



# The Puzzles of Material Constitution

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## Abstract

Monists about material constitution typically argue that when Statue is materially constituted by Clay, Statue *is* just Clay. Pluralists about material constitution deny that constitution is identity: Statue *is not* just Clay. When Clay materially constitutes Statue, Clay *is not* identical to Statue. I discuss three familiar puzzles involving grounding, overdetermination and conceptual issues, and develop three new puzzles stemming from the connection between mereological composition and material constitution: a mereological puzzle, an asymmetry puzzle, and a structural puzzle.

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Consider a statue made of a piece of clay. Call the statue ‘Statue’ and the piece of clay ‘Clay’. Clay materially constitutes Statue. What is this relation? A standard way to ask this question is to ask whether Clay is strictly identical to Statue. Or is Clay numerically distinct from Statue? The more general way to ask the question is to ask what it means for an object to materially constitute another. Is constitution simply identity? If not, what are the features of this relation?

Some contemporary metaphysicians argue that material constitution is simply identity. In other words, when Statue is materially constituted by Clay, Statue just *is* Clay.<sup>1</sup> Fine (2003) calls this view *monism*. Others follow the lead of what seem to be intuitive judgments about the natures, essences, and sorts of objects and defend *pluralism* about material constitution, denying that constitution is identity. When Clay materially constitutes Statue, Clay *is not* identical to Statue.<sup>2</sup> After all, it seems as though Statue and Clay differ in their properties. Statue is essentially statue-shaped, but Clay is not. Clay could be shaped into a vase, but Statue would not persist through this change. Statue represents beauty and grace incarnate. Clay does not. If Statue and Clay do not share all of their properties, they cannot be identical, for if *a* and *b* are the same object, *a* has exactly the same properties as *b*.<sup>3</sup>

Why be a monist? Given the difference in properties, isn’t it just obvious that Statue cannot be identical to Clay? No, for monists can deny there are any real differences in essence or other properties. According to the monist, the seeming differences in essential and other properties are just differences in description. Statue is just Clay called by a different name, and considered with respect to a different context. Different contexts encourage different descriptions. We think of the object we call ‘Statue’ in such a way as to ascribe an essence that includes being statue-shaped and having representational properties of grace and beauty. But when we think of that very same object, albeit in a different way, we can call it ‘Clay’, ascribing it a different essence and different representational properties.

The most popular way to be a monist is to hold that essential and other sorts of properties that seem to differ between constituting and constituted object are only skin-deep, i.e., they are context dependent rather than observer-independent features of the world. So we see how the monist can defend her position. Another sort of monist might

endorse the objectivity of *de re* modal properties, but simply reject the claim that Statue and Clay actually differ with respect to such properties.

The defenses available to the monist require us to reject very natural ways of thinking about ordinary objects that, at least *prima facie*, seem like the right ways to think about them – so, again – why be a monist? For the purposes of this article, I will focus on the most popular version of monism, which holds that the modal and other differences are only skin-deep. Why is this view attractive? Two reasons. First, monists may be independently motivated to hold that *de re* modal properties (and any other seeming differences between Statue and Clay) are merely skin-deep. But second, and much more importantly, monists are driven by a deep desire for parsimony. They think the pluralist contention that the world is constructed largely from materially coinciding objects fills reality with layer upon layer of excess ontological fat. (See Bennett (2004) for discussion.)

The thought is that we need to take a leaner, meaner, and more sophisticated approach by re-thinking our way of considering objects related by constitution. One can make intuitive sense of monism about material constitution using an analogy. If we take the right intellectual perspective, we can see that Statue is just Clay, just as a picture is just an arrangement of pixels on paper.

A dot-matrix picture has global properties—it is symmetrical, it is cluttered, and whatnot—and yet all there is to the picture is dots and non-dots at each point of the matrix. The global properties are nothing but patterns in the dots.’ (Lewis 1986, p. 14)

Lewis is discussing the reductive supervenience of the picture on the arrangement of pixels; for him, reductive supervenience between particulars is just identity. Understood in terms of material constitution, the idea is that when Statue is constituted by Clay, Statue reductively supervenes on Clay, or equivalently, Statue just is Clay. One could explicate this by reasoning that Statue is nothing but the material of the clay arranged in a certain way at a certain time and Clay is nothing but the material of the clay arranged in a certain way at a certain time, so Statue must be identical to Clay. Seeming incompatibilities of properties are just the result of incompatibilities in perspective or description.

The pluralist argues that all this is a mistake. The monist, in an obsessive desire to reduce, is rejecting deep facts about the natures of objects. Monists, in effect, are taking objects to be mere hunks of matter devoid of essences and certain other observer-independent characteristics. Moreover, the pluralist argues, the monists’ assumption that we can simply restate or redescribe away differences in properties of objects like Statue and Clay does not fit well with natural language semantics. (For an objection along these lines, see Fine (2003); and for a reply defending monism, see King (2006).) In any case, pluralists claim that they have the more natural, intuitive view. According to the pluralist, we should use constitution to understand why persons are different from their bodies (they are constituted by their bodies), why art objects are not just bits of material arranged in a certain way (a statue can be made of junk yet worth millions) or even to explain how mental states are different from physical states (see Paul (forthcoming, 2007), Pereboom (2002), and Shoemaker (2007)).

But for pluralists to defend the idea that they have the more intuitive view, they must be able to flesh out our understanding of material constitution in a substantive way. What is it for one object to constitute another? It seems to involve the fact that the constituting object provides the material basis for the object it constitutes. Clay provides the material basis for Statue by providing the located matter that Statue is constructed from. As a result, Statue and Clay share many properties: because they share their matter and their location, they share their color and their size and many other instances of what we can call their

*material properties*. Statue and Clay also seem to share spatiotemporal parts, since they share their molecules and any smaller parts, and they may share some larger parts as well.

Pluralism raises several puzzles, only some of which have been recognized and addressed in the literature. The problems cannot be avoided by endorsing four-dimensionalism about persisting objects and then arguing that the Statue is a proper four-dimensional part of Clay, or some such. We can simply stipulate that Statue and Clay exist at exactly the same spatiotemporal locations: when Clay comes into existence, so does Statue, and when it is destroyed, so is Statue. Although there seem to be good reasons to deny that Statue is identical to Clay, pluralists need to provide in-depth explanations of the nature of material objects to maintain the plausibility of their view in the face of puzzlement.

The best known puzzles for pluralists are the *conceptual puzzle* and the *grounding puzzle*. The conceptual puzzle asks how we are to make conceptual sense of numerically distinct material objects sharing their matter and location.<sup>4</sup> In other words, how can we make conceptual sense of multiple material objects fully occupying the same place at the same time? Wouldn't the occupation of the space by one material object crowd out all others? For example, how can two statue-shaped material objects 'squeeze' into just one statue-shaped space at one time? The grounding puzzle asks how objects like Statue and Clay can differ in their modal, historical, and other properties, given that they share their matter, location, and material properties.<sup>5</sup> If all of the properties of Statue supervene on its matter, location, and material properties and the properties of Clay supervene on its matter, location, and material properties, and if all of Statue and Clay share their matter, location, and material properties, then why don't they share all of their properties?

Another puzzle for pluralists is the *overdetermination puzzle*.<sup>6</sup> The overdetermination puzzle arises when we consider the fact that Statue seems perfectly able to cause things in virtue of having certain material properties. For example, Statue's weight causes a crack in its pedestal. But it also seems that Clay's weight causes the crack in the pedestal. Now, it seems wrong to say that Statue's weight contributes only part of the force that causes the crack, while Clay's weight contributes the other part, especially when we stipulate that the crack is only as long and large as it would be if something that weighed just what Statue weighs had caused it. So Statue's weight is perfectly sufficient, under the laws, for the crack. But so is Clay's. Hence, Statue's weight and Clay's weight causally overdetermine the crack in the pedestal in a way that suggests that there is more causation than we need or want.

Fleshing out what exactly pluralism about constitution involves can solve these puzzles. The conceptual puzzle can be solved once we are clear about the way in which Statue and Clay are distinct and the way in which they are not. Statue and Clay are numerically distinct, that is, they are two rather than one. There exist two objects, Statue and Clay. But Statue and Clay are not mereologically distinct, since they share some of their parts: at the very least, they share their particles, since they share their matter. So the way in which Statue and Clay are distinct is that they are two, not one, yet they share their matter and material properties, so they are not entirely separate entities. Once we understand that Statue and Clay literally share a single hunk of matter and hence literally share their token material properties, the conceptual problem dissolves. The claim is not that there are somehow two interpenetrating material objects at the same location, but rather, that there is one hunk of matter, with coincident material objects sharing this hunk of matter. Coinciding material objects, such as Statue and Clay, overlap in the same region of spacetime and are constructed from something more than the mere matter they share.

(Perhaps, objects are constructed from their matter plus certain additional tokens of properties, such that Statue includes certain tokens of representational properties along with its matter in what it is, while Clay does not include these tokens of representational properties.)

Clarity about the proper sort of distinctness exhibited by Statue and Clay also resolves the overdetermination puzzle. Because Statue and Clay share their matter, they share their causally efficacious parts and their material properties. In our example with the cracked pedestal, it is Statue's matter having mass  $m$  that makes Statue a cause of the cracking of the pedestal. And it is also Clay's matter having mass  $m$  that makes Clay a cause of the cracking of the pedestal. Even more precisely, it is Statue's matter having an instance of the property of being mass  $m$  that makes Statue a cause of the cracking of the pedestal, and it is Clay's matter having an instance of the property of being mass  $m$  that makes Statue a cause of the cracking of the pedestal. But Statue and Clay literally share their matter, and so literally share this instance of being mass  $m$ . (If one endorses tropes, then one should hold that they share their mass trope.) We can retain this solution even if we think Statue's having an instance of being mass  $m$  and Clay's having an instance of being mass  $m$  are numerically distinct events, since these events would literally share the property instance that is causally efficacious. So there is no problem with overdetermination. Statue and Clay share the bit of matter that is causally responsible for the crack, so they share the property instance that is causally responsible for the crack, hence they share what is causally efficacious.

The grounding puzzle takes more work. Here, the puzzle is founded on the assumption that all of an object's properties supervene upon its matter, location, and material properties. In other words, all of Statue's properties supervene on what it shares with Clay, and all Clay's properties supervene on what it shares with Statue, namely, its matter, location, and material properties. So how could any of their properties differ? Or as it is sometimes put: What grounds the difference between Statue and Clay?

Those who wish to dismantle the grounding puzzle can attack it in at least two ways. First, they can deny the assumption that all of an object's properties supervene on what it shares with its constituting (or constituted) object. Call the shared matter, location, and material property instances the *material core*. Perhaps Statue has other fundamental property instances apart from its material property instances, and some of its differences from Clay are due to these property instances. Perhaps Clay has other fundamental property instances apart from its material property instances, and some of its differences from Statue are due to these property instances. For example, some modal property instances might be ontologically fundamental property instances that do not supervene on the material core. Perhaps, property instances of being a certain sort supervene on these modal property instances plus the material core. This is one way in which Statue could have different persistence property instances and belong to a different sort or category of object from Clay. (See, e.g., Wiggins (2001).)

The second way of attacking the problem, which is independent of the first way, is to deny that every object that shares a material core also has every property instances that supervenes on the core. One might hold that an object has only some of the property instances that supervene upon the core. The idea here is that when there is a material core there exist all of the instances of the properties that supervene upon it, but Statue is mereologically constructed from the material core it shares with Clay plus some but not all of the additional property instances that supervene upon their shared material core. Likewise, Clay is mereologically constructed from the material core it shares with Statue plus some but not all of the additional property instances that supervene upon the shared

material core. Moreover, some of the instances that construct Statue are not used to construct Clay, and (perhaps) *vice versa*. For development of this approach, see Paul (2006).

The conceptual, grounding, and overdetermination puzzles have received a significant amount of attention. But there are other, neglected puzzles that arise for both pluralism and monism, although the details of the puzzles differ slightly for each view. These puzzles do not have well-developed solutions.

One puzzle that has been recognized but needs more attention involves questions about part-whole relations and composition. For example, how is Clay related to the particles that compose it? And how is Statue related to the particles that compose it (i.e., Statue)? The composition relation is what makes a plurality of objects into a sum or whole of those objects. Presumably, the same particles are involved in composing both Statue and Clay. If one holds that composition is unique, such that the plurality of particles can only compose a single object at a time, this lends support to monism. On the other hand, the pluralist holds that even when Clay constitutes Statue, and Clay and Statue share their particles, they do not share all of their parts. For example, the part of Statue that is its head is not shared with Clay, and the part of Clay that is a head-shaped piece of clay is not shared with Statue. The matter is shared but the parts are not. Monism seems to be slurring over differences that need to be respected, and if Statue and Clay do not share all of their parts the uniqueness of composition is irrelevant. So the question arises: what is the mereology of the objects related by the constitution relation? Call this the *mereology puzzle* for constitution; some of its features have been discussed in the literature.<sup>7</sup>

Another sort of question, quite overlooked in the literature, derives from the asymmetry of the relation of material constitution: Clay constitutes Statue, and Statue does not constitute Clay. What is it about the ontology of material constitution that explains this asymmetry fact? Call this the *asymmetry puzzle*. The pluralist version of the asymmetry puzzle arises from the asymmetry of the constitution relation, and of asymmetries in the fundamentality of certain modal properties, asymmetries of properties of being of a particular sort, and asymmetries of certain spatiotemporal parts that are often associated with the material constitution of one object by another. The monist version of the asymmetry puzzle asks how the monist can explain the asymmetry of constitution given that strict identity is symmetrical. If constitution is just identity, then when Clay constitutes Statue it is simply identical to Statue. So Statue is identical to Clay. But Statue does not constitute Clay. The monist cannot simply revert back to differences of description without sounding *ad hoc*, especially since there do not seem to be any remotely natural contexts of description according to which Statue constitutes Clay. The monist could beg the question by forcing a context in which we describe Statue as identical to Clay and then say Statue constitutes Clay, but this is obviously a nonstarter.

Returning to the pluralist version of the puzzle, we can make the asymmetry worries present by considering the following series of questions. Why are Clay's essential properties such as *being material* or *being of  $x$  molecules* more fundamental than Statue's essential properties such as *being a representation of grace incarnate*? Why are things that fall under the (piece of) clay-sort more fundamental than things that fall under the statue-sort? Why are the spatiotemporal parts that Clay does not share with Statue, such as the head-shaped part of Clay, more fundamental than Statue's unshared parts, such as Statue's head? All of these questions revolve around the asymmetry of instances of the constitution relation.

We can see this once we realize that many of the questions about asymmetry are naturally answered, at least in the first instance, by positing some other difference arising from the asymmetry. For example, one might answer that Clay's unshared parts are more fundamental than Statue's because Clay's unshared parts materially constitute Statue's

unshared parts. We might explain the difference between objects of different sorts by appealing to a difference in essences such that the essences of objects belonging to the clay-sort are more fundamental than the essences of objects belonging to the statue-sort, which in turn is explained by the fact that Clay is the sort of thing that grounds, constitutes or provides the material basis for things like Statue. On the other hand, the asymmetry of material constitution might be explained by stipulating that the essence or sort of the constituted object is simply less fundamental than the essence or sort of the constituting object. At least one of these asymmetries needs to be taken as primitive or explained in some way outside of the circle. Speaking for myself, it seems most appealing to hold that the essences or sorts of some objects are more fundamental than others and take this to ground the other asymmetries.

The puzzle is especially pressing for the pluralist when we consider that, if objects are related by an asymmetrical nonreductive material constitution relation, this seems to ontologically entail that the world has an ascending hierarchy of ontological levels of some sort. The idea that there exist ontological layers, such that our world is a layered world, raises a number of questions about how to make sense of this possibility.<sup>8</sup> In what sense is the world layered, and how would this fit with (currently dominant) physicalist or anti-emergentist ontologies? Such levels and the relations between them need to be explicated and understood, not least because objects at different ontological levels seem to be ordered, i.e., constituting objects seem to be more fundamental – in some rather opaque ontological sense – than the objects they constitute. (The monist will want to understand the idea of a layered world in some suitably thin sense; see the discussion of the monist's version of the structural puzzle below.)

Reflecting on the asymmetry and mereology puzzles allows us to unearth yet another overlooked puzzle of material constitution for both the monist and the pluralist. One's mereological commitments involve metaphysical commitments (such as the view that composition is unique); how do these metaphysical commitments derived from one's mereology fit with the substantive metaphysical commitments required to take a stance on material constitution? The composition relation is a relation that holds between parts of a whole. The constitution relation is a relation where one object provides a material basis for another (perhaps simply by being identical to it). Since both relations are basic relations of object-building, that is, mereology builds from parts to wholes and constitution builds from material bases to (at least seemingly) higher level objects, how is an object built using both composition and constitution relations? How is an individual object structured mereologically as well as constitutively, i.e., how is it built from its parts while also being constituted by its material basis? How do pluralities sum to create larger objects while providing a material basis needed to constitute an object? Call the puzzle about how these ways of building are related the *structural* puzzle. It asks: how is the compositional structure of the world related to the constitutive structure of the world?

A natural thought, when trying to solve these puzzles for either the monist or the pluralist, is to think that the asymmetry puzzle, the mereology puzzle, and the structural puzzle are somehow related. Perhaps, once we understand the mereological facts we will have an explanation for the world's asymmetries and structure. Below, I will look at one way to make sense of compositional structure as connected to the debate about the nature of material constitution.

An obvious way to explore an account of the compositional structure of the world is to start with the account of different levels of science described by Oppenheim and Putnam (1958). In this classic article, they argue that the world as described and organized by science has multiple levels of objects ordered by the mereological relation of spatio-

temporal part to whole. Oppenheim and Putnam categorize and present the objects belonging to different levels this way:

- 6.....social groups
  - 5.....(multicellular) living things
  - 4.....cells
  - 3.....molecules
  - 2.....atoms
  - 1.....elementary particles.
- (1958, p. 409).

In Oppenheim and Putnam's model, sums of lower layer objects are identical to objects at higher layers and objects at higher layers are exhaustively (i.e., without remainder) decomposable into parts that are objects at lower layers. Any whole that is exhaustively decomposable into parts belonging to layer *L* is counted as also belonging to *L*, so objects at each layer include all objects at higher layers.

The thesis that there are such levels (even if they are not really organized quite as Oppenheim and Putnam described them) is widely accepted. Perhaps we can use this widely accepted thesis about a world of levels to solve the structural and asymmetry puzzles. If composition and constitution are related in the right ways, it might be that the way objects at lower levels are composing objects at higher levels explains the structure of constitution. For the pluralist, the compositional hierarchy might help to explain the notion of a constitutively layered world, and the asymmetry of composition (parts compose wholes but wholes do not compose parts) could explain the asymmetry of constitution. For the monist, understanding the compositional hierarchy will help to shed light on the structural question and may provide a suitably thin interpretation of how the world is layered. It might also lend motivational support to the monist's parsimonious approach.

A pluralist account based on Oppenheim and Putnam's theory of levels needs to be developed and revised if it is to have any hope of success. First, it would not do to simply cite their view that levels exist as widely accepted. This is because the Oppenheim–Putnam theory of levels is based on nomic equivalences and the construction of bridge laws between terms of theories of objects in different layers. Hence, the sorts of levels they defend and discuss are levels of scientific theory or explanation. They are not endorsing the existence of numerically distinct objects existing at numerically different layers of the world.

One might try to interpret the thesis of levels in science in ontological terms, and one might even think that this version of the thesis is also widely accepted. After all, it seems right to say that, in some sense, atoms are ontologically more basic than cells or persons. And Oppenheim and Putnam did claim that the levels were organized mereologically. But the implications of such an ontological view are neither as simple nor as straightforward – nor as uncontroversial – as one might think. Moreover, the view could be understood differently depending on whether one prefers monism or pluralism.

Let us look more closely. At least in the first instance, a seemingly uncontroversial way to understand the idea that there exists a hierarchy of ontological levels of science is to hold that higher levels just correspond to different ways of organizing and summing lower level objects. Lower level objects are the proper parts of higher level objects, and things belong to different levels in virtue of what they have as their parts. Particles are parts of molecules, molecules are parts of cells, cells are parts of bodies, and so on. Such

an interpretation can apply the Lewisian account of reductive supervenience discussed above, where a picture is just an arrangement of colored pixels on paper, to the composition of all objects, big and small.

This reductive view of composition echoes (but is not the same as) monism about constitution. Understood in this context, objects at higher levels of science composed by lower level objects simply reductively supervene on arrangements of objects at lower levels. In most cases, the objects at higher levels will be larger than those at lower levels, and so the higher level objects will supervene on patterns of smaller lower level objects.

This position might seem to be uncontroversial, methodologically clean, parsimonious, and appealing. Of course, it does not lend much support to the pluralist, since if objects at higher levels simply reduce to arrangements of objects at lower levels, there is no ontological basis for fundamental constitutive differences. But it looks like it should appeal to the monist: the compositional structure and the constitutional structure are both reduced to ways of arranging or describing a single-layered world. It is worth noting that the monist does not need to worry about the possibility of ‘infinitely descending’ levels, since these would just be descending levels of description or arrangement. There is just one ontological level: the level of what there is.

But matters are more complicated. The position just described is extremely vague about what is being assumed about reductions to arrangements or patterns of objects and whether or how composition generates ontological levels of some sort. Different ways of understanding the facts about composition generate at least three ways of understanding what the interpretation of levels of science involves. Each of these ways involves taking a particular stance on how or whether larger objects at higher levels are composed of smaller objects at lower levels. (Hence, we connect to a version of the mereology puzzle.) Once we sort this out, we shall see that each approach to the composition of higher objects by lower objects is controversial in its own way, and that the cards do not stack up so obviously in favor of the monist. Both the monist and the pluralist need to address these issues to resolve the structural puzzle.

The first way, and arguably the simplest and cleanest way, to understand the reductionist view is to endorse *compositional nihilism*, i.e., to deny that there is any relation of composition.<sup>9</sup> On this view, strictly speaking, there are no levels, and so no higher level objects. There are just simples (noncomposite objects) arranged in different ways. When we pick out an object such as Statue, we are merely picking out some simples arranged in a certain Statue-way. Nihilism is clean and parsimonious, but it is deeply at odds with common sense and with many philosophical views. Hence it is controversial.

Given their general ontological skepticism, many nihilists will simply deny that material constitution exists, although a nihilist could hold that simples arranged Clay-wise constitute, in some sense, simples arranged Statue-wise. If monists are inclined to accept compositional nihilism, this would seem to be an attractive option for them. The pluralist who accepts compositional nihilism needs to develop an account of how simples arranged Clay-wise can provide the material basis for simples arranged Statue-wise. Such a pluralist might have trouble reconciling the meager ontological resources permitted by the nihilist with a solution to the asymmetry problem.

A second way of understanding levels holds that higher level objects are composed of lower level objects, taking the composition relation to be the identity relation.<sup>10</sup> So composition is identity. (Note that this is distinct from the view that *constitution* is identity.) Here, I take identity to be strict, or ordinary, identity. On this view, the sum is identical to the plurality of objects that compose it. This view is controversial because it allows



identity to be a many–one relation: the many (the plurality of lower level objects) is identical to the one (the sum of these lower level objects). Normally, strict identity is taken to be a one–one relation that is reflexive, symmetric, and transitive.

The pluralist may be particularly skeptical of the view that composition is identity, since it seems to entail that objects with different essences are identical: the plurality is surely essentially a plurality of many things, while the sum is essentially one thing. In any case, the view does not seem to help pluralists, since it is unclear how it provides them with an ontological hierarchy of levels that can support nonreductive constitution and asymmetry facts. If composition is identity, there are no ontological levels. Instead, there are different ways to describe the same thing – either as a plurality of small objects or as a larger object that is the sum of the smaller objects. Hence, the only help the view can give to pluralists is to suggest that there are nonreductive and asymmetrical facts about descriptions of objects. Monists, however, as with nihilism, will find this view attractive – provided they can accept and explain the controversial view that composition is strict identity.

A third way of understanding the levels view is to deny that composition is identity, holding that the sum of lower level objects is not identical to the plurality. Rather, it is analogous to identity. Lewis (1991) calls this view ‘composition *as* identity’. The claim is that composition is analogous to identity, perhaps so much so that it can be called ‘identity’ according to some broad definition where ‘identity’ picks out a class of similar relations including strict identity as well as composition.<sup>11</sup> Lower level objects compose numerically higher level objects, yet the higher level composites only add to the ontology in some very minimal way.

There are good questions one can ask about just how the sums do and do not add to one’s ontology. If sums exist but are not identical to pluralities, then the stock of objects in the world has increased. There are more essences: there is the essence of the sum, which is distinct from the essences of the pluralities. Moreover, one might make the case that composition as identity allows for causal overdetermination, since both the sum and the plurality seem to be eligible to be causes of an effect. Merricks (2001) develops this line of thought.<sup>12</sup> So the ontology of the world has been added to, no matter how ‘analogous’ composition is to identity. This granted, the ontological addition is in some sense minimal, as it is not the addition of entirely distinct objects: the sums are constructed from the parts, and so no new *stuff* has been added. The only increase is in the number of objects, not in the amount or kind of material that objects are made of. This way of understanding the view makes sense. But if the defender of constitution as analogous to identity takes the addition to ontology to somehow be even more minimal than this, the view is deeply obscure.

How does composition as analogous to identity shake down for monists and pluralists? The view is less controversial than the more reductionist strategies just discussed. If one is prepared to admit that there is a sense in which ontology increases with composition, then this treatment of composition is understandable and is consistent with the logic of strict identity. (Of course, if one claims without explanation that there is no contribution to ontology when composition is merely analogous to strict identity, then we are back in the realm of mystery. Let us set any such claim aside.)

Given the clarity of this view of composition, monists might prefer to endorse this treatment of composition over its more reductive competitors, since it could be used to give an answer to the monist’s versions of the structural and asymmetry puzzles. But there is a serious methodological problem for the monist: the very consequence that the monist explicitly accepts here, that it is acceptable to admit minimal ontological additions when

constructing objects, is precisely what she rejects in the constitution debate. The strongest point in the monist's defense of her treatment of constitution is that it is exceedingly parsimonious: there is no addition to the ontology of the world when constructing objects via constitution. But if the monist grants composition as identity, then she grants additions to ontology elsewhere in similar circumstances. Moreover, the ontological additions are very similar: on composition as merely analogous to identity, multiple material objects can occupy the very same place and time and share the same matter. For example, the plurality of parts of Statue and Statue itself are both material, wholly occupy the very same place and time, and share the very same matter.

The situation is somewhat better for the pluralist. He might also find composition as analogous to identity more attractive than the more controversial reductive options. Perhaps he can use the view to hold that ontological levels in the actual world are generated by the composition of smaller objects into larger ones and explain the existence of the hierarchy of compositional levels.

But explaining the hierarchy of composition does not obviously help the pluralist to explain the structure of constitution and its asymmetry. The trouble is that the compositional levels, even if they are nonreductive in some sense and support the asymmetry of composition, do not correspond to the layers of constituting and constituted objects. What level is Clay at? What about Statue? They seem to be at different levels, but not at levels directly related by composition. (This is also a problem for the monist, who will presumably try to explain it away as an artifact of descriptive perspective.) It is not right to simply hold that Clay is at some lower compositional level than Statue, since Clay is neither a proper part of Statue nor a plurality that composes Statue. If we defend the inelegant view that Clay is simply a proper spatiotemporal part of Statue, we need to reject the classical way of individuating parts in terms of their material and location, since Statue and Clay share their material and location. On the other hand, very small parts of Clay (at least the particle-sized ones) do seem to be proper parts of Statue. What really seems to be going on is that some particle-sized parts compose Clay, and then Clay constitutes Statue. The particle-sized parts of Clay also seem to be involved somehow in the composition of Statue.<sup>13</sup>

Perhaps our newfound clarity about the structure of compositional levels can help us develop the overall structure of the pluralist's world. Focus on the structure we have so far: some particles compose some proper parts of Clay, and these parts in turn constitute some parts of Statue. Also, all the parts of Clay compose Clay and all the parts of Statue compose Statue.<sup>14</sup> We can now see the outline of a possible pluralist structure: multiple hierarchies of compositional levels, with parallel hierarchies connected by constitution. Pluralities compose parts of Clay, which compose Clay, which constitutes Statue. Some or all of the parts of Clay also constitute parts of Statue.

Now the pluralist has at least given some detail about how the layered world is structured and how it fits with the compositional account of the world, and how to address the mereology puzzle. Maybe she can even address the asymmetry puzzle. Here is a tentative suggestion. Perhaps she can hold that the asymmetry of constitution derives from the fact that Clay's (larger) parts are obtained directly, via composition, rather than indirectly via composition and then constitution, like Statue's parts are.<sup>15</sup> The assumption the pluralist can then defend is that composition is ontologically more fundamental than constitution. If this is defensible, since Clay is merely the product of composition while Statue is not, it is more fundamental than Statue, which explains the asymmetry. There is more than a whiff of circularity here. Perhaps another way to ground the asymmetry is to hold that Clay holds onto its particles more tightly than Statue, since what it is, is just

a sum. Clay's particle-sized parts are more essential to it than to Statue (Statue can survive the loss of a particle while Clay cannot). Other asymmetries of essence follow (something like this idea is discussed in Thomson (1983)). This view seems to take certain asymmetries of essence as given, but perhaps this sort of ontological assumption would be more palatable once the structure of the pluralist's world has been developed. It is not clear to me what the overall prospects are for either suggestion. In any case, there are outstanding structural, asymmetry, and mereology puzzles for both the monist and pluralist about material constitution.

### Short Biography

L. A. Paul received her PhD from Princeton in 1999. She specializes in metaphysics and the philosophy of mind, with a special emphasis on the nature of objects, mereology, causation, and modality. She is presently an Associate Professor at the University of North Carolina at Chapel Hill.

### Notes

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<sup>1</sup> See, for example, Noonan (1988, 1992), Lewis (1986), Gibbard (1975), Heller (1990), Robinson (1982), and Wasserman (2002, 2004).

<sup>2</sup> See, for example, Baker (1997), Doepke (1982, 1996), Fine (2003), Forbes (1987), Johnston (1992), Koslicki (2004), Kripke (1971), Lowe (1995, 2003), Paul (2006, 2007), Oderberg (1996), Shoemaker (1999, 2003), Simons (1987), Thomson (1998), Wiggins (2001), and Yablo (1987).

<sup>3</sup> There are other views I will not address here. Some adopt more complex treatments, and some reject the principle of the indiscernibility of identicals. See Rea (1997); especially his Introduction, and Wasserman (2009) for nice discussions of some of these variants.

<sup>4</sup> Lewis (1986), Zimmerman (1995), Bennett (2004).

<sup>5</sup> See Zimmerman (1995), Olson (2001), Bennett (2004), Heller (1990), pp. 30–2, Oderberg (1996), p. 158, and Simons (1987).

<sup>6</sup> Paul (2007).

<sup>7</sup> See, for example, Fine (1999), Johnston (1992), Levey (1997), Lowe (1998), Paul (2006), Simons (2000), and Thomson (1983). McDaniel (forthcoming) has an excellent discussion of mereological issues in general and of some applications to the problem of constitution.

<sup>8</sup> For related discussion, see Schaffer (2003) and Paul (2007).

<sup>9</sup> Rosen and Cian (2002) discuss this view of composition.

<sup>10</sup> Baxter (1988a,b).

<sup>11</sup> Lewis (1991), p. 84.

<sup>12</sup> I am indebted to a reviewer from *Philosophy Compass* for the points about essence and overdetermination.

<sup>13</sup> Paul (2006) discusses the relationship between parthood and constitution in great detail.

<sup>14</sup> I am glossing some complexities here. Strictly speaking, according to the pluralist, the fact that parts of Clay are composed from particles does not necessarily mean that the parts of Clay are merely hunks of amodal matter. See Paul (2006) for discussion.

<sup>15</sup> 'Fundamental particles' are not the fundamental bits of the world, see Malament (1996).

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