).

What's more, it is precisely these conditions that make my own principles of unity more suitable than Johnston's for playing the role of *natures*. Thus, Johnston writes:

> Consider HCl, a kind of molecule. The principle of unity for individual hydrogen chloride (HCl) molecules is the relation of *bipolar bonding*. … The principle of unity holds of the ions, and its holding is the essential condition for existence of the molecule. It is simply an essentialist elaboration of a proposition of chemistry that what it is for a given hydrogen chloride molecule to be is for there to be a hydrogen ion and a chlorine ion together in a bipolar bond. (2006: 653)

By contrast, my own view precludes relations like *bipolar bonding* from being principles of unity. To see why, one need only attend to the fact that carbon monoxide also has its constituent atoms united (in Johnston's sense) by the bipolar bonding relation, and yet it does not share a nature with hydrogen chloride. As I see it, a nature should be something that *unites the powers* of the parts of the object in the sense described above. But it is hard to see *bipolar bonding* as playing that role. HCl and CO have very different causal powers, after all; thus, even if *bipolar bonding* satisfied conditions (i - iv) of the definition of power-uniting, it is hard to imagine that it would satisfy condition (v). Presumably condition (v) is satisfied in each case by a more 'all-encompassing' power—i.e., a power that we would normally name by reference to a kind, like *being hydrogen chloride*, or *being carbon monoxide*.[23]

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temporary parts of a thing at any given time. (Cf. 1999: 65 – 66, 68 – 69) This is a complication safely ignored for present purposes.

[23] Johnston does posit principles of unity for kinds, as well as for objects. (2006: 654) And, for all I can tell, these might be suited to play in his ontology something like the role of natures. But for those of us who wish to say that

4. NATURES AND 'INDIVIDUATORS'

According to the version of hylomorphism that I am developing, the natures of material objects play the role of form, and they enter into compounds with things or stuffs that play the role of matter. On one common way of understanding the roles of form and matter, forms are constituents that are shared among objects of the same kind, whereas matter is what individuates objects of a kind. I can unqualifiedly endorse the claim about forms, but not the claim about matter. In accord with the spirit of that claim, I want to say that (for material objects, anyway) what natures enter into compounds with are *individuators*. But for those of us who endorse the view that *distinct objects* might nevertheless share the *same matter* in common, and for those of us who believe that immaterial things might have a hylomorphic structure, the claim that 'matter is what individuates objects of a kind' cannot be affirmed without qualification. Individuators cannot be seen as accounting for distinctness, since distinct items can have the same individuator as a constituent. Furthermore, *matter* cannot always be what individuates, since immaterial things have no matter, strictly speaking. (Another way of putting this: It is not always matter, literally speaking, that plays the matter-role.) Let me therefore say a few words about how I am thinking about individuators, about matter-sharing, and about the hylomorphic structure of immaterial things.

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the nature of a thing is a power intrinsic to it, these other sorts of principles of unity won't do. For, on Johnston's view, the principle of unity for a *kind* is something like a resemblance relation among the principles of unity for individuals. Thus, in the case of HCL, for example, the principle of unity for the kind "is just that such individual molecules *share certain kinds of parts, namely hydrogen ions and chlorine ions, and share a certain principle of unity, namely bipolar bonding*." (654: emphasis in original) But, obviously enough, *that* principle of unity is not one that can be construed as a power intrinsic to individual HCL molecules.

Let us begin by considering simple material objects. A simple material thing—a point-sized particle, for example—will have a nature which it shares with other particles of the same kind. But what accounts for the fact that there are *many* particles with the same nature rather than just *one* scattered, mereologically complex particle located wherever we find the nature in question? The answer, I take it, is just this: The nature itself does not divide across disconnected regions of spacetime; it is a power that must be, in some sense wholly or fully concentrated at, or attached to, point-sized regions (or, better, line-sized ones for the typical case of a *moving*, spatially-point-sized particle) rather than to scattered regions. In light of this, it is natural to suppose that, in the case of each particle of the relevant kind, the nature has compounded with some further constituent that accounts for its concentration at or attachment to the region in question. From here, the story might be fleshed out in a variety of different ways. My own inclination is to think that, for simple objects, the individuators are regions—presumably point-sized, but perhaps not—of spacetime. I think of the powers of simple material objects as physically locatable properties—qualities that exist at multiple regions of spacetime. Thus, it is natural to regard the objects themselves as compounds whose matter is a spacetime region and whose form is the quality located at that region.

What about complex material things? Here, it seems, we have fundamentally the same situation, but on a larger scale. What is it that accounts for the fact that there are many distinct human beings rather than just one spatiotemporally scattered human being? Presumably it is that human nature does not divide widely across spacetime; it is the sort of power that is fully and completely located in what we think of as human-shaped regions.[24] More precisely: it is a

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[24] But, one might wonder, *how* is it located at those regions? For some such region R, does the nature *entend*, *pertend*, or *span* the region? (Roughly, this question boils down to the following: "Is the nature wholly present at every subregion of the region in question, or does it have parts at every subregion, or neither?" For definitions of

power that *unites* only the natures of certain kinds of objects standing in certain kinds of relations, and it is this fact that explains why human nature concentrates at human-shaped regions rather than scattered regions. Unlike the case of simple particles, however, it is *not* so natural to suppose that the individuating constituent of a human being is its region of spacetime. The reason is just that there is an intuitively better candidate available—namely, the collection of objects whose powers are united by the nature. (By using the terms 'a better candidate' and 'the collection of objects', I do not mean to commit to the claim that 'the collection' is *an individual thing*. Perhaps it is a plurality. More on this in section 5.) Thus, in general, the individuators for mereologically complex things will just be collections of objects whose powers are united by the natures of those things.

But what if we believe that distinct things share all of the same matter in common? Suppose, for example, you think that a clay statue is distinct from the lump of clay that constitutes it. (Perhaps you think that the lump can survive things—squashing and reshaping, for instance—that the statue cannot, and that by virtue of this difference, the lump cannot be identical to the statue.) In that case, it will be at least somewhat misleading to say that matter individuates. Matter would *not* be what accounts for the distinctness of the two objects. Nevertheless, if you also believe—as I do—in a relation of *numerical sameness without identity*, you might think that there is still a perfectly good sense in which matter *does* individuate. Proponents of numerical sameness without identity say that, in the statue/lump case, though the statue and the lump are distinct, they nevertheless count as *one material object*. They are *two* hylomorphic compounds, two things, two entities, etc.; but they are, nevertheless, one material object. Thus, on this view, *material objects* are individuated by their matter. That is, whether *x*

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entension, pretension, and *spanning*, and related notions see Hudson 2005: 99 – 101. See also Parsons 2007.) I don't have a definitive answer to this question, but I rather like the suggestion that they span.

and *y* count as the *same material object* just depends on whether they share the same matter. I have defended this view elsewhere (Rea 1998a) and do not have the space to rehearse that defense here. But what I want to note is just this: If one has this sort of view, the right thing to say about individuators is *not* that they account for *distinctness simpliciter*, but rather that they account for *absence of numerical sameness*. In the case of material objects, matter plays that role. (What, then, accounts for distinctness simpliciter? Perhaps divergence of properties.)

Thus far, my discussion has been confined to the case of simple and complex material things. If you believe in immaterial things, you might wonder whether they too can have, in some sense, a hylomorphic structure. My answer is 'yes'; and I have discussed this matter elsewhere. (Brower & Rea 2005, Rea 2009, and Rea 2010a) But for present purposes I'll simply leave that issue aside.

5. DEFINITIONS

Having finished commenting on theses T1 – T3, I can now provide the promised definitions of *constituent, matter-form compound*, *matter*, and *form*. Thus:

x is a constituent of *y* $=_{df}$ *x* plays in *y* the role of matter or the role of form.

x is a matter-form compound $=_{df}$ something in *x* plays the role of matter and something in *x* plays the role of form

> *m* plays the role of matter in $x =_{df}$ *m* is an individuator (i.e., something that accounts for absence of numerical sameness) that exactly mereologically overlaps *x*; and either *m* is not a nature or *x* lacks spatiotemporal parts.

> *f* plays the role of *form* in $x =_{df}$ *f* is a nature of *x* and *f* does not play the role of matter in *x*.[25]

As noted earlier, I allow that mere pluralities—collections—can function as individuators, and hence can play the role of matter. But, in light of the above definitions, this poses a small terminological problem. Consider the collection of particles, C, that plays the role of matter in some particular cat. Suppose the *x*s are the members of the collection. Given that C is a mere collection, 'C' is just a device for referring collectively to the xs. Thus, the *x*s play the role of matter. But now do we say that the *x*s *are constituents* of the cat? If we do, the definitions imply (falsely) that *each* of the *x*s plays the role of matter in the cat. If we don't—if we say, instead, that the *x*s are *a constituent* of *y*—then we violate grammar. There is no substantive issue here. We just need to recognize that, just as 'the collection' is only apparently a singular referring expression, so too 'being a constituent of the cat' only apparently picks out a role that can be played just by an individual. (Analogously: We cannot grammatically say that the members of the Notre Dame football team are *the winner* of Saturday's game. We have to say either that the team itself was the winner or that the members of the team won. The problem in the case of constituency is just that there is no corresponding verb analogous to 'won'. We could invent one; but once the point here has been appreciated, there is no need to.)

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[25] For theological purposes I want to allow that natures can also play the role of matter; hence the second conjunct. (Cf. Rea 2010a)

For reasons cited earlier, these definitions have the consequence that Johnston's principles of unity do not necessarily play the role of form. They do not, however, imply that nothing that Johnston would call a principle of unity plays the role of form. Matters are less clear with respect to Fine's theory. I suspect that with some substantive additions, Fine's principles of embodiment could be made to correspond to forms as I understand them, which would mean that my own theory is at least consistent with Fine's; but I do not have the space here to try to support this speculation with argument. As regards Koslicki's theory, I have already noted my rejection of the claim that objects have formal parts, and so my own views are at least to that extent inconsistent with hers. Note, however, that it would not be difficult to accommodate her view within the present framework, given that powers, and so forms, are located in spacetime just like more ordinary parts of objects. So far as I can tell, the present theory modified in that direction would be consistent with the rest of what she says about form as well. Of course, I do not take consistency with other versions of hylomorphism to be a necessary condition on the adequacy of my own. But harmony with fellow travelers is nice when it can be found.

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