

## Mereological Nominalism

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# Mereological Nominalism

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ABSTRACT: Mereological nominalism is the thesis that properties are identical to fusions of their instances. Long ignored, this paper argues that it's a plausible ontology of properties. Whilst not everyone will accept it, it's going to appeal to many philosophers and (at the least) should no longer be relegated to the annals of the history of metaphysics.<sup>1</sup>

Motivations for believing in properties ('reifying motivations') include: explaining genuine resemblance [Armstrong 1978*a*, 1989; see also Oliver 1996: 52-54]; explaining predication [Oliver 1996: 49-51]; explaining the laws of nature [Armstrong 1983; Dretske 1977; Tooley 1977, 1987]; because they are needed to be constituents of other things [Armstrong 2010: 11]; and because they play a useful role in ontological reductions (e.g. to numbers or possible worlds [Forrest 1986]). I assume throughout that some reifying motivation holds. Mereological nominalism is one theory which can satisfy such motivations. Its core commitment is:

PROPERTIES ARE INSTANCE FUSIONS: Every property is a fusion of its instances.<sup>2</sup>

For instance, *Charge* would be a fusion of all charged things and *Republican* a fusion of all Republicans.

Mereological nominalism is so niche that it has been accused of having no defenders at all [Leftow 2011: 91], which is almost true. It has only one explicit defender (namely Zemach [1982]) plus a smattering of oblique support: Boethius's *De Divisione* says sympathetic things [Erismann 2007: 219]; Chinese language may reflect it [Mou 1999]; and it's not a million miles away from some understandings of the Hegelian 'concrete universal' [Rojek 2008: 365-6, 373-76].<sup>3</sup> This paper argues that mereological nominalism has been unjustly ignored and that it should appeal to a good number of philosophers who already accept a reifying motivation, particularly courting those who are nevertheless tempted by nominalism e.g. Quine (who started off as a nominalist [Goodman and Quine 1947] before losing his resolve and accepting classes on the grounds, at least partially, of having to reify properties [Quine 1940: 120]) and van Inwagen (a realist who is quite clear he'd aspire to a nominalist ontology if only it were achievable [2011: 400]).

Just as there are many different realist and class nominalist theories, there are many different mereological nominalist theories. Rather than discussing a specific version of mereological nominalism, this paper discusses numerous different versions, advancing the case for at least one mereological nominalist theory being better than whatever non-mereological nominalist theory you might currently accept. §1 explains mereological nominalism's appeal whilst the rest of the paper responds to the problems facing mereological nominalism. Some problems are solved by

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<sup>2</sup>  $x$  is a fusion of the  $y$ s  $\equiv_{df}$  each  $y$  is a part of  $x$  and no part of  $x$  fails to overlap a  $y$ .

<sup>3</sup> Although Hegel himself probably didn't believe it [Giladi 2014: 743, 748*n*7; Stern 2007].

endorsing contentious, but nonetheless popular, principles e.g. ‘multi-thingism’ (the thesis that, say, statues/lumps are distinct things). Other problems are solved by taking the theory of properties you otherwise would think were best and then showing that, if that theory is acceptable, there’s also an attractive mereological nominalist theory which avoids whatever problem was mooted. I consider four competing theories: vanilla realism, which takes the instantiation relation between universals and instances as primitive (§2); constituent realism, whereby universals are metaphysical constituents of their instances (§3); state realism, whereby there are states of affairs which objects and universals are co-constituents of (§4); and class nominalism, whereby properties are identified with classes (§5). (I ignore trope theory both because of space constraints and because tropes are reified property *instances*, rather than shareable properties, and instances alone may not meet the demands of the reifying motivation(s).) Not everyone should think mereological nominalism is better than their currently accepted theory—that much I admit. However, by the end of this paper I show that the mereological nominalist need say nothing so preposterous that it should be considered—as it has been thus far—utterly implausible. This more limited conclusion is enough to pull mereological nominalism out of the dustbin that it’s been consigned to since Armstrong’s *Universals and Scientific Realism*.

## 1. Motivations

### 1.1 The Promise of the Desert Landscape

Nominalism is a broad church with members varying from ‘weak’ nominalists, who only want an ontology without abstracta, to ‘strong’ nominalists wanting an ontology consisting solely of material objects [*cf* Melia 2007: 99-100]. Reified properties will likely offend all varieties of nominalism since properties are generally thought of as being abstract [*cf* Moreland 1996: 133]—exceptions might be made for those who believe immanent universals are concrete, although even immanent realism will grate the nerves of those with stronger nominalist convictions. Mereological nominalism manages to reify properties without necessarily rubbing against nominalism. Of course, mereological nominalism does not *guarantee* a nominalist ontology. For instance, PROPERTIES ARE INSTANCE FUSIONS is consistent with there being an ontology containing Platonic numbers (and arithmetical properties being fusions of those Platonic things). However, it *allows* for a purely nominalist ontology which includes properties—just as long as all non-properties are concrete, non-abstract, material things, then nominalism can be squared with a reifying motivation. Indeed, mereological nominalism looks to be the *only* theory which can do this (and so the only theory which will satisfy dually accepting both nominalism and a reifying motivation, as Quine and van Inwagen do).

### 1.2 Ontological Parsimony

Mereological nominalism may also appeal to some on the grounds of ontological parsimony. There are two types of ontological parsimony: Quantitative and qualitative. The former is the easiest to grasp: Theory *T* is quantitatively parsimonious compared to *T\** iff fewer things exist according to *T* than according to *T\**. Having assumed that there are properties, the imaginary interlocutor will believe there are *n* of them and then add that there are *m* non-properties as well. And so were the interlocutor to instead endorse mereological nominalism, they’d reduce their theory from *n+m* things to *m* things. Parsimony achieved!

Consider three problems with this argument.

Problem one: PROPERTIES ARE INSTANCE FUSIONS demands a liberal principle of composition e.g. mereological universalism (i.e., where ‘Fu( $\gamma$ s)’ stands for the fusion of the  $\gamma$ s,  $\forall \gamma s \exists x(x = \text{Fu}(\gamma s))$ ). If the interlocutor doesn’t already believe composition is liberal, then the mereological nominalist’s theory might well be less parsimonious.

Response: Admittedly, were the interlocutor to not believe universalism I’d have a problem. But given I only plan to demonstrate that mereological nominalism is a legitimate contender for the correct ontology of properties, it’s enough that mereological universalism is widely accepted [Effingham 2009*b*: 300] for this motive to be noteworthy.

Problem two: If the interlocutor’s theory committed to an infinite number of non-properties, reducing properties to instance fusions will leave them with an infinite number of things. We couldn’t then say that one theory had ‘fewer’ entities than the other.

Response: We should, quite apart from anything to do with mereological nominalism, buttress our understanding of parsimony, saying, e.g., that theory  $T$  is more parsimonious than  $T^*$  if  $T$  commits to a proper subset of those entities committed to by  $T^*$  [Nolan 1997]. That’d leave mereological nominalism being the more parsimonious theory.<sup>4</sup>

Problem three: The argument is not entirely general since it won’t work against the class nominalist. We only reduce the ontology from  $n+m$  things to  $m$  things because the realist’s abstracta are obviously superfluous and dispensable once properties turn out be instance-fusions. The same doesn’t apply to class nominalism for classes play a role other than in the identification of properties e.g. their indispensability to mathematics. So the mereological nominalist will nevertheless need to include classes in their ontology—at best, their ontology will be as parsimonious, not more parsimonious, than the class nominalist’s.

Response: The worst-case scenario is that the motive of ontological parsimony is denied to those mereological nominalists seeking class nominalist converts. The best-case scenario is that the mereological nominalist includes numbers or classes by reducing them to properties. For instance, one might reduce numbers to: Millian properties of aggregates [Irvine 2010; Kitcher 1998]; relations [Kessler 1980]; properties of pluralities [Seidel 1984; Yi 1999]; or relational monadic properties [Armstrong and Forrest 1987]. Alternatively, classes might be reduced to properties: Bigelow [1988: 105-9; 1990] identifies classes with essences of pluralities; Bealer [1981: 352; 1982: esp. 111-118] identifies them with abstracted properties;<sup>5</sup> mereological nominalists friendly to states of affairs could use Armstrong’s reductive scheme

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<sup>4</sup> Just as long as, e.g., the interlocutor’s theory already contained the fusions that the mereological nominalist was going to identify properties with.

<sup>5</sup> Bealer aims to mimic von Neumann’s identification scheme (i.e.  $0 = \emptyset$ ,  $1 = \{\emptyset\}$ ,  $2 = \{\emptyset, \{\emptyset\}\}$  etc.). He replaces  $\emptyset$  with a property necessarily having the extension it has. Bealer uses the property of something being such that there’s something distinct from itself (call that ‘ $\xi$ ’). Bealer then identifies 1 with the property of being such that something is identical to  $\xi$  i.e.  $\lambda x[x = \xi]$ . He continues in that vein:  $2 = \lambda y[y = [\lambda x[x = \xi]]]$ ,  $3 = \lambda z[z = [\lambda y[y = [\lambda x[x = \xi]]]]]$  etc. (Thanks to Robbie Williams for bringing Bealer to my attention and Nicholas Jones for helping me understand him.)  $\xi$  is uninstantiated, so this won’t work for mereological nominalism. However, an alternative property with a necessary extension is the property of being identical to the world—call it ‘ $\omega$ ’—for, whilst the world’s contents may vary (even unto nothing), the world itself nevertheless necessarily exists. The Bealer construction can then be carried out:  $0 = \omega$ ;  $1 = \lambda x[x = \omega]$ ;  $2 = \lambda y[y = [\lambda x[x = \omega]]]$ ,  $3 = \lambda z[z = [\lambda y[y = [\lambda x[x = \omega]]]]]$  etc.

[2004a: 112-24]. So the mereological nominalist has a lot of options even when squaring off against class nominalism.

So mereological nominalism (likely) offers a quantitatively parsimonious ontology. But this only motivates mereological nominalism if quantitative parsimony is a theoretical virtue and it's oft characterised as being the poor cousin of qualitative parsimony (at best) or simply pointless (at worst) [*cf* Lewis 1973: 87]. This paper is not the place to offer a thoroughgoing defence of quantitative parsimony as a theoretical virtue—it is enough for now for me to say that I side with those who think that it is virtuous [Nolan 1997; Jansson and Tallant 2017].

An associated, and more pressing, worry is that quantitative parsimony might be virtuous only when it secures fewer *fundamental* entities [Schaffer 2015]—that is, fewer entities whose existence have no further metaphysical explanation. It is less obvious that mereological nominalism can secure fewer fundamental entities. Whether it can or not partially depends upon whether the original reifying motivation demands that properties are fundamental. Some motivations might require properties to be fundamental (e.g. if properties are needed for reducing worlds or numbers to them, or if they are needed to be constituents of things, then there's some reason to believe at least some properties will end up being fundamental) whilst others may not (certainly, some reify properties without thinking they are fundamental e.g. class nominalists who ground properties in their members, or Armstrong who says universals and particulars are grounded in the states of affairs which they constitute [Armstrong 1980: 447; 2010: 27]).

If the theory mereological nominalism compares itself to says at least some properties are fundamental—which I suspect is the realist's position—and the accepted reifying motivations don't demand that properties are fundamental, mereological nominalism will be more parsimonious when it comes to fundamental things. If instance-fusions are derivative (i.e. their existence has a metaphysical explanation), mereological nominalism can meet the reifying motivations whilst including fewer fundamental entities than the competing theory. On the other hand, if the reifying motivation requires properties to be fundamental, the mereological nominalist will have to say that some instance-fusions are fundamental<sup>6</sup> and thereby they won't have fewer fundamental entities—mereological nominalism would be only as parsimonious as, not more parsimonious than, the competing theory.

In short: If you treat the quantitative parsimony of fundamental things as a theoretical virtue, mereological nominalism's attractiveness depends upon the details of the reifying motivation. If it doesn't demand that properties are fundamental, mereological nominalism will prove attractive compared to realist theories which take properties to be fundamental. If it does demand it, mereological nominalism won't prove attractive—although it won't be *unattractive* on those grounds, either.

Next, turn to the quagmire which is qualitative parsimony. A qualitatively parsimonious theory is one with a paucity of basic ontological categories. Using **bold face** to name categories, one facet of the quagmire is determining which categories are 'ontological'. For instance, why are

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<sup>6</sup> This means, contrary to commonly held intuitions, that some composites wouldn't be derivative. That's not necessarily a bad thing. For instance, Barnes [2012] argues that composites needn't be derivative (and lists examples of fundamental composites [2012: 886-89]). And one can also rely on the argument from §3.2: Constituents, not mereological parts, metaphysically explain the existence of the constituttee, thus allowing for fundamental composites.

**Particular**, **Possible World**, and **Number** thought to be ontological categories whilst **Chicken**, **Liars**, and **Mortgage Advisor** are not? [cf Daly 2010: 143-46; Melia 1992; Schaffer 2015: 646] This is a problem independent of mereological nominalism, so imagine it is somehow resolved. The next problematic facet is how to understand ‘basic’. I suggest a category is non-basic when it’s reducible, endorsing:

REDUCTION: Category **C** is reducible to ontological category **C\*** (or ontological categories **C<sub>1</sub>\***, **C<sub>2</sub>\***...) iff **C** is a subset of **C\*** (or a union of subsets of **C<sub>1</sub>\***, **C<sub>2</sub>\***...).

For instance, in Lewis’s [1973, 1986] modal realism, **Possible World** is reducible to **Region** (and so **Possible World** isn’t basic) because **Possible World** is a subset of **Region**.

With REDUCTION in place, compare mereological nominalism to a theory according to which **Property** is basic (a commitment which I assume most realists accept). Given REDUCTION, mereological nominalism will arguably be qualitatively parsimonious. Assume that: (i) some things fall in a basic category other than **Property**; (ii) instance-fusions aren’t in an ontological category of their own (e.g. fusions of objects are objects, fusions of arithmetical things are arithmetical things, etc.). Given (i), the imagined interlocutor believes **Property** is one of multiple basic ontological categories. Were they to instead accept mereological nominalism then every member of **Property** would be an instance-fusion which, given (ii), then falls within one of those other ontological categories—given REDUCTION, it follows that **Property** wouldn’t be basic and mereological nominalism would offer qualitative parsimony.

This argument won’t convince everyone. Some realists are ‘extreme realists’ who believe that only properties are fundamental and that everything else is built from them [Borghini 2012; Carmichael 2016; Dasgupta 2009; Paul 2002, 2012; van Cleve 1985]—presumably, (i) would be false and **Property** would be the sole basic category. Similarly, class nominalists say properties are derivative (since they’re grounded in their members) and will presumably deny that **Property** is basic (since it’s a sub-category of **Class**); in that case, **Property** being non-basic according to mereological nominalism is no big whoop. These are all good points, but it’s still the case that there are sensible, extant interlocutors who don’t believe these things e.g. ‘moderate’ realists who believe that **Property** is one basic category amongst many.

So whether ontological parsimony is a motivation depends upon what theory we are comparing it to and what type of parsimony we have in mind. If we weight mere quantitative parsimony, mereological nominalism is parsimonious (except, perhaps, if we compare it to class nominalism). If we weight parsimony only of fundamental entities, mereological nominalism is only more parsimonious if (i) we compare it to realist theories according to which some properties are fundamental and (ii) the reifying motivations we accept don’t need properties to be fundamental. Finally, if we are interested in qualitative parsimony, it’ll appeal only if we compare it to moderate realism, not extreme realism or class nominalism. In short: Parsimony is a motivation in some cases, but not all.

### 1.3 Theoretical Explanation

Mereological nominalism can explain various other metaphysical principles. Consider three examples.

*Example One:* PROPERTIES ARE INSTANCE FUSIONS straightforwardly explains Armstrong’s ‘Instantiation Principle’ [Armstrong 1989: 75] that only instantiated properties exist.

*Example Two:* It explains why properties are located. Given mereological nominalism, their being located simply follows from the readily acknowledged principle that material objects are located where their parts are.<sup>7</sup> Were properties instead universals, we must add in an extra principle saying that properties are located as a matter of brute fact or that things with instances are located where their instances are. No matter the details, that's theoretically more complex.

*Example Three:* 'Ostrich worlds' are identical to the actual world (i.e. have the same objects, same events, same arrangement of matter throughout spacetime etc.) except that properties don't exist at them. If you're committed to the existence of properties, you'll presumably deny that such worlds are possible. Given a common assumption about composition—that what composes what else is a matter of metaphysical necessity—mereological nominalism straightforwardly explains the impossibility of ostrich worlds, for such worlds would need the fusions which are properties to be 'stripped away', which clearly contradicts that assumption. Admittedly, alternative explanations of the impossibility of ostrich worlds exist: perhaps 'existing as a part of' a world is to be distinguished from how a property 'exists from the standpoint of' a world [Lewis 1983*b*: 39-40] and only parts of worlds can be freely recombined; perhaps the Humean principle of recombination can be caveated to avoid ostrich worries [Cameron 2008]; perhaps it should be entirely replaced by a non-Humean principle [Hofmann 2006]. Whilst these are fine options for explaining why ostrich worlds are impossible, it's hard to deny that the mereological nominalist's explanation is the more straightforward one.

#### 1.4 Theoretical Unification

Mereological nominalism will appeal to those who believe properties are located and who endorse one or more of the following:

HARMONY: The mereological structure of spatial regions mirrors the mereological structure of things exactly occupying those regions [Uzquiano 2011].

SUBREGION PARTHOOD:  $x$  exactly occupies a region partially occupied by  $y$  iff  $x$  is a proper part of  $y$  [Markosian 2014: 73*n*12].

PERDURANCE: Things persist through interval  $T$  in virtue of having distinct temporal parts at every instant during  $T$  [*cf* Effingham 2012: 188-89].

Universals/classes don't have proper parts thus, were they located, those principles would be false.<sup>8</sup> HARMONY must be restricted such that only the mereological structure of regions and objects mirror one another; properties would not be in harmony. Those attracted by SUBREGION PARTHOOD and PERDURANTISM must apply similar restrictions: properties exactly occupy extended regions without having parts and would persist without having temporal parts. This makes for a disunified theory of reality where facts about mereology/persistence are disjunctive.

Not so if mereological nominalism were true. Properties would have material parts which can: mirror the regions which objects occupy; exactly occupy subregions the property partially occupies; turn out to be temporal parts in virtue of which a property persists. Mereological

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<sup>7</sup> Note, though, that it's not an entirely uncontentious principle [Sucedo 2011].

<sup>8</sup> And even if they do have proper parts (for instance, classes having their subclasses as proper parts [Lewis 1991]) those parts clearly can't play the appropriate role in those principles.

nominalism can elegantly unify one's metaphysical theory of spatiotemporally located entities in a way that realism and class nominalism cannot.

## 2. Compared to Vanilla Realism

§1 discussed what makes mereological nominalism attractive. But extant discussions of mereological nominalism tend not to question its virtues, instead focussing on its vices by mounting allegedly damning objections. The rest of this paper makes the case that these objections are unsuccessful.

In §1.2 I pursued the strategy of assuming that (given a reifying motivation) there's some theory—that is, some variety of realism or class nominalism—which my imaginary interlocutor currently takes to be best. Each section of the rest of this paper continues that theme, comparing example competing theories to a version of mereological nominalism which is roughly on a par (or better) than the theory it's being compared to. That in place, I explain how the mereological nominalist comparator can avoid the main objections to mereological nominalism.

### 2.1 The Armstrong-Quine Objection

The infamous worry for mereological nominalism is the Armstrong-Quine objection [Armstrong 1978*b*: 34-35; Quine 1950: 624]. Say that '\_\_\_instantiates\_\_\_' relates a property and its instance ('instantiates' is therefore neutral as to whether realism is true or not). The Armstrong-Quine objection assumes that mereological nominalists analyse instantiation mereologically:

INSTANTIATION IS MEREOLOGICAL:  $x$  instantiates  $F_{ness}$  iff  $x$  is a proper part of  $F_{ness}$ .

The objection is simple: The right-hand side of the bi-conditional leads to absurdity. An electron which is part of Donald Trump is, given the transitivity of parthood, a part of the fusion of all Republicans i.e. a part of the property *Republican*. Given INSTANTIATION IS MEREOLOGICAL that electron must itself, absurdly, be a Republican. Conclusion: Mereological nominalism is false.

The solution is easy: Deny INSTANTIATION IS MEREOLOGICAL. To see how we might set about denying it, it's time to detail the first theory we're comparing mereological nominalism to. Vanilla realism says that realism is true (i.e. **Property** is basic) plus:

INSTANTIATION IS PRIMITIVE: There is no informative analysis of '\_\_\_instantiates\_\_\_'. It is a primitive relation which holds as a matter of brute fact between instances and their properties [Armstrong 1989: 108].

Assume the imaginary interlocutor currently believes vanilla realism. If that's the case, it's hard to see why the mereological nominalist theory we compare to it cannot simply co-opt the realist's ideology. Where the vanilla realist thinks that there's an extra primitive of instantiation, the mereological nominalist can say likewise—after all, it'd be churlish to think realists can corral a



primitive off just for themselves. In that case, some objects (i.e. instances) stand in a primitive instantiation relation to some other object (i.e. a property).<sup>9</sup>

This co-option strategy inflates the mereological nominalist's ideology. Vanilla realism's ideological stock consists only of instantiation; the mereological nominalist co-option needs both instantiation and, since it features in PROPERTIES ARE INSTANCE FUSIONS, a mereological primitive (e.g. proper parthood). It'll be ideologically worse off than vanilla realism. Ideological parsimony comes in two types: quantitative parsimony concerns the *number* of primitives; qualitative parsimony concerns the number of ideological categories. In having two primitives it's quantitatively worse off (although we might think quantitative ideological parsimony is less important than qualitative [Cowling 2013]) and (with the notable exception of Forrest [2013]) instantiation and parthood are not thought to be in similar ideological categories. So, there are issues with ideological parsimony. Whether the extra primitive is worth it or not leads us into the thorny bush of weighing ideological parsimony versus those theoretical virtues which mereological nominalism scores better on. That debate can't be settled here. Fortunately, it needn't be settled—given the aim is only to show that mereological nominalism has been unjustly ignored, since the jury is out on these issues the jury must be out on whether or not mereological nominalism is better or not than vanilla realism i.e. the Armstrong-Quine objection is not decisive.

## 2.2 The instantiation regress

Presumably, if instantiation is primitive then instantiation *explains* why some object is the way that it is i.e.  $x$  being  $F$  is explained by  $x$  instantiating  $Fness$ . In turn that's explained by  $Fness$  and  $x$  jointly instantiating the relation *Instantiation*. In turn that's explained by  $Fness$ ,  $x$ , and *Instantiation* jointly instantiating *Instantiation*. And so on. Thus, if the mereological nominalist accepts INSTANTIATION IS PRIMITIVE they'll be faced by a regress. The mereological nominalist has a problem.

But the vanilla realist is faced by a similar regress! And whatever escape route the vanilla realist has, mereological nominalists can adopt. Vanilla realists might believe the regress is benign rather than vicious [Armstrong 1997: 118-19]. The mereological nominalist can say the same. They might say the regress can be ignored because analysing all predication is an unattainable aim in the first place [Lewis 1983a: 353-4]. The mereological nominalist can say the same. They might say *Instantiation* doesn't exist and 'instantiation' is just a piece of ideology [Sider 2006: 388]. The mereological nominalist can say the same. Even the less straightforward responses can be co-opted. For instance, Armstrong says instantiation is not a relation/universal (and thus no regress arises) because it's a 'fundamental tie' [1989: 108-10; 2010: 27]. Says Armstrong: It's a tie because it's 'intimately' tied to its relata (or, since it's not really a relation, its 'tielata') [1978b: 109-10]. But the mereological nominalist can ape this move, for there's nothing to stop them saying that

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<sup>9</sup> Someone—I apologise that I forget who—suggested that endorsing INSTANTIATION IS PRIMITIVE just is what it is to be a realist. This is just a terminological speed bump. However realism is defined, the truth of PROPERTIES ARE INSTANCE FUSIONS is what's at stake; at best the objection shows that such mereological nominalists would be realists.

property and instance are related in the same, intimate, manner. In short, the regress has no unique bite on mereological nominalism over and above vanilla realism.

### 2.3 Shared Decompositions

Say that a decomposition of an object is any plurality of things which compose the object. PROPERTIES ARE INSTANCE FUSIONS entails that properties with the same instances, e.g. *Cordate* and *Renate*, will share some decomposition. If we assume:

UNIQUENESS: If  $x$  and  $y$  are both composed of the  $\mathcal{X}$ s then  $x = y$ .

then *Cordate*=*Renate* even though they're *prima facie* distinct [Armstrong 1978*b*: 35-36; Edwards 2014: 102; see also Quine 1950: 626-8]. Similar issues arise with mereological properties like *Simple* and *Composite*, which (in a non-gunky world) share a decomposition. The problem also arises with relations. Given PROPERTIES ARE INSTANCE FUSIONS the mereological nominalist should presumably say:

RELATIONS ARE RELATA FUSIONS: A relation is the fusion of everything which it relates (e.g. *Loves* would be the fusion of everyone in love and who is loved).

Consider a world at which the only objects are three balls of different sizes, each a metre apart. In fusing the same instances, *Ball*=*Bigger Than* and a monadic property does double duty as a dyadic relation. Similarly, *Bigger Than*=*1m Separated*—some relation is both asymmetric and symmetric. Such consequences seem absurd.

Armstrong raised this objection forty years ago. Since then metaphysics has progressed; it is now solvable. Consider a case of permanent coincidence in which a statue-shaped lump of clay is brought into existence and then annihilated moments later [Gibbard 1975]. A statue,  $s$ , and a lump of clay,  $l$ , exist;  $s$  and  $l$  share a decomposition thus, given UNIQUENESS,  $s=l$ . But  $s$  has certain features,  $F_s$ , which lump lacks (e.g. the *de re* modal property of being essentially statue-shaped). Similarly,  $l$  is  $F_l$  whilst  $s$  is not. Given Leibniz's Law,  $s \neq l$ . Contradiction! The mereological nominalist can refurbish a response to the statue/lump paradox to avoid the problem of shared decompositions. Not every response can be refurbished,<sup>10</sup> but one of the most popular responses—'multi-thingism'<sup>11</sup>—can be.

Multi-thingers believe that where there is an object (e.g. a lump) there can also be a multiplicity of distinct objects (e.g. a statue) [Bennett 2004: 339-40]. Multi-thingers say  $s$  and  $l$  are distinct; either UNIQUENESS is false or  $s$  and  $l$  don't share a decomposition. A multi-thinger mereological nominalist says the same: either UNIQUENESS is false or the properties don't share a decomposition.<sup>11</sup> But multi-thingers have a problem: What grounds the difference in the

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<sup>10</sup> 'One-thingers' (who believe  $s=l$ ) can avoid the *Cordate/Renate* problem using counterpart theory [Ball 2011; Guigon 2014; Heller 1998: 300-307, 313; 2002: 79-80]. However, this doesn't work for every such problem. For instance, if a simple instantiates *Simple*, and *Simple*=*Composite*, a simple would be composite. It's hard to see how counterpart theory could help in such a case.

<sup>11</sup> Endorsing multi-thingism also ameliorates a worry about properties with a single simple instance. Imagine a property, *Unique*, has a simple,  $a$ , as is its sole instance; *Unique* would be both a fusion of, and distinct from,  $a$ . This conflicts with WEAK SUPPLEMENTATION (*q.v.*). But multi-thingers already have a similar problem [Varzi 2009]: if the statue and lump are distinct, given universalism they compose an object which conflicts with WEAK SUPPLEMENTATION. These problems seem analogous (particularly since even a simple could constitute a statue [Hudson 2006; Johansson 2009]). Whatever resolution the multi-thinger relies upon for statues/lumps they can rely upon for *Unique/a*. For instance, we may (as some independently do already [Donnelly 2011; Lowe 2013;

properties of coinciding objects if not their underlying microstructure? Not every proposed solution to this ‘grounding objection’ works for mereological nominalism;<sup>12</sup> some will, though.

For instance, *s* and *l*'s having differing properties may be explained by a mereological difference—*s* has parts which *l* does not and/or vice versa. We might have in mind either their having different regular parts (e.g. a nose being a part of *s* but not *l* [Baker 2000: 181; Doepke 1982; Wasserman 2002: 202-6]) or their having different modal parts [Graham 2015; Wallace 2014]. If noses fail to be parts of lumps then the mereological nominalist can similarly say that kidneys can be parts of *Renate* but not *Cordate*.<sup>13</sup> Likewise, if there are modal parts then *Renate* has heartless people as modal parts whilst *Cordate* does not. Both responses solve the problem for the mereological nominalist.

Similarly, we might believe that there is no explanation of why their properties differ—*de re* modal facts are brute facts [Bennett 2004; Sidelle 2016]. *Prima facie* the mereological nominalist can say the same: It's simply a brute fact that *Cordate* and *Renate* have the properties which they do. One snag is worth discussing. Bennett's multi-thinger ameliorates the brutality by endorsing:

CHOCKA: Wherever there's an object, *x*, there's also an object which has every possible modal profile of *x* (where a ‘possible modal profile of *x*’ is any consistent combination of accidentally/essentially having the non-sortal properties which *x* has).

I am a male human philosopher. Given CHOCKA where I am there is: something essentially human but accidentally a male philosopher; something essentially male but accidentally a human philosopher; something essentially a philosopher but accidentally a male human; and so on. CHOCKA ameliorates the brutality of *de re* modal facts because there's then nothing special about *s* being essentially statue shaped and *l* being only accidentally so—there's nothing special because *every* (consistent) distribution of *de re* modal properties is instantiated by some object. Back to the snag. Modal profiles are properties. If CHOCKA explains the existence of objects then, given PROPERTIES ARE INSTANCE FUSIONS, it explains the existence of modal profiles. But then modal profiles featuring in CHOCKA is in tension with the asymmetry of explanation—for example, it's standard to say that properties featuring in a proposition are amongst its constituents, thus modal profiles would both be constituents of, and explain, CHOCKA even though CHOCKA in turn

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Smith 2009; see also Cotnoir 2013]) deny WEAK SUPPLEMENTATION. Alternatively, a multi-thinger may accept that statues have parts which lumps do not, bringing *s/l* (and *Unique/a*) in line with WEAK SUPPLEMENTATION.

<sup>12</sup> For completeness, consider responses which can't be co-opted by the mereological nominalist. Imagine that the difference in *s* and *l*'s properties is explained by the different intentional relations holding between their parts and agents [Baker 2000; Einheuser 2011; Sutton 2012]: *s* is *F<sub>s</sub>* in virtue of agents standing in an intentional relation, *R<sub>s</sub>*, to *s*'s parts and *l* is *F<sub>l</sub>* in virtue of agents standing in relation *R<sub>l</sub>* to those same parts. *R<sub>s</sub>* and *R<sub>l</sub>* have the same relata; given RELATIONS ARE RELATA FUSIONS they therefore coincide and, thus, agents must stand in intentional relations *R<sub>s'</sub>* and *R<sub>l'</sub>* to those parts. Since *R<sub>s'</sub>* and *R<sub>l'</sub>* have the same relata they'll again coincide; thus, agents stand in relations *R<sub>s''</sub>* and *R<sub>l''</sub>* to the parts of *R<sub>s'</sub>*/*R<sub>l'</sub>*. And so on, in a regress. I believe similar regresses will arise for other answers e.g. using differing identity properties [deRosset 2011] or grounding relations [Saenz 2015; Korman 2015: 212-16] instead of intentional relations.

Other solutions have different problems. Hylomorphism [Fine 2008; Koslicki 2008] (and similar theories [Paul 2006]) say that *s* and *l*'s differing properties are explained by their having different properties as proper parts (e.g. essential shape properties like *Statue Shaped*). But what property could play that role for *Renate*? It can't be shape properties (for the only candidate is *Shaped such as to have a kidney*, which is just an overly wordy renaming of *Renate*, not a proper part of *Renate*). Similarly, *Being Composed of 'Renate' instances* won't work since it's clearly less fundamental than *Renate* and so can't—as the hylomorphist would need—be a constituent of *Renate*.

<sup>13</sup> A referee objected that HARMONY is false on this view, undermining a motivation from §1.4. But if you like this response to the grounding objection in the first place, you'd already think HARMONY was false and there'd be no need to explain its truth.

explains their existence. This snag is easily avoided: Objects *don't* exist in virtue of CHOCKA being true and *aren't* metaphysically explained by it. They exist because their parts are arranged in a certain way (or because their property constituents are co-instantiated, or...); those objects turn out (as a matter of brute fact!) to map to the consistent modal profiles, but (since having a particular modal profile is a brute fact) they don't exist *in virtue* of anything to do with those modal profiles. CHOCKA is true, but it is not a truth that explains the existence of objects.

In summary, the mereological nominalist can purloin multi-thinger responses to the grounding objection to escape the problem of shared decompositions.

## 2.4 Relationality

Another worry: Given RELATIONS ARE RELATA FUSIONS, the mereological nominalist cannot explain why a relation's a relation i.e. they can't say what it is about the metaphysical structure of a property/relation which explains its being monadic, dyadic, triadic etc.<sup>14</sup>

To solve this problem, the mereological nominalist should continue the theme of the paper and consider what their imagined interlocutor's answer would be. They can then probably say more or less the same thing. Vanilla realists have four options open to them. They might say that the world is arelational and that there are no relations [Fisk 1972; Humberstone 1995; Heil 2012: 135-50; Lowe 2016]. Were this so, mereological nominalists can say likewise. Alternatively, they might say relatedness is inexplicable and that adicity facts are brute facts [Gilmore 2013: 191-200]. Again, mereological nominalists can simply say it's a brute fact that some fusions are *n*-adic.

The third option is that adicity is explained by facts about instantiation. Extending INSTANTIATION IS PRIMITIVE to relations, instantiation turns out to be a one-many relation and a relation is *n*-adic in virtue of a plurality of *n* things instantiating it [*cf* Scaltsas 2016].<sup>15</sup> But, again, if this is the best answer the vanilla realist has, the mereological nominalist can simply rabbit the response by endorsing INSTANTIATION IS PRIMITIVE, its corresponding extension to relations, and the same explanation of relationality.

Option four is to introduce abstract 'slots' which are constituents of universals: To be *n*-adic is to have *n* slots [Gilmore 2013]. The mereological nominalist might say the same, accepting that slots exist and that they're constituents of fusions. This option won't work, though, for those mereological nominalists committed to a desert landscape. But such mereological nominalists will themselves balk at adding in an extra category of entities—i.e. slots—solely to account for adicity. This is because, if you're attracted to nominalism in the first place, you'll be against thinking extra ontology is the solution to those sorts of problems—just as nominalists shy away from thinking that the apparent truth of 'There are more hobbits in *Lord of the Rings* than holes in my jeans' demands that there are fictional characters and holes, they'll be unmoved by the initial claim that the existence of abstract slots are a good explanation of the truth of sentences about a relation's adicity. So a vanilla realist will have to put them to work elsewhere if they hope to

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<sup>14</sup> The worry might instead be the inexplicability of the 'order'/'direction' of relations. But everyone—realist and mereological nominalist alike—has that problem [Donnelly 2016; Fine 2000, 2007; Gaskin and Hill 2012; MacBride 2007, 2014].

<sup>15</sup> Gilmore [2013: 199-200] complains that this doesn't help with relations which can have identical relata (e.g. *Identity* and *Being At Least As Tall As*). But (i) the vanilla realist has this problem as well, so it's irrelevant to the comparison and (ii) those relations are the ones most unlikely to appear in an ontology of sparse properties [Lowe 2016].

convince the nominalist of their worth and the only work I can see them doing is analysing instantiation:

INSTANTIATION IS FILLING: Where  $R_{ness}$  corresponds to an  $n$ -place predicate 'R',  $R(x_1 \dots x_n)$  iff  $R_{ness}$  has slots  $\sigma_1 \dots \sigma_n$  and  $x_m$  fills  $\sigma_m$  (for all  $m$  such that  $1 \leq m \leq n$ ).

But INSTANTIATION IS FILLING is false. Imagine a world at which: four objects,  $a-d$ , exist;  $Dyadic$  is a dyadic relation corresponding to ' $\_D\_$ ';  $aDb$ ;  $cDd$ ;  $\neg aDd$ .  $Dyadic$  has two slots,  $\sigma_1$  and  $\sigma_2$ ;  $a$  and  $c$  fill  $\sigma_1$  whilst  $b$  and  $d$  fill  $\sigma_2$ . INSTANTIATION IS FILLING is false since  $a$  fills  $\sigma_1$ ,  $d$  fills  $\sigma_2$  yet  $\neg aDd$ .<sup>16</sup>

Overall, if one is worried about explaining relationality the mereological nominalist has no problem which the vanilla realist does not.

## 2.5 Intrinsic Revulsion

Perhaps mereological nominalism is simply ludicrous. Gerrymandered fusions of electrons could no more be *Charge* than my mental state of being in pain could be a cucumber from Norway. Similarly, a referee worried that it's absurd that, if *Red* had a single red rose as its sole instance, *Red* would smell nice. PROPERTIES ARE INSTANCE FUSIONS, goes this line of thought, is clearly nonsense; mereological nominalism is plainly unbelievable.

But these concerns arise for any of a variety of reductions. Consider:

- (i) Works of music being perduring fusions of their performances (for then Beethoven's Piano Sonata No. 13 flits in and out of existence as different performances of it begin and end);
- (ii) People being events (for then Donald Trump occurs);
- (iii) People being places (meaning that where I am is having a pleasant day);
- (iv) Organisations being objects (for now Barclays Bank Plc would have a mass in kilograms);
- (v) Possibilities being spacetimes (which entails that specific possibilities have sizes measured in light years).

Each of (i)-(v) has been mooted and nevertheless taken seriously: Caplan and Matheson [2006] *vis-à-vis* (i); Campbell [2007] *vis-à-vis* (ii); supersubstantivalism *vis-à-vis* (iii) [Effingham 2009a: 42]; a number of people *vis-à-vis* (iv) [Effingham 2010: 254]; and—obviously—David Lewis's genuine modal realism [1986] *vis-à-vis* (v). Just as people are happy to take those reductions seriously, they should take mereological nominalism seriously.

This ends the list of putative problems. If you currently believe vanilla realism is the best theory of properties, you should accept that a plausible version of mereological nominalism can be constructed such that it can overcome those problems.

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<sup>16</sup> A slot theorist might instead make slots 'local' i.e. rather than every  $n$ -adic relation having  $n$  slots, every instance of the relation has its own complement of  $n$  slots. That solves the problem but reifies 'relation instances' which the slots are then constituents of. Below, in §4.2, I explain how relation instances by themselves account for relationality and how the mereological nominalist can say the same.

### 3. Compared to Constituent Realism

Not every realist is a vanilla realist. A ‘constituent realist’ believes that properties are constituents of their instances (perhaps other things, e.g. bare substrata, are also constituents; for exposition purposes, I’ll assume that only properties are constituents). Instead of INSTANTIATION IS PRIMITIVE they’ll endorse:

INSTANTIATION IS CONSTITUENCY:  $x$  instantiates  $Fness$  iff  $Fness$  is a constituent of  $x$   
[Hawthorne and Sider 2001; Paul 2002, 2012].

So imagine we compare mereological nominalism to constituent realism. In that case, the mereological nominalist should still deny INSTANTIATION IS MERELOGICAL and instead co-opt its competitor’s ideology i.e. accept INSTANTIATION IS CONSTITUENCY and say that fusions of instances are constituents of their instances (which may sound absurd; I make it palatable in §3.2-4.)

#### 3.1 Solving Mereological Nominalism’s Problems

We can revisit the above problems and see if this new mereological nominalist theory solves them. I won’t provide a tedious, detailed examination, since, broadly speaking, the mereological nominalist endorsing INSTANTIATION IS CONSTITUENCY can say the same as one who endorses INSTANTIATION IS PRIMITIVE. When it comes to the problems of the Armstrong-Quine objection, shared decompositions, the instantiation regress, relationality, and intrinsic revulsion, those problems should be solved by the same reasoning used by §2’s mereological nominalist.

Indeed, this version of mereological nominalism is better since it alleviates some worries about ideological profligacy. Admittedly, the constituent realist has one primitive of metaphysical constituency whilst the mereological nominalist has two (metaphysical constituency and some mereological primitive). But parthood and constitution are both ‘building relations’ [Bennett 2011] so appear to be in the same category; given INSTANTIATION IS CONSTITUENCY, the mereological nominalist is not being ideologically profligate in the qualitative sense.

But it has problems of its own since it’s hard to make sense of instance-fusions being constituents of their own instances. §3.2-4 deal with worries along these lines.

#### 3.2 Grounding Asymmetry

Assume:

PART GROUNDING: Objects are grounded in their parts.

CONSTITUENT GROUNDING: Objects are grounded in their constituents.

Imagine an electron,  $e$ , exists. *Charge* is a constituent of  $e$ . Given CONSTITUENT GROUNDING,  $e$  is partially grounded in *Charge*. *Charge* is a fusion of all electrons and so has  $e$  as a part. Given PART GROUNDING, *Charge* is partially grounded in  $e$ . Since grounding is asymmetric, that’s a contradiction.

A premise must go. We could deny PART GROUNDING. One might already be tempted to do this because we believe that the intuitive view of wholes being grounded in their proper parts should be reversed [cf Schaffer 2010, 2013]. Further, constituent ontologists may independently deny PART GROUNDING. Were objects grounded in their properties, further grounding them in their material parts is overkill. Grounding and explanation are connected: The  $x$ s grounding  $y$  implies that the existence and arrangement of the  $x$ s metaphysically explains the existence of  $y$ . Were an object's existence explained by its constituents being thus-and-so and also explained by its parts being so-and-thus, we'd have two separate explanations and a case of (metaphysical) overdetermination. Given constituent ontology's conceit that properties are the backbone of the world, a natural solution is to elevate them to that position by saying that objects are solely grounded in their properties—their mereological parts don't do any grounding and objects depend upon their parts solely in some purely modal sense. Alternatively, constituent ontologists can resolve the tension by adopting pluralism about grounding relations: one sort of relation grounds wholes in their parts; another grounds them in their constituents. In that case PART GROUNDING and CONSTITUENT GROUNDING would be true, but it'd be an equivocation to think that they entailed a contradiction. Of course, some constituent ontologists will believe this 'overdetermination argument' to be less convincing, but my point is not that *every* constituent ontologist will acquiesce over PART GROUNDING, but only that there's reason to believe that some reasonably minded constituent ontologists will—independent of mereological nominalism—take that option.

### 3.3 Size and location

The remaining problems assume an analogy between constituency and parthood. If you doubt that there's such an analogy—and I've argued elsewhere [Effingham 2015] that there are such reasons—neither will be a problem and you can skip to §4. So charitably assume that there *is* an analogy. A rough statement of the first problem is that there's something weird about an enormous scattered fusion being a constituent of a much smaller instance. I detail two ways to sharpen up this rough sketch (although there may be more). The first assumes:

CONSTITUENT SIZE: For all  $x$  and  $y$ , if  $x$  is a constituent of  $y$ , and  $y$  is exactly located at a region,  $r$ , then  $x$  is not exactly located at a region larger than  $r$ .

Imagine only three electrons ( $e_1$ ,  $e_2$ , and  $e_3$ ) exist. Each instantiates *Charge*. They occupy disjoint regions (respectively  $r_1$ ,  $r_2$ , and  $r_3$ ). Assuming that fusions of things must be singularly located:

UNIVERSALISM<sub>SL</sub>: For all  $y$ s, any object composed of the  $y$ s is exactly located at the fusion of the regions which the  $y$ s exactly occupy.

Given UNIVERSALISM<sub>SL</sub>  $e_1$ ,  $e_2$ , and  $e_3$  compose a fusion exactly occupying  $Fu(r_1, r_2, r_3)$ . Given PROPERTIES ARE INSTANCE FUSIONS at least one of those fusions compose *Charge*. Since  $Fu(r_1, r_2, r_3)$  isn't a proper sub-region of  $r_1$  and *Charge* is a constituent of  $e_1$ , this conflicts with CONSTITUENT SIZE.

The second way to cash out the rough problem instead assumes:

LOCATION INHERITANCE: For all  $x$  and  $y$ , if  $x$  is a metaphysical constituent of  $y$  then  $y$  is partially located where  $x$  is exactly located.

Given LOCATION INHERITANCE, since *Charge* is a constituent of each electron then each of  $e_1$ ,  $e_2$  and  $e_3$  would be partially located at  $Fu(r_1, r_2, r_3)$ . That's absurd because  $e_1$  exactly occupies only  $r_1$  and doesn't partially occupy any region which isn't a proper sub-region of  $r_1$ .

Mereological nominalists should respond by saying properties are multi-located,<sup>17</sup> UNIVERSALISM<sub>SL</sub> is false, and the following is true:

UNIVERSALISM<sub>ML</sub>: Where the  $y$ s are any plurality of disjoint objects, each  $y$  exactly occupies some region—call the plurality of those regions the  $r$ s. If the  $r^*$ s are a plurality of regions which have the same fusion as the  $r$ s, then there is an object composed of the  $y$ s which exactly occupies each of the  $r^*$ s.

Given UNIVERSALISM<sub>ML</sub>, not only is there the regular, singularly located, fusion of the electrons exactly located at  $Fu(r_1, r_2, r_3)$ , but also scads of other fusions multiply located at every combination of  $r_1$ ,  $r_2$ ,  $r_3$  (and their fusions). Crucially, there's at least one fusion exactly occupying each of  $r_1$ ,  $r_2$ , and  $r_3$ . The key to the mereological nominalist's solution is to say that *Charge* is such a multi-located fusion.

*Charge* being a multi-located fusion helps because mereological nominalist properties would then be similar to the immanent realist's multi-located universals. And just as no-one accuses the immanent realist of having problems with thinking properties are constituents of their instances, mereological nominalism is problem free also. To see why multi-location helps, consider why LOCATION INHERITANCE is false of multi-located things. Imagine a time travelling particle. Its past version is a part of me whilst its time travelling future version is somewhere near Pluto. Even though it's in two locations at once I don't inherit both locations—I am not partially located somewhere near Pluto just because a bit of me later travels in time. I inherit only the location of the past version of the electron, not that of its future version [Effingham 2013: 332-3]. If *Charge* is multi-located then  $e_1$  need only be partially located where *its* 'version' of *Charge* is (i.e. only at  $r_1$ ). Similarly for CONSTITUENT SIZE: An instance must only be as big or bigger than the particular version of the thing it has as a constituent. And in both cases what's doing the work here is *Charge*'s being multi-located; it's irrelevant whether it's a multi-located universal (as immanent realists say) or a multi-located fusion of objects (as mereological nominalists should say). So UNIVERSALISM<sub>ML</sub> solves the mereological nominalist's problems.

Nor is UNIVERSALISM<sub>ML</sub> without independent motivation. A common motivation for mereological universalism is resolving ontological disagreements [Gilmore Forthcoming; Hawthorne 2006: xii; Sider 2008: 257-61; see also Bennett 2004 and, for objections, see Korman

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<sup>17</sup> Given §1.4's argument that properties perdure, it's odd to multi-locate them given that multi-location is a hallmark of endurantism. However, questions within the metaphysics of persistence split along two dimensions: where is the object located? does it have temporal parts? [Effingham 2012] Having—and persisting in virtue of having—temporal parts at different times is not necessarily connected with being—and persisting in virtue of being—singularly located throughout spacetime. So it's consistent for multi-located things to persist in virtue of having temporal parts.



2015]. Imagine a car. Some of its temporal parts are within a garage whilst others are outside it. Imagine a tribe of people who believed in ‘incars’ (being that object composed of the former temporal parts) and ‘outcars’ (being that object composed of the latter temporal parts). We disagree, saying that there are no incars or outcars, merely cars. There’s no easy way to resolve this dispute; no microscope, no matter how strong, will detect a ‘compositron particle’ which appears when composition takes place. To take sides risks a form of prejudice, for you’d have no good reason to favour one side over the other. Universalism offers the chance to give everyone’s views equitable treatment: Everyone is correct to say some things compose and wrong when they deny it. Equity is good; prejudice is bad; universalism is true. Similar reasoning motivates UNIVERSALISM<sub>ML</sub>. Imagine a tribe which agrees with us about compositional facts but disagrees about facts concerning exact location. Where I say that a car exactly occupies a single spatiotemporal region, *R*, the tribe says that the car exactly occupies multiple spacetime regions—namely, the intersections of *R* with each time. Our dispute would be as irresolvable as that concerning composition and the analogous move would be to say that both sides are right and that there’s an object singularly located at *R* as well as a distinct object multiply located at the intersections. Generalising this lesson, we must populate our ontology with objects exactly occupying all sorts of regions i.e. endorse UNIVERSALISM<sub>ML</sub>.

### 3.4 Constituency Asymmetry

*Mass* is instantiated by every object with a mass. Given PROPERTIES ARE INSTANCE FUSIONS, it’s composed of some material objects (but not all, since photons and gluons have no mass). Every material object instantiates *Materiality*. *Materiality* is composed of every material object. *Materiality* has a mass, therefore it has *Mass* as a constituent. *Mass*—in being composed solely of material objects—is clearly a material object and thus has *Materiality* as a constituent. Given constituency is asymmetric, that’s impossible. The mereological nominalist has a problem.

But it’s not a problem *just* for the mereological nominalist. The constituent ontologist has this problem regardless of mereological nominalism. Consider the Platonist: *Charge* instantiates both *Propertyhood* and *Abstractness*; in turn they instantiate—and have as a constituent—one another. Consider the immanent realist: If all that existed was a spherical extended simple, every property would have to be in the same place; *Spherical* would be spherical; *Propertyhood* would be spherical; those properties would instantiate—and have as a constituent—one another. So all constituent ontologists have this problem, not just mereological nominalists.

The realist might escape this problem by denying that properties have constituents. But then the mereological nominalist can say the same: Some objects, but not all (i.e. not properties) have constituents. But another response might work for the realist and not the mereological nominalist: Accept a sparse theory of properties whereby only the properties of fundamental physics exist. Now there are no second-order properties such as *Propertyhood* and the problem of both parties is dissolved. But a new problem, which affects only mereological nominalism, is just around the corner. Imagine *Charge* and *0.51 MeV* are sparse properties in a universe consisting of a lone electron, *e*. *e* composes both properties. Being composed solely of *e*, *0.51 MeV* is charged and has *Charge* as a constituent. Being composed solely of *e*, *Charge* has a mass of 0.51 MeV and

has *0.51 MeV* as a constituent. The problem—which the realist doesn’t have—has now re-emerged!<sup>18</sup>

However, this sort of problem case crops up only when the properties share their decompositions (unlike *Materiality* and *Mass*, which did not). To see why, imagine a world at which, alongside *e*, there’s another uncharged particle with a mass of 0.51 MeV (and so *Charge* and *0.51 MeV* don’t share a decomposition). *Charge* would have a mass of 0.51 MeV (and have *0.51 MeV* as a constituent) but *0.51 MeV* wouldn’t be charged, for it would only be partially charged. And since *Partial Charge* isn’t a property featuring in our most fundamental physics, *Partial Charge* doesn’t exist and *0.51 MeV* won’t have any problematic constituents.

That the problem only crops up when properties share decompositions is an indication that multi-thingism bears upon its solution. It turns out that what the multi-thinger says about statue/lump cases can solve this problem here. Consider two things they might say.

First: Multi-thingers might say that *s* is a lump of clay only in a derivative sense—similarly *l* is a statue only in a derivative sense [Baker 2000: 46-58]. That sounds a lot like saying that *s* is a lump of clay but doesn’t have *Lump Of Clay* as a constituent; instead, *Lump Of Clay* is solely a constituent of *l* but, because *s* and *l* coincide, *s* gets to ‘derive’ its lumpness from *l*’s constituents. The multi-thinger who takes this route can say the same about properties: *0.51 MeV* is charged without having *Charge* as a constituent; it’s enough that *0.51 MeV* coincides with something (i.e. *e*) which has *Charge* as a constituent. Problem solved!

Second: Multi-thingers might say that *l* isn’t a statue and *s* isn’t a lump of clay (instead it’s merely made of clay). By extension the multi-thinger will say similar of other predicates, for instance that statues, but not lumps, can be Romanesque [Fine 2003]. Once they say that, it seems reasonable to say, e.g., that whilst a statue shaped lump of metal can be charged (or magnetic, or whatever) the statue it coincides with cannot. And if that’s reasonable, it’s reasonable to say that *0.51 MeV* isn’t charged at all, although the electron coinciding with it is charged. Problem solved.

Both alternatives are popular and, for the multi-thinger, should look attractive. So, once again, the mereological nominalist is not faced by an insurmountable problem.

## 4. Compared to State Realism

Consider a third type of realism: ‘State realism’. Like constituent realists, state realists believe some things are constituents of other things, but instead of properties being constituents of instances, they believe that universals and objects are constituents of states of affairs. The state realist endorses:

INSTANTIATION IS CO-CONSTITUENCY: *x* instantiates *Fness* iff there exists a state of affair with *Fness* as its property-constituent and *x* as its object-constituent [Armstrong 1997: 115-6, 127].

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<sup>18</sup> Properties could then have just a single proper constituent, contrary to an analogue of WEAK SUPPLEMENTATION. But not only might WEAK SUPPLEMENTATION be false (see *n11*) I’ve also argued elsewhere [2015] that all constituent ontologies have this problem.

The problems of intrinsic revulsion, shared decompositions, and the instantiation regress all get the same solutions as they did for the vanilla realist. The Armstrong-Quine Objection and the Relationality problem are trickier.

#### 4.1 The State Mereological Nominalist

The mereological nominalist's strategy in the face of the vanilla and constituent realist was to simply co-opt the realist's ideology. They can do the same here. In that case, they'd accept that states of affairs exist, claim that fusions of instances can be property-constituents of such states, and accept INSTANTIATION IS CO-CONSTITUENCY. Because INSTANTIATION IS MEREOLOGICAL is false, this solves the Armstrong-Quine Objection. Further, they can co-opt the state realist's response to the problem of relationality. State realists will build relatedness into states of affairs, saying that a property/relation is  $n$ -adic in virtue of being the property-constituent of a state of affair alongside  $n$  object-constituents. And were the mereological nominalist to include states of affairs in their ontology, they can rabbit the claim.

But states of affairs aren't paradigmatically thought of as being material objects, so this co-option rallies against the mereological nominalist's motive of achieving a desert landscape. The mereological nominalist might argue that if all constituents of states of affairs are material objects, states of affairs *are* material objects. Or they might argue that—contrary to the strongest flavour of nominalism—it's enough that states of affairs are concrete to achieve a desert landscape. Or they might give up on the motive altogether, instead resting happy with some of the remaining motives for mereological nominalism. But as insurance against this—and because it helps make a general point—I'll consider an alternative mereological nominalist theory.

#### 4.2 Constituent Mereological Nominalism vs. State Realism

The general point to be made is that, when comparing a version of mereological nominalism to some competing theory, we need not *always* co-opt the ideology of their imagined interlocutor. It's also enough to show that a comparable, yet distinct, ideology is available. If you are attracted by nominalist motivations, the mereological nominalist can develop just such an ideology when compared to state realism.

State realists accept that things have metaphysical constituents, just like those who accept INSTANTIATION IS CONSTITUENCY. They only differ over what the appropriate relata are (instances/properties and states of affairs versus properties and instances). So it's hard to see what grounds a state realist would have for critiquing the mereological nominalist theory of §3 which endorses INSTANTIATION IS CONSTITUENCY and says properties are constituents of their instances. As already discussed, that theory avoids the various problems facing mereological nominalism so there's no reason not to prefer it to state realism.

One small issue is that the state realist's solution to the problem of relationality (i.e. that a property-constituent of state of affair  $s$  is  $n$ -adic iff  $s$  has  $n$  object-constituents) is suitably different to the already discussed solutions which the mereological nominalist might rely upon. We can imagine state realists pressing that their unique solution is reason enough to prefer state realism. But the mereological nominalist can construct a suitably similar response. The mereological nominalist can believe in 'relation-instances'. Relation-instances are composed out of the relata of a given instance of a relation—for instance, there'd be numerous relation-instances of *Monogamous Marriage*, each composed by a different pair of spouses. Just as states of affairs have a structure

other than their mereological structure (namely, a structure of constituents) so too do relation-instances. Where state realists say a relation's relata are object-constituents of a state of affair, mereological nominalists say they're object-constituents of a relation-instance. Where relations are property-constituents of states of affairs according to the state realist, the mereological nominalist should say something different: drop 'property-constitution' in favour of 'instance-constitution', whereby relation-instances (instance-)constitute their relation. The mereological nominalist can then explain relatedness:  $x$  is an  $n$ -adic relation in virtue of an instance-constituent of  $x$  having  $n$  things as object-constituents. Thus mereological nominalists can construct a competing theory of relationality even without states of affairs.

### 4.3 Other realisms?

There are alternative realist theories [e.g. Armstrong 2004*b*; Baxter 2001; Cowling 2014; Cumpa 2014; Forrest 2006, 2013]. But the discussion of the above three realist theories makes clear the general strategy a mereological nominalist can pursue. For each such theory, similar tactics can be used to develop a suitable mereological nominalist comparator, either by co-opting their ideology (as with vanilla and constituent realism) or—as §4.2 has shown—demonstrating that some existing ideology (e.g. endorsing INSTANTIATION IS CONSTITUENCY) is on a par compared to the competing realist theory. All this in mind, turn to a final comparison—this time to a non-realist, nominalist theory.

## 5. Compared to Class Nominalism

### 5.1 Comparative ideology

I'll assume a version of class nominalism whereby relations are classes of ordered tuples of their relata. Contiguously, properties will be sets of 1-tuples of a property's instances. Thus—assuming that, for all  $x$ ,  $\langle x \rangle = \{x\}$ —properties are of the form  $\{\{x_1\}, \{x_2\}, \dots\}$ . The analysis of instantiation is then:

INSTANTIATION IS MEMBERSHIP:  $x$  instantiates  $F$  iff  $\langle x \rangle$  is a member of  $F$ .

(Alternative class nominalist theories will take properties to simply be classes of their instances [Lewis 1986: 50-69; Quine 1940: 120] or of tropes [Oliver 1996: 34-37]; I assume what I say below similarly applies to such theories.)

Mereological nominalists cannot co-opt INSTANTIATION IS MEMBERSHIP. Just as with the theory discussed in §4.2, they should instead show that an ideology endorsing either INSTANTIATION IS CONSTITUENCY or INSTANTIATION IS PRIMITIVE is on a par with whatever class nominalist theory we are imagining to be competing for our attention. The details of that demonstration vary depending upon what our imaginary class nominalist theory says about the metaphysical structure of classes. They have three options: subclass building; member building; and anti-building.

*Subclass building:* Classes are built out of their subclasses. *Vis-à-vis* ontology, classes are fusions of their subclasses, composed of structureless singletons; *vis-à-vis* ideology, the singleton relation and a mereological relation are primitive [Lewis 1991]. Compare a class nominalist theory accepting subclass building to a mereological nominalist theory accepting INSTANTIATION IS PRIMITIVE

alongside a primitive mereological relation. Quantitatively speaking, they're ideologically on a par. Qualitatively speaking, they're at least on a par: Membership isn't mereological according to the subclass builder, so if instantiation isn't mereological the mereological nominalist's ideology is on a par, and if instantiation *is* mereological [Forrest 2013] then their ideology is superior.

*Member Building:* Classes are built out of their members. Perhaps there is only one type of building relation—a mereological relation like proper parthood—which is also membership. Members compose their classes just as simples compose a composite e.g. Jack and Jill compose a two-headed object-fusion identical to {Jack, Jill}. But that fusion would have an electron,  $e$ , as a part and—since proper parthood is membership— $e \in \{\text{Jack, Jill}\}$ , which is false. To remedy this, one could say membership is a restricted form of parthood; only parts meeting a certain condition—met by Jack and Jill but not met by  $e$ —are members of {Jack, Jill}. But the mereological nominalist would then be justified in tweaking INSTANTIATION IS MEREOLOGICAL to avoid the Armstrong-Quine objection by saying that, for each property, there's a condition which parts must meet in order to instantiate it. For instance, in the case of *Republican* there's some condition, met by Donald Trump but not met by an electron, which means the former instantiates *Republican* whilst the latter does not.

More likely, member builders will instead be pluralists about building relations [Fine 2010]. Material objects would be built in a mereological fashion, obeying, e.g.,:

WEAK SUPPLEMENTATION: If an object has a proper part it must have another which doesn't overlap the former.

LEVELLING: If  $x_1 = \text{Fu}(xs)$ ,  $x_2 = (ys)$ , and  $x_3 = \text{Fu}(xs, ys)$  then  $x_3 = \text{Fu}(x_1, x_2)$ .

Classes, on the other hand, are built non-mereologically. They needn't obey WEAK SUPPLEMENTATION (since singletons exist) nor LEVELLING (since  $\{\{a_1, a_2\}, \{a_3, a_4\}\} \neq \{a_1, a_2, a_3, a_4\}$ ). Since membership and parthood are different relations,  $e$  can be a part of Jack whilst  $\text{Jack} \in \{\text{Jack, Jill}\}$  even though  $e \notin \{\text{Jack, Jill}\}$ . However, if one is happy with pluralised building relations, it's hard to see what objection could be raised to a theory utilising a different building relation—namely, metaphysical constitution. So the mereological nominalist can again include that primitive, accept INSTANTIATION IS CONSTITUENCY, and endorse the theory of §3. In comparison the class nominalist would have (at least) two building relations—mereological and set theoretical—and the mereological nominalist would have two as well—mereological and constitutional. Ideologically, they're on a par. So, pluralising parthood helps member builders only by opening up the possibility of a constituent-based mereological nominalism which is as equally competitive when it comes to ideology.

*Anti-Building:* Classes have no metaphysical structure: classes aren't built from anything; set-theoretical relations aren't building relations; membership is more similar to, say, spatial separation than to parthood. Anti-builders have the better ideology, taking only membership as primitive (and analysing away instantiation using INSTANTIATION IS MEMBERSHIP), whereas mereological nominalism has two primitives. But whilst the anti-builder has the svelte ideology,

they lose out elsewhere by making classes into structureless, featureless blips.<sup>19</sup> That’s bad because structure is good. Compare the actual world, and its mereologically structured objects, with an otherwise identical world at which the material objects are the same except regarding their mereological structure. At that world their mereological features are ‘stripped away’ and every object is a mereological simple; where one object would actually be a part of another, at this other world they are just spatially interpenetrating simples [cf Williams 2006]. That world is weird and inelegant; the loss of structure means we cannot explain the features of macroscopic objects by reference to their parts. Similarly, it is better for classes to be structured entities built out of components than that they are featureless blips standing merely in non-building relations to other things. A mereological nominalist ontology which reduces classes to properties, and properties to fusions, can capture just such a structure. So anti-building has ideological simplicity but no structure whilst mereological nominalism has ideological complexity but includes structured entities. I lean towards thinking the latter theory is better, although it’s not necessary to decide between them since my aim is only to show that mereological nominalism is plausible—since the jury is out on how to calculate weightings of theoretical virtues, the jury would be out on whether mereological nominalism is a good theory compared to anti-building class nominalism.

## 5.2 Avoiding the problems

So, whatever the class nominalist says about the metaphysical construction of classes, the mereological nominalist can moot a theory which should be attractive compared to it. That theory will avoid the Armstrong-Quine objection by denying INSTANTIATION IS MEREOLOGICAL (or tweaking it to otherwise avoid the problem) and can avoid the problems of an instantiation regress, of shared decompositions, of intrinsic revulsion, and of relationality<sup>20</sup> in exactly the way that either the vanilla mereological nominalist or constituent mereological nominalist did.

## 6. Conclusion

This paper has made the case for giving quarter to mereological nominalism. Where mereological nominalism was previously relegated to being merely a quizzical oddity, I hope to have shown that it is a serious contender for the one, true ontology of properties—certainly, the problems it faces are not crippling, as has been previously thought. Note that this conclusion is subtly different from concluding that everyone should accept mereological nominalism. Whilst I hope the arguments presented here win some converts, it would be conceited to ignore the fact that the mereological nominalist makes contentious commitments along the way (e.g. to multi-thingism or mereological universalism). But whilst this means it’s not universally appealing (and what theory ever is!) since those commitments are contentious but not ludicrous, I hope that all parties would accept that it’s now time to hear the mereological nominalist’s voice at the table.

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<sup>19</sup> The term ‘featureless blips’ comes from Melia [2005: 72].

<sup>20</sup> Ordered tuples are sets, e.g.:

$$\langle x_1, x_2, \dots, x_n \rangle = \{ \{x_1\}, \{x_1, x_2\}, \dots, \{x_1, x_2, \dots, x_n\} \}$$

Since relations are sets of tuples, an  $n$ -adic relation with  $m$  instances is of the form:

$$\{ \{ \{x_1^1\}, \{x_1^1, x_2^1\}, \dots, \{x_1^1, \dots, x_n^1\} \}, \{ \{x_1^2\}, \{x_1^2, x_2^2\}, \dots, \{x_1^2, \dots, x_n^2\} \}, \dots, \{ \{x_1^m\}, \{x_1^m, x_2^m\}, \dots, \{x_1^m, \dots, x_n^m\} \} \}$$

Class nominalists will extend INSTANTIATION IS MEMBERSHIP to relations, saying that a relation is  $n$ -adic in virtue of having a member with  $n$  members. Given INSTANTIATION IS PRIMITIVE, the mereological nominalist says similar: A relation is  $n$ -adic in virtue of being instantiated by a plurality of  $n$  things. Similarly they’ll say that, given INSTANTIATION IS CONSTITUENCY, a relation is  $n$ -adic in virtue of having a plurality of  $n$  things as constituents.

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