"PERFECTLY UNDERSTOOD, UNPROBLEMATIC, AND CERTAIN": LEWIS ON MEREOLOGY
For Blackwell Companion to David Lewis, edited by Barry Loewer and Jonathan Schaffer
Karen Bennett

1. Four Theses About Composition

David Lewis famously takes mereology "to be perfectly understood, unproblematic, and certain" (1991, 75). It is central to his thought, appearing in his discussions of set theory, modality, vagueness, structural universals, and elsewhere. He held views not only about how composition works and when it occurs, but also about the role of mereology in philosophy. In this essay, I will proceed by articulating four theses that Lewis holds about composition. (I would call them the four U's, if only 'unguilty' were a word!) Three of them are familiar; Lewis himself explicitly articulates and relies upon them. The fourth remains implicit, but it is nonetheless important. Here they are:

> Composition is *unique*—the same things cannot have two different fusions.
> Composition is *unrestricted*—any two things whatsoever have a fusion.
> Composition is *ontologically innocent*—composed entities do not "count" beyond
>   their parts.
> Composition is *unmysterious*—it is not problematic to treat it as primitive, and
>   can function in demystifying explanations.

I will devote a section to each thesis: explaining what it says, pointing to the texts that illustrate that Lewis believes it, and explaining why Lewis believes it. These sections are largely expository. But woven in between them are interstitial sections in which I reflect upon further questions that arise, and draw further lessons.

Two preliminary caveats. First, I will often talk of 'things' or 'objects' either having parts or being parts of something else. This is not meant to suggest that only concrete physical objects stand in the parthood relation. Lewis allows that things that do not occupy space and time can also do so (1991, 75), and I will follow him in this. My choice of words is just that—a choice of words, intended to be neutral about just what kinds of things can be part of others.

Second, the four theses around which this piece is structured do not exhaust Lewis' claims about mereology. He also believes, for example, that parthood is transitive (e.g. 1991, 74) and that atomless gunk—entities all of whose parts have proper parts—is possible (e.g. 1986a, 30; 1991, 20-21). I have simply chosen the four theses because they are particularly interesting and revealing.

2. First Thesis: Uniqueness

The claim that composition is unique is the claim that if some entities compose something, they compose exactly *one* thing. You can never build two distinct composites out of the same parts. That is, sameness of parts is sufficient for identity: if x and y have the same parts, then 'they' are identical. And although Lewis only explicitly mentions and relies upon that conditional (1986a, 36; 1991, 74, 78, 100), the converse is guaranteed by Leibniz's Law. Indeed, in formal mereology, the idea is usually expressed as a biconditional, called the extensionality of proper parthood: any items that have proper parts at all are identical just in case they have all the same proper parts.

Uniqueness (or extensionality) is a powerful claim. It entails, for example, that the very same parts cannot compose both a lump of clay and a distinct statue. Consequently, those who believe that constitution is not identity either deny extensionality (e.g. Baker 2002) or else claim that, *contra* appearances, coincident entities are not composed of exactly the same parts after all (e.g. Koslicki 2008).

Lewis uses the label 'uniqueness' and explicitly endorses the thesis in *Parts of Classes* (1991, 74). It is important to his treatment of set theory in terms of mereology and the relation of singleton formation; for more detail, see Burgess, this volume. But another important appeal to the uniqueness of composition occurs in his dispute with David Armstrong over the nature and existence of structural universals.

Armstrong believes that properties are universals, wholly located in each of their instances, and that some universals are structural. A structural universal is a universal such that anything that instantiates it does so in virtue of the fact that its *parts* instantiate other universals, relational and otherwise. To see the idea here, consider a methane molecule: it consists of four hydrogen atoms bonded to a carbon atom in a particular way. On Armstrong's view, the universal *methane* itself is structured in a way that echoes the compositional structure of each particular methane molecule.

Lewis is deeply suspicious of structural universals (1986a). For present purposes, all that matters is his criticism of what he calls the 'pictorial conception' of structural universals, by analogy with what he calls 'pictorial ersatzism' about possible worlds (1986c, 165-174). On this line, a structural universal is literally composed of other universals; they have other universals as parts. Lewis argues:

Each methane molecule has not one hydrogen atom but four. So if the structural universal *methane* is to be an isomorph of the molecules that are its instances, it must have the universal *hydrogen* as a part not just once, but four times over. Likewise for *bonded*, since each molecule has four bonded pairs of atoms. But what can it mean for something to have a part four times over? What are there four of? There are not four of the universal *hydrogen*, or of the universal *bonded*; there is only one (1986a, 34).

The clear hidden premise here is uniqueness (see also 1986b, 92). Without it, the three universals *hydrogen*, *carbon* and *bonded* could compose any number of structural universals—all of the vast array of hydrocarbons. But *with* it, they can compose only the straightforward mereological fusion of the three simpler universals. (For an alternative mereology that allows things to have parts twice over, see my 2013.)

Armstrong's reaction to Lewis is interesting. Initially, he not only denies the principle that two distinct things cannot be composed of the same parts, but claims to *counterexample* it (1986a). He points out that the state of affairs of John's loving Mary is not the same as the state of affairs of Mary's loving John, despite the fact that they have the same three constituents (John, Mary, and the *loving* relation). States of affairs, he says, violate uniqueness just as structural universals do. He therefore suggests not just that Lewis is wrong, but that he has in fact begged the question against him (85).

Later, however, under Lewis' "benign prodding" (1988, 312), he came to agree that neither states of affairs nor structural universals are literally composed of parts at all. Instead, he claims their constituents make them up in a different way, by means of a *sui generis* relation of "non-mereological composition" (1988, 1997). That is, Armstrong first claims that ordinary composition violates uniqueness, and later backs down to the claim that there are *other* generative relations that do. Yet he never explains why he changed his mind; in fact, neither he nor Lewis ever acknowledges the shift at all. And they both take it for granted that the later move is better (though Lewis remains mystified, of course; 1986b, 92).

This sheds some light, I think, on the question of why Lewis believes that composition obeys uniqueness in the first place. Lewis does not *argue* against the claim that distinct things can be composed of the same parts; he simply calls it "unintelligible" (1986a, 36). Clearly, part of his implicit motivation is that he wants mereology to echo set theory. But equally clearly, part of it is that he honestly does find the denial of uniqueness unintelligible. That is, he takes uniqueness to be true as a piece of *conceptual analysis*. Just as nothing can count as a square

3

unless it has four right angles, nothing can count as parthood or composition if it does not obey uniqueness. This explains his apparent thought that Armstrong simply *must* be appealing to some other relation. He can call it whatever he likes, but it isn't composition. I will return to this point in section 4.

3. Second Thesis: Unrestricted Composition

The claim that composition is unrestricted is the claim that any things whatsoever have a fusion. It—or, at least, the claim that it is necessary that composition is unrestricted—entails that it is not possible for there to be only two things. If *a* exists and *b* exists, there is guaranteed to be some *c* that they compose. This entails that there is a fusion of, say, this chair, the moon, and a tree in Madagascar. Combined with Lewis' eternalism, it also entails that there are cross-time sums—go ahead and add Abraham Lincoln or a woolly mammoth to that previous fusion. Combined with Lewis' perdurantism, it also entails that there are cross-time sums of instantaneous temporal parts—there is an object composed of alternating temporal parts of you and that woolly mammoth. Combined with Lewis' modal realism, it entails that there are transworld sums—there is an object composed of any one of the previous fusions plus a flying pig. Finally, since Lewis sees no reason to restrict composition to concrete objects (1986a, 212n9; 1991, 7), it also entails that there is something composed of any of the previous fusions plus the number 7. We don't *talk* about most of these weird entities, of course; we implicitly restrict our quantifiers to range over more ordinary things. But they exist nonetheless, in just the way that you and I do. We must acknowledge the strange fusions when we speak with our "quantifiers wide open" (1991, 80; see also 1986c, 2-3).

Lewis endorses unrestricted composition in both *On the Plurality of Worlds* (1986c, 211) and *Parts of Classes* (1991, 74). He relies upon it to characterize set theory (1991, 101) and to argue that counterpart theory can be reformulated in terms of transworld individuals (1986c, 213-217). So why does he believe it? Partly because he sees no good reason to deny it (1991, 19), partly because it preserves the analogy between set theory and mereology, but mostly on the basis of what has come to be known as the "argument from vagueness" (1986c, 212-213; 1991, 80-81).

Suppose composition is restricted "in accordance with our intuitions about this-worldly cases" (1986c, 212)—suppose, for example, that there are chairs, but not chair-moon fusions.

4

But Lewis claims that any way of restricting composition so all and only "ordinary" composites exist will be hopelessly vague. There won't be a sharp line between cases where composition occurs and cases where it does not:

> it's not on to say that somewhere we get just enough contrast with the surroundings, just enough cohesion… to cross a threshold and permit composition to take place, though if the candidate class had been just a little worse it would have been sumless (212).

But if it is vague just how cohesive (for example) some things have to be to compose something, then it is vague when composition occurs. And if composition is vague, then so is *existence*. That is, if it is vague whether *a* and *b* compose anything, it is vague whether *there is* a thing that they compose—i.e. it is vague whether that composite exists. But that, says Lewis, cannot be; "the only intelligible account of vagueness locates it in our thought and language… vagueness is semantic indecision" (212). Lewis' example here is the outback. There is no determinate answer to the question, "where exactly does the outback begin?" But, according to Lewis, that is not because

> there's this thing, the outback, with imprecise borders; rather there are many things, with different borders, and nobody has been fool enough to try to enforce one of them as the referent of the word 'outback' (212).

In short, working backwards: there are no vague objects, which entails that existence is not vague, which entails that composition is not vague, which entails that composition is not restricted in any way. Lewis' claim is that only the large ontology generated by unrestricted composition enables a coherent treatment of vagueness.

For more careful discussion of the argument from vagueness, and an extension of the argument to justify four-dimensionalism, see Sider 2001, chapter 4 §9. For recent defense of the idea that there *can* be indeterminacy 'out in the world', rather than in our thought and language, see Barnes and Williams 2011. For a classic book-length defense of an alternative to unrestricted composition—and careful articulation of the 'special composition question' to which it is an answer—see van Inwagen 1990.

4. First Reflection: Motivating Mereological Principles

Notice that Lewis believes uniqueness and unrestricted composition for very different reasons. He has a substantive philosophical argument for unrestricted composition—the argument from vagueness. But, as I noted in section 2, he says little to nothing about why he

believes uniqueness. It certainly appears that he believes it largely on the basis of conceptual analysis—reflection on the notion of composition is supposed to reveal that the same entities can only compose one whole.

This difference is worth noting, and not just as a piece of Lewis scholarship. After all, both theses are valid in classical extensional mereology. (Unrestricted composition is an axiom; the extensionality of parthood is a theorem that follows from two axioms: anti-symmetry and strong supplementation.) So there is a question, independent of Lewis, of *why* they are valid in that formal system—that is, of why principles that validate them have been chosen as axioms. I do not mean this as a history-of-philosophy question about the intentions of people like Lesniewski or Leonard and Goodman; I mean it as a question about why they are *usually* taken as axioms, about why a system that does so is widely accepted, or at least very familiar.

The answer to this question is that there is no across-the-board answer to this question. Lewis is not alone in having different motivations for the principles; his doing so simply echoes a more general fact that reveals something about the nature and point of formal mereology.

Formal mereology is a somewhat odd beast. It is in part simply a codification of our ordinary notions of parthood and composition—just conceptual analysis in fancy, symbolic garb. But that is not all it is. Conceptual analysis plausibly secures the antisymmetry of parthood, and that it obeys weak supplementation. It is somewhat less plausible to claim that conceptual analysis secures the uniqueness of composition. But conceptual analysis clearly does *not* secure the hotly disputed claim of unrestricted composition. That is a substantive and controversial claim about what exists, not guaranteed by the meanings of terms like 'part' and 'compose'.

In short, mereological systems do not simply make analytic claims about the nature of parthood, but also reflect other philosophical commitments and purposes. Consequently, both in Lewis and more broadly, different principles can be motivated in quite different ways—and are therefore susceptible to quite different sorts of challenges.

5. Second Reflection: Persistence

Regardless of how they are motivated, the first two theses might appear to generate odd consequences about persistence. One such consequence apparently follows from uniqueness alone; another apparently follows from uniqueness and unrestricted composition taken in conjunction.

First, the putative consequence of uniqueness alone—it appears to entail mereological essentialism, the claim that composites cannot survive the gain or loss of parts. Here is the rough train of thought. According to uniqueness, sameness of parts is necessary for identity. Thus in order for a composite x at time t_1 to be identical to composite y at t_2, x at t_1 and y at t_2 must have exactly the same parts—i.e., x must have all the same parts at t_2 as at t_1.

Second, the putative consequence of uniqueness and unrestricted composition taken together—they appear to entail that no composite object can be destroyed unless at least some of its parts are destroyed as well. Here's why. Suppose I smash a cup to smithereens with a hammer. Well, the smithereens still exist, so by unrestricted composition they still compose something. That is, there is a thing composed of exactly the same parts that once composed the cup. Since uniqueness says that sameness of parts is sufficient for identity, it follows that the cup is identical to that scattered thing. That renders my smashing rather ineffective; I didn't destroy the cup, but only spread it out over a larger spatial region. In short, uniqueness and unrestricted composition together seem to entail that if an object is composed of the xxs, it exists whenever the xxs do, no matter what the relations among the xxs.

Both of these arguments are too quick; both putative consequences can be blocked. The key point is that there is no direct entailment from the mereological theses to any claims about how composites persist through change. Any such entailment depends upon background views about the nature of time and persistence.

For example, an eternalist perdurantist—like Lewis himself (see Hawley, this volume)—has replies to both arguments. Suppose in particular a version of the view according to which persisting objects are space-time 'worms' (as opposed to the stage view of Hawley 2001, Sider 2001)—cross-time composites of momentary time-slices, which are themselves composed of spatial parts. On this view, an ordinary persisting composite like a cup has three kinds of parts that are worth distinguishing. First, the cup has *spatial parts*. Many of these, like electrons, are persisting entities, themselves composite space-time worms. Second, the cup has *temporal parts*—time-slices that exist only for one moment. Third, the cup has spatially smaller momentary parts, which could equally well be characterized as temporal parts of spatial parts or as spatial parts of temporal parts. (Consider a proper part p of a temporal part t of the cup. Since t has no proper temporal parts of its own, p must be a momentary entity, spatially smaller than the cup. It is a (non-persisting) spatial part of the temporal part of the cup; it is also a temporal

part of some (persisting) spatial part of the cup, like an electron.)

Given this picture, an ordinary composite object like a cup can perfectly well have different spatial parts at different times. For the cup to have an electron as a part until t, and then not have it thereafter, is for it to have *part* of the space-time worm that is the electron as a part. It is for the cup's temporal parts up until t, and only until t, to have the electron's temporal parts until t as parts. This does not violate uniqueness. To see this, consider a temporal part x of the cup from the interval when the cup has the electron as a part, and a temporal part y of the cup from the interval when the cup does not have the electron as a part. Those short-lived entities x and y have different parts, and uniqueness entails that *they* are distinct. But that is not at all the same as saying that the cup goes out of existence when it loses the electron. The cup is a temporally extended entity that has a (temporal) part composed of some things, and another (temporal) part composed of some other things; this does not violate uniqueness any more than does the fact that my elbow has different parts than my knee.

A similar move blocks the apparent commitment to the claim that composite objects survive the massive rearrangement of their parts. Suppose that at t_2 I smash the cup into smithereens. Each smithereen itself persists through time, and therefore has temporal parts of its own. Call the t_1 time slices of the smithereens the *xxs*. Call the t_2 time slices of the smithereens the *yys*. Unrestricted composition entails that at t_1, the *xxs* compose a temporally unextended spatially unified entity y; it also entails that at t_2 the *yys* compose a temporally unextended scattered object z. It further entails (given the eternalism currently being assumed) that there is a cross-time composite c of which both y and z are parts. However, neither unrestricted composition nor uniqueness entail that y is identical to z—y and z are momentary time-slices, not persisting entities—nor that c is the *cup*. The cup is not identical to c; it has y, but not z, as a part. The cup ceases to exist when it is smashed.

Now, there are two important points to notice about these perdurantist replies. First, they deny neither that fusions have their parts essentially (on that, see Uzquiano ms), nor that fusions exist whenever their parts do, regardless of how those parts are arranged. The perdurantist rather claims that ordinary objects are fusions of temporal parts rather than merely of spatial ones. As a consequence—this is the second point—these replies do not touch the related worries that ordinary persisting objects have their *temporal* parts essentially (see van Inwagen 1981) and are guaranteed to exist if their *temporal* parts do. If desired, these modal worries can be blocked

with additional machinery; Lewis himself would invoke counterpart theory here. (See Beebee and Ismael's contributions to this volume for more detail.)

What about endurantism? Endurantists think that objects persist through time by being wholly present at each moment at which they exist, and therefore take the persistence of a composite across time to involve the strict numerical identity of a composite that exists at one time with a composite that exists at another. Matters are more complicated here, and I will not go into great detail. Suffice it to note that, first, the concern about mereological essentialism is just an instance of a broader question the endurantist faces about how to reconcile Leibniz's Law with *any* change over time. (See Lewis 1986c, 202-204 for an initial statement of the problem; 1988 for further discussion; Haslanger 1989 for an endurantist solution.) Many endurantists will index property instantiation—or the possession of parts—to a time. One way to do this is to say that the cup has-at-t_1 the *xx*s as parts, and has-at-t_2 the *yy*s as parts. What about the second concern, about whether uniqueness and unrestricted composition entail that the cup exists as long as its parts do, no matter how scattered? The endurantist who accepts uniqueness and unrestricted composition does appear to be committed to the claim that the spatially unified object *y* that fuses the smithereens at t_1 persists as the spatially scattered object *z* that fuses the smithereens at t_2. Perhaps there is room for her to deny that ordinary objects like cups are mereological fusions of spatial parts. Unlike the perdurantist, however, this requires her to deny that they are mereological fusions *at all*, and thus leaves her with the question of what they are instead.

I obviously do not intend to resolve these issues here. I make only the following two claims in this section. First, uniqueness *alone* does not entail mereological essentialism, and the combination of uniqueness and unrestricted composition *alone* does not entail that composite objects persist through all kinds of rearrangement and separation of their parts. Deriving any such claims requires supplementing the mereological principles with claims about how persistence itself works. Second, on Lewis' own views about time and persistence (and modality), the problematic consequences do not follow.

For more on Lewis' views of time and persistence, see Hawley, this volume. See Varzi 2010 §3.2 for general discussion of what uniqueness (extensionality) does and does not entail.

6. Third Thesis: Ontological Innocence

Many people dislike Lewis' second thesis, unrestricted composition, because it entails that so very many things exist. But Lewis thinks this is a completely wrong-headed reaction:

> Given a prior commitment to cats, say, a commitment to cat-fusions is not a *further* commitment. The fusion is nothing over and above the cats that compose it. It just *is* them. They just *are* it. Take them together or take them separately, the cats are the same portion of Reality either way… If you draw up an inventory of Reality according to your scheme of things, it would be double counting to list the cats and then also list their fusion… The new commitment is redundant, given the old one (1991, 81-82).

This is the third thesis: composition is *ontologically innocent*. This thesis would, if true, assuage the worry that accepting unrestricted composition leads to a bloated ontology. But *is* it true? Why exactly should we think so?

If Lewis' claim were that the fusion is *literally identical* to the cats that compose it, he would clearly be entitled to ontological innocence. After all, a thing is "nothing over and above" *itself*, and should not be entered on the inventory of Reality twice. But, despite his evocative language in the above passage, that is not exactly his claim. Although Lewis endorses what he calls the "thesis of Composition as Identity" (1991, 82), he does not mean that composition *is* identity, that they are the very same relation. He rather intends the much weaker claim that composition is "strikingly analogous" (84) to identity. Indeed, Lewis explicitly denies the stronger claim (84n12; see also 87). By doing so, he avoids certain difficult questions—for example, how a relation that holds many-one can be reflexive, or obey Leibniz's Law. But there are plenty of other questions that do arise. In particular, in what does the striking analogy between composition and identity consist? And how does that analogy support the thesis of ontological innocence?

Those questions are tricky because they are interwoven. On the one hand, Lewis seems to suggest that Composition as Identity *justifies* the thesis of ontological innocence: he says that "it is *in virtue of* [Composition as Identity] that composition is ontologically innocent" (82, italics mine). But, on the other hand, he also says that innocence is part of the *content* of Composition as Identity—it is one of five "aspects of the analogy" that Lewis lays out. Here are those five aspects (1991, 85-86):

1. Both composition and identity are *ontologically innocent*. If $x=y$, y is not an ontological commitment beyond x; similarly, if the xxs compose y, y is not an ontological commitment beyond x.
2. Both composition and identity are *automatic*. No special conditions beyond

the existence of *x* must be met in order to guarantee the existence of a *y* identical to *x*; similarly, given unrestricted composition, no special conditions beyond the existence of the *xx*s must be met in order to guarantee the existence of a *y* composed of the *xx*s.

3. Both composition and identity are *unique*. No *x* can be identical to more than one thing; similarly, no *xx*s can compose more than one thing.

4. Both composition and identity involve *property inheritance*. Each *x*'s properties supervene (trivially) on *x*'s properties, intrinsic and relational. Similarly, each *x*'s properties supervene on the properties of its parts, intrinsic and relational. (Lewis's own rough characterization of the fourth analogy (85) makes it sound as though he thinks that both identity and composition obey Leibniz's Law: as though he thinks that the properties of a thing are the very same as the properties of its parts. My more plausible version reflects the fact that he denies this a few pages later (87).)

5. Both composition and identity *block multi-location*. Each *x* is located exactly where it itself is; similarly, each *x* is located exactly where its parts are.

Yet even setting aside aspect 1, the thesis of ontological innocence that is the topic of this section, this is a somewhat odd list. The entries do not all have the same status. Two of them—aspects 2 and 3—are Lewis' controversial theses of unrestricted composition and uniqueness. As we have seen, he discusses these at some length throughout his work, and feels at least some obligation to defend them. In contrast, two of them—aspects 4 and 5—are fairly uncontroversial and not really in need of argument. They are interesting phenomena that can legitimately be taken as data; it is hard to deny that composites inherit their properties and locations from those of their parts. Yet although these phenomena may not need to be defended, they do need to be explained. *Why* do composites inherit their properties and locations from their parts? Here, again, we would have an answer if composition literally *is* identity. But, again, we do not obviously have an answer given the weaker claim that composition is merely *like* identity. In fact—and this is the important point—we certainly do not have an answer in light of the fact that property inheritance and the ban on multi-location are given as part of what it *means* to say that composition is like identity. It would be circular to 'explain' those phenomena in terms of composition as identity.

Now, back to ontological innocence. Like the second and third aspects of the analogy, and unlike the fourth and fifth, this is an extremely controversial thesis that requires defense (e.g. van Inwagen 1994, Merricks 2001). Yet like the fourth and fifth aspects, including it as part of the content of the analogy itself undermines the usefulness of the analogy. If the analogy between composition and identity partially consists of the claim that composition is ontologically

innocent, the analogy cannot also justify the claim that composition is ontologically innocent.

So Lewis' famous discussion in *Parts of Classes* does not actually provide any argument at all for ontological innocence. Still, though, there are two arguments for ontological innocence that he could have given but did not—two non-circular arguments that are close enough to what he says that they may have been at least in the ballpark of what he intended.

First, Lewis could have argued that composition is like identity in certain respects *other than* ontological innocence, argued that those similarities justify extending the analogy, and concluded that composition is like identity in that it generates no new ontological commitments. This would be a classic argument by analogy. I do not know whether such an argument can be made compelling; I merely point out that it involves a highly nontrivial step that Lewis does not take in *Parts of Classes*.

Second, he could have defended the ontological innocence of composition *without appeal* to the thesis of Composition as Identity. Indeed, the natural beginnings of an argument can be found in the thesis of unrestricted composition, and Lewis' idea that it makes composition "automatic". If composition always occurs—if any two or more things have a fusion—then the existence of the *xx*s guarantees the existence of their fusion. No further conditions need to obtain; nothing more needs to happen for that fusion to exist. But if nothing more needs to happen for the fusion to exist, then the fusion is nothing over and above the *xx*s. Now, that last sentence contains the obvious gap in the argument, and I admit that I am not sure how to fill it. Again, however, doing so is Lewis' task, not mine. (Note that several people accept the converse of this argument-sketch—i.e., the claim that Composition as Identity entails unrestricted composition. See Sider 2007, though see Cameron 2012 for some pushback.)

Additional reading suggestions: Lewis explicitly states that he is following Donald Baxter 1988a, b. See Sider 2007 for detailed discussion of various composition as identity theses of varying strength. For a contemporary collection, see the forthcoming volume edited by Baxter and Cotnoir. For a non-Lewisian explication of the idea that some things—not just composites—are "nothing over and above" other things, see chapter 7 of my forthcoming.

7. Fourth Thesis: Unmysteriousness

The fourth and final thesis is one that Lewis never explicitly articulates or defends, but which he clearly believes: composition is *unmysterious*. It is unmysterious in (at least) the

following two senses:

1. Composite entities are exactly as mysterious as their parts—no more.
2. No analysis of the composition relation in other terms is either forthcoming or required.

A few remarks about each are in order.

The key idea behind the first aspect of unmysteriousness is that the composition relation adds no further mystery to the things it acts upon. This falls out of ontological innocence, or perhaps the thesis of Composition as Identity more broadly. If a composite is nothing extra, nothing beyond its parts—if it just *is* the parts—then how *could* a composite be problematic if its parts are not? All composition does is wrap many into one. Note that this train of thought yields a strategy for rehabilitating *prima facie* dodgy entities: argue that they are composed of unmysterious parts, parts that the skeptic already accepts. A central example here would be Lewis' account of possible worlds. Don't fret about them, he seems to say; they are just fusions of more-or-less ordinary things, albeit causally and spatio-temporally isolated from us (1986c, 1-3; 69-71).

Lewis's commitment to the second aspect of unmysteriousness can be read off the fact that he neither offers an analysis of composition, nor even expresses worry that he hasn't got one. Indeed, I cannot think of anywhere that he discusses the issue at all. (Contrast van Inwagen's discussion of the "general composition question" (1990, chapter 4).) Of course, he claims to know a great deal about how composition *behaves*: it obeys uniqueness, unrestricted composition… etc. That is presumably why he claims that it is "perfectly understood" (1991, 75). Still, though, a list of rules that composition obeys is not an account of what composition *is*. (Compare the standard format of formal mereological systems: they introduce a primitive mereological predicate (parthood, proper parthood, or overlap), and then introduce axioms that govern how the predicate can be used.)

Both aspects of the fourth thesis can be illuminated by comparing Lewis' attitude towards composites and the composition relation to his attitude towards singleton sets and the relation of singleton formation. According to Lewis, singletons are "mysterious" (1991, §2.1) and, as for "the generation of unit sets from their members… God knows what it is" (1986a, 37). Set theory can't do without singletons, unfortunately, and mathematics can't do without set theory. So Lewis accepts singleton formation as a primitive relation (though he also presents a structuralist alternative), but he clearly would have been happier if he could have reconstructed set theory

purely in comfortable, easy, mereological terms (1991, preface, §2.8).

So what is supposed to be so bad about singletons and singleton formation? Perhaps the best summary is Lewis' imaginative description of a student trying to grasp the idea:

> he has no elements or objects… to be 'combined' or 'collected' or 'gathered together' into one… Rather, he has just one single thing, the element, and he has another single thing, the singleton, and nothing he was told gives him the slightest guidance about what that one thing has to do with the other (1991, 30).

The complaint begins, then, with the fact that singleton formation is one-one, not many-one. Whatever it does, it does not simply wrap many into one (30, 41). Singletons sets are "atoms" (31), not entities with the original entities as parts. Indeed, singletons are "wholly distinct from the familiar individuals" that are their members (31, 41). This means two things. First, we know very little about what these singletons are like—they are wholly new entities magically zapped into existence. Second, the relation of singleton formation is not ontologically innocent (also 87). Indeed, we know almost as little about the relation as we do about the entities it generates: all we know is that it is not ontologically innocent, and it is not intrinsic (34). Now contrast composites and composition. No mysteries there, according to Lewis; all composition does is take us from plural to singular. The crucial difference, note, is the putative ontological innocence of composition. Composites are *not* wholly distinct from their parts, so we do know as much about their nature as we know about the nature of the parts.

Does this difference really hold up? One way to challenge it would be to argue that singleton formation is not mysterious after all. The other way to challenge it would be to argue that composition is not as… wholesome as Lewis thinks. This would perhaps be a good time to remember that Lewis offers no real argument for the ontological innocence of composition. Further, it is at best questionable to demystify composition by means of the claim that composites are "nothing over and above" their parts when that phrase cannot be interpreted as meaning "numerically identical to".

8. Fourth Reflection: Privileging Mereology

The discussion thus far—both mine and Lewis'—makes it sound as though Lewis acknowledges exactly two generative relations. He embraces composition, will tolerate singleton formation, and wants no truck with anything else, like Armstrong's non-mereological composition. Yet this is not accurate. Non-causal uses of 'because' and 'in virtue of' are

liberally sprinkled throughout his work, and he heavily relies on supervenience. (This prompts an interesting question: what would Lewis have thought of the currently popular view, largely due to Kit Fine (1994) (though see also McLaughlin and Bennett 2011 §3.5), that 'in virtue of' cannot be explicated in terms of modal notions like supervenience? Here is one passage that might provide a clue about his possible reaction: "'first' we have individuals, and the classes come 'later'. In some sense" (1991, 9).) Even restricting my attention to supervenience yields plenty of familiar examples:

> Among worlds with no alien natural properties, mental properties supervene on
>   physical ones (1983, 208-212).
> Internal relations supervene on the intrinsic natures of their relata (1986c, 62).
> Representation *de re* supervenes on qualitative character (1986c, 221).
> *Everything* supervenes on the worldwide distribution of intrinsic properties over
>   space-time points (1986d, ix; 1994, 473.)

What should we make of such claims?

They clearly involve the idea that one kind of property, relation, or entity gives rise to or generates another, less fundamental kind. (Again, supervenience alone does not entail any such thing (see McLaughlin and Bennett 2011, §3.5), but it is indisputably what Lewis intends.) Yet they equally clearly do not invoke composition; Lewis is not saying that mental properties have physical properties *as parts*, nor that internal relations are *made of* the intrinsic properties of their relata. So they are in some sense generative, but not mereological. Rather like singleton formation. Why is supervenience kosher when singleton formation is not?

In fact, supervenience seems to share some of the features that worry Lewis about singleton formation. It is not always many-one; consider the case of materialism. Even in cases where that description can at least sort of be pressed into service—internal relations arguably 'wrap' the intrinsic features of multiple entities into a single relation—it is not the case that the supervening features 'gather together' the subvening features in anything like a compositional sense. What about ontological innocence? The 'nothing over and above' terminology is tempting here, and widely used by others if not by Lewis (see McLaughlin and Bennett 2011, §3.4). However, it again does not mean numerical identity, so the issue remains open for further discussion.

The questions here are these: is there a broader class of generative relations—what I elsewhere call 'building relations' (ms)—that includes composition among others? If so, what makes a relation count as a member of that class? Why exactly does Lewis take some generative

relations to be more respectable than others? Is he right to do so? Lewis did so much to deepen our understanding of composition and its usefulness; I wish he had turned his formidable mind to these broader questions as well.

Armstrong, David. 1986. In defence of structural universals. *Australasian Journal of Philosophy* 64: 85-88.

———. 1988. Are quantities relations? A reply to Bigelow and Pargetter. *Philosophical Studies* 54: 305-316.

———. 1997. *A World of States of Affairs*. Cambridge, UK: Cambridge University Press.

Baker, Lynne. 2002. Replies to critics. *Philosophy and Phenomenological Research* 64: 623-635.

Barnes, Elizabeth, and Williams, J. Robert G. 2011. A theory of metaphysical indeterminacy. In K. Bennett and D. Zimmerman, eds., *Oxford Studies in Metaphysics*, Volume 6. Oxford: Oxford University Press: 103-148.

Baxter, Donald. 1988a. Identity in the loose and popular sense. *Mind* 97: 575-582.

——. 1988b. Many-one identity. *Philosophical Papers* 17: 193-216.

Baxter, Donald, and Cotnoir, Aaron, eds. Forthcoming. *Composition as Identity*. Under contract with Oxford University Press.

Beebee, Helen. This volume. xxx

Bennett, Karen. 2013. Having a part twice over. *Australasian Journal of Philosophy* 91: 83-103.

——. Forthcoming. *Making Things Up.* Under contract with Oxford University Press.

Burgess, John. This volume. Lewis on mereology and set theory.

Cameron, Ross. 2012. Composition as identity does not settle the special composition question. *Philosophy and Phenomenological Research* 84: 531-554.

Fine, Kit. 1994. Essence and modality. *Philosophical Perspectives* 8: 1-16.

Haslanger, Sally. 1989. Endurance and temporary intrinsics. *Analysis* 49: 119-125.

Hawley, Katherine. 2001. *How Things Persist*. Oxford University Press.

——. This volume. David Lewis on persistence.

——. 2010. Mereology, modality, and magic. *Australasian Journal of Philosophy* 88: 117 – 133.

Ismael, Jenann. This volume. xxxxx

Koslicki, Kathrin. 2008. *The Structure of Objects*. Oxford: Oxford University Press.

Lewis, David. 1983. New work for a theory of universals. *Australasian Journal of Philosophy* 61: 343-377.

——. 1986a. Against structural universals. *Australasian Journal of Philosophy* 64: 25-46.

——. 1986b. A comment on Armstrong and Forrest. *The Australasian Journal of Philosophy* 64: 92-93.

——. 1986c. *On the Plurality of Worlds*. Oxford: Blackwell.

——. 1986d. *Philosophical Papers Volume II.* Oxford: Oxford University Press.

———. 1988. Rearrangement of particles: Reply to Lowe. *Analysis* 48: 65-72.

———. 1991. *Parts of Classes*. Oxford: Blackwell.

———. 1993. Mathematics is megethology. Reprinted (1998) in *Papers in Philosophical Logic*. Cambridge: Cambridge University Press, 203-230.

———. 1994. Humean supervenience debugged. *Mind* 103: 473-490.

McLaughlin, Brian, and Bennett, Karen. 2011. Supervenience. In Edward N. Zalta, ed., *The Stanford Encyclopedia of Philosophy (Winter 2011 Edition)*. Available online at <http://plato.stanford.edu/archives/win2011/entries/supervenience/>.

Merricks, Trenton. 2001. *Objects and Persons*. Oxford: Oxford University Press.

Sider, Theodore. 2001. *Four Dimensionalism*. Oxford: Oxford University Press.

———. 2007. Parthood. *Philosophical Review* 116: 51-91.

Simons, Peter. 1987. *Parts: A Study in Ontology*. Oxford: Oxford University Press.

Uzquiano Cruz, Gabriel. ms. Parthood, identity, and modality.

Varzi, Achille. 2010. Mereology. In Edward N. Zalta, ed., *The Stanford Encyclopedia of Philosophy (Spring 2010 Edition)*. Available online at <http://plato.stanford.edu/archives/spr2010/entries/mereology/>.

van Inwagen, Peter. 1981. The doctrine of arbitrary undetached parts. *Pacific Philosophical Quarterly* 62:123-137.

———. 1990. *Material Beings*. Ithaca: Cornell University Press.