

# Mereological Nominalism

## Renewed

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ABSTRACT: This paper argues that mereological nominalism – the thesis that properties are a fusion of their instances – has been unduly neglected. I motivate mereological nominalism on the grounds of a cost/benefit analysis compared to its competitors (namely realism and class nominalism). I then explain how to avoid long-standing misgivings from Armstrong and Quine, as well as problems with properties being constituents of their instances and the theory itself being *prima facie* implausible.

### 1. Reifying Motivations

This paper assumes you have a motivation – a ‘reifying motivation’ – for including properties in your ontology. A list of such motivations includes: providing an explanation for genuine resemblance [Armstrong 1978*a*, 1989; see also Oliver 1996: 52-54]; explaining why things fall under predicates [Oliver 1996: 49-51]; because we quantify over them in our best theory [Armstrong 2010: 11-12; Jackson 1977]; because they are constituents of states of affairs [Armstrong 2010: 11]; because they’re needed to explain the laws of nature [Armstrong 1983; Dretske 1977; Tooley 1977, 1987]; because they play a role in parsimonious reductions of natural numbers [Maddy 1990] or possible worlds [Forrest 1986] etc. (More motivations can be found in Oliver [1996: 14-20].) Given such motivations one must settle on an ontology of properties, of which two main families are popular: realist theories (properties are universals) and class nominalist theories (properties are classes). This paper argues that an alternative, not discussed since Armstrong’s criticisms from the late 70s, has been unduly ignored: mereological nominalism (**MN**) – that properties are a fusion<sup>1</sup> of their instances (and relations fusions of their relata).

My argument is that a cost-benefit analysis favours **MN**. §1 lays out the competition; §2 explains **MN**’s benefits (namely that it’s ontologically parsimonious and explains certain modal principles); §3 examines the ideological aspects of **MN**, showing that it’s equitable compared to the competition; §4 dispatches extant objections from Armstrong; and §§5-6 discuss other likely objections. I conclude that, for a selection of popularly endorsed competing positions, there is a version of mereological nominalism that is to be favoured, with the specifics of each position (namely, the specifics of its ideology) varying depending upon what theory we compare mereological nominalism to. In short, **MN** deserves to be resurrected and included as a live option in the contemporary discussion about property ontology.

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<sup>1</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  $y$ .

## 1.1 Realist Theories

Define ‘Realism’ as the thesis that properties are *sui generis* entities (‘universals’), irreducible to any other category of entity [cf Oliver 1996: 25]. Flavours of realism differ over how to treat the instantiation relation:

Vanilla Realism: Instantiation is a primitive. [Armstrong 1989: 108]

Constituent Realism: According to Armstrong, states of affairs are ontologically fundamental [1997a: 115-6] and allow us to eliminate instantiation as a universal [1997a: 127]. This suggests the following analysis:  $x$  instantiates  $Fness =_{df}$  a state of affair has  $x$  and  $Fness$  as ordered constituents e.g. electron  $e$  instantiates *charge* iff a state of affair exists with  $e$  as the first constituent and *charge* as the second.

(An alternative) Constituent Realism: Objects have properties as constituents (e.g. an electron has *mass of 0.51 MeV* and *charge* as constituents), and we analyse thusly:  $x$  instantiates  $Fness =_{df}$   $x$  has  $Fness$  as a constituent. (See, e.g., Hawthorne and Sider [2001].)

Baxterian Realism: Analyse it as:  $x$  instantiates  $Fness =_{df}$   $x$  is partially identical to  $Fness$  [Baxter 2001; Armstrong 2004b] e.g. an electron instantiates *charge* just when it is partially identical to *charge*.<sup>2</sup>

## 1.2 Class Nominalism

Class nominalists reduce properties by identifying them with classes. There are two dimensions they vary along.

The first is exactly what they are classes of e.g. of property instances [Lewis 1986: 50-69; Quine 1940: 120], of tropes (see Oliver [1996: 34-37]), or of objects that resemble one another. For purpose of example, throughout I’ll consider that brand of class nominalism whereby properties are sets of property instances (or, in the case of relations, sets of ordered tuples of the relata), which means that having a property is analysed as standing in the membership relation to that property (in the case of relations: standing in the ancestral of membership to that relation). The argumentative strategy of this paper should copy over to the variant forms.

The second dimension is what view one has of the structure of sets:

Subclass-Part Class Nominalism: Classes are composed of their subclasses; membership is nothing like parthood; properties are classes. (This is the view of Lewis [1991].)

Member-Part Class Nominalism: Classes are composed of their members; membership can be analysed in terms of parthood (or is in some sense like parthood); properties are classes. (Fine [2010] and Caplan, Tillman, and Reeder [2010] accept the first two points, although no-one explicitly endorses all three – indeed, Caplan *et al*’s theory is incompatible with it. However, we can imagine developing a theory that accepts Fine’s position that members are parts of sets and combines it with class nominalism.)

Non-mereological Class Nominalism: Classes have no mereological structure whatsoever; membership is primitive; properties are classes.

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<sup>2</sup> This list is not comprehensive, missing out, e.g., ‘locationism’ [Cowling 2014] and both Forrest’s operationalism [2006] as well as his more recent theory [2013]. But, in this paper, I will concentrate only on the above and leave development of discussions of these other theories to another time.

## 2. Motivations for MN

With the competition in place we can turn to reasons to accept **MN**.

### 2.1 The Promise of the Desert Landscape

One reason for accepting **MN** is if you yearn for a ‘desert landscape’ consisting only of material objects.<sup>3</sup> Previously, such yearnings have thought to be met only by giving up on the reifying motivations and eliminating properties (and doing likewise for sets, numbers etc.) but **MN** could make room for both. Those who yearn for the desert landscape, but accept some reifying motivation, include van Inwagen, who is explicit that he wants an ontology solely of material objects but feels he cannot get it because of reifying motivations [2011: 400] and Quine, who initially disdained properties [Goodman and Quine 1947] and only later came to accept them<sup>4</sup>. So **MN** has the benefit of eliminating commitment to things that nominalist scruples intuitively abjure. Whilst we might, ultimately, need more than **MN** (for we might be motivated to commit to other things that are neither properties nor *prima facie* reducible to material objects) it’s nonetheless a step in the right direction.

### 2.2 Ontological Parsimony: Compared to Realism

A second, albeit connected, motivation is that **MN** is ontologically parsimonious compared to the competition. First consider the realist. If a realist believes some things that are not properties (e.g. objects, events, numbers etc.) are fundamental and that the properties are also fundamental, then **MN** is clearly more parsimonious: mereological nominalists can accept the original non-property things that the realist accepts and ontologically reduce the properties by identifying them with fusions of those things. Clearly this is qualitatively parsimonious (as there are less kinds of things) and quantitatively parsimonious (for now there are only the things and the fusions, rather than things, fusions, and distinct properties).<sup>5</sup>

A wrinkle is if this imagined realist denied that the fusions of the original things exist, in which case **MN** has commitments that realism does not. However: (i) unrestricted composition is popular (see Effingham [2009*b*: 300] for a list), and – as a notable *ad hominem* – realism’s main stalwart, Armstrong, accepts it [1989: 92]; (ii) **MN** eliminates an entire category at the cost of including extra fusions – many will rank that as a minor cost in return for a major benefit. So set aside this wrinkle.

A ridge, and not merely a wrinkle, is that realist theories often do not take things other than properties to be fundamental, instead having everything else constructed solely out of properties. Call this ‘extreme realism’ – example extreme realists include Paul [2002, 2012], Dasgupta [2009], Borghini [2012], and many bundle theorists will go in that category as well (e.g. van Cleve [1985]). Given extreme realism there are some things (e.g. objects, events, numbers etc.) but they are

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<sup>3</sup> Some nominalists explicitly demand merely an ontology *sans* abstracta or *sans* universals rather than consisting of nought but material objects. But I take it one’s nominalist scruples are that we commit only to familiar things such as material objects. (See, e.g., Melia [2007: 99-100].)

<sup>4</sup> Although Quine saw commitment to properties as a cheap by-product of committing to classes [1940: 120], and classes ruin one’s desert anyhow. But we might be able to reduce classes to properties (§2.3) so a Quinean could be swayed back to the desert landscape even if they thought classes were indispensable.

<sup>5</sup> There might be an infinite number of such things, but even then it seems *intuitive* that one theory has, in some sense, ‘less’ of them. We can ground this intuition using technical devices like that introduced by Nolan [1997] to allow us to fruitfully compare theories along the dimension of parsimony even when the same infinite cardinality of entities exist according to the theories compared.

constructions out of fundamental properties. Problematically, the mereological nominalist wants to identify properties with constructions of those things, which would then be more fundamental than the properties, thus making *more* things more fundamental than the properties (for now the properties are non-fundamental and the objects, events, numbers etc. are fundamental). The only hope is that the mereological nominalist can construct an ontology consisting of just one category of fundamental things (e.g. material objects), from out of which they construct properties of those things (e.g. properties of material objects) from which they further construct, or learn to live without, all other things (e.g. all other things are constructed from objects and/or properties of material objects). But even then, it's only *as* parsimonious as the extreme realist ontology; conclusion: compared to extreme realism, **MN** is not more parsimonious. This is not as troubling as you might imagine. At best the mereological nominalist will be able to pull off the construction of their one category ontology and/or the extreme realist will be swayed by one of the other benefits **MN** can provide. At worst, assuming that the mereological nominalist cannot construct a one category ontology, we can scratch extreme realists off of the list of people **MN** will appeal to; as many realists are not extreme (Paul [2012: 230] comments that moderate realism has the pedigree, as well as providing a lengthy list of moderate realists [2012: 229]) that doesn't scupper the overall aim of the paper: to argue that **MN** is a viable, live theory that will prove compelling to *some* people (not *everyone!*). With this in mind, we shall press on.

### 2.3 Ontological Parsimony: Compared to class nominalism

The same thoughts do not quite apply to class nominalism for most class nominalists have additional motivations for believing in classes than the reifying motivations (e.g. their being indispensable to mathematics). So even if we reduced properties to fusions of instances, the class nominalist would demand that we include classes anyhow, and the two theories end up equitably balanced: both theories include some things plus classes, varying over whether properties are a fusion of some of the former or one of the latter.

The mereological nominalist still has some room for manoeuvre if we can eliminate or reduce classes by: reducing classes to (or eliminating them in favour of) properties (see Bealer [1982] or Russell); reducing classes to things with properties as constituents (e.g. states of affairs [Armstrong 2004: 112-124; 2010: 97-100]); given the mereological nominalist ontology includes *instantiating some property or another* (as it is the fusion of everything) we could reduce classes to complexes of their members plus that property as a 'formal part' [Caplan, Tillman, and Reeder 2010]; or, if you would find it satisfactory to lose classes as long as you kept properties and numbers, we could reduce numbers to properties [Armstrong and Forrest 1987]. In short, once properties are installed in our ontology we might have ways of dispatching classes. Usually such a move would be of little interest to a class nominalist (for we eliminate/reduce classes only at the expense of including some properties which are, standardly, as problematic as classes in some salient respect e.g. both are standardly thought of as abstract) but given **MN** the move is interesting as we now compare class nominalism (an ontology of some things – objects, events etc. – plus classes) to mereological nominalism (an ontology of just those things and their fusions as classes are now eliminated or reduced). If you find any of the listed reductions/eliminations attractive (but disparaged them because they apparently needed properties and an unwanted concurrent commitment to realism) then **MN** can give you a better ontology.

## 2.4 Recombinatorial Elegance

The core idea behind the Humean principle of recombination is that, as long as two things are distinct, they can be ‘freely recombined’ in different ways. Exact specifications of the principle vary (see, e.g., Nolan [1996: 239], Efrid and Stoneham [2008], and Darby and Watson [2010] *inter alia*) but it is standard to think that mereological relations limit the free recombination of entities – that is, that the ‘as long as two things are distinct’ caveat is important. Whilst there seems to be something misleading about that caveat (e.g. I can exist without my parts in the sense that I could have different parts or that I could be a giant mereological simple) it also seems to capture something right in banning worlds at which, say, there are particles arranged tablewise without a corresponding table. Whilst we *could* permit the existence of such worlds, and make composition contingent [Cameron 2007, Miller 2009, Parsons 2013], such a position is infrequently signed up to and, certainly, Humeans aren’t *committed* to contingent composition. So (something like) the caveat will feature in most people’s current understanding of Humean recombination.

**MN**’s competitors have problems with the principle, even with that caveat. Assuming properties are wholly distinct from their instances, recombination would then permit the existence of ‘ostrich worlds’ exactly the same as the actual world but with properties freely recombined away. If we are compelled by the reifying motivations, this situation – which is similar to Rosen’s world without numbers [2002] (see also Cameron [2008: 32] and Hofmann [2006]) – will be intolerable. The competitors can ultimately gel with Humeanism by adding in some additional theoretical machinery, for example:

- Conscript in counterpart theory to avoid these problems [Lewis 1991: 37-38].
- Have it that properties exist from the *standpoint* of a world and not *at* the world [Lewis 1983: 39-40], and are thus to be ignored when it comes to recombination.
- Add in further caveats to solve the problem (Cameron [2008] adds that ontologically dependent entities cannot be recombined; Hofmann [2006] gives an entirely new, quite unHumean, principle).

However, **MN** needs no additional theoretical machinery whatsoever, and can make do with the original caveat: in the same way that having particles arranged tablewise obliges a world to include a fusion of those particles, having some instances of a property makes it obligatory to include their fusion – that is, the property. **MN** can, therefore, more elegantly deal with the Principle of Recombination than its competitors and such theoretical elegance – the lack of a need for additional machinery – is a virtue. One might not weight this benefit heavily, seeing such elegance as granting little metaphysical benediction, but as the rest of this paper makes clear, even a little benefit might be enough to favour **MN** overall if the comparative costs are correspondingly minor or non-existent.

An objection to this benefit is that if universals/classes are *not* wholly distinct from their instances, the competitors can say the same. Start with those realists who believe that all things are fusions of their properties (or maybe properties plus a substratum). **MN** no longer has the comparative benefit of recombatorial elegance but scores well elsewhere instead by explaining why properties cannot exist without an instance (obviously, if you think properties *can* exist without instances this will be a bad thing – but then you are, null objects aside, unlikely to be attracted by **MN** in the first place!). **MN**’s explanation is obvious: if the property is a fusion of

instances, clearly instances must exist. If, however, objects are fusions of properties, some explanation is called for as to why such a principle is true. Compare to physical wholes and imagine what would be the case if composition was restricted. Some things might then be parts of nothing e.g. a lone mereological simple in the midst of space. But why, then, can't we say the same of properties? Why can't an uninstantiated alien property like *schmarged* be like the atom, and be part of no instance? An explanation is called for! Now run the comparison whilst imagining composition was unrestricted. Now everything composes, so no object fails to be a part of a further material object (and no property fails to be a part of anything either). But in the same way that we think fusions of material objects can be sifted into two categories (the 'ordinary objects' like hydrogen atoms or people, and 'gerrymandered objects' like trout-turkeys), the realist must say that fusions of properties are likewise (lest we think the existence of *mass of 0.51 MeV* and the property *Kangaroo* – which, as composition is unrestricted, and we are committed to their fusion – absurdly demands the existence of electron sized marsupials!). So some property fusions are 'ordinary instances' whilst others (like that of *mass of 0.51 MeV* and *Kangaroo*) are 'ignorable gerrymandered property fusions'. But then we must recast the original principle that every property must have an instance as: every property must have an ordinary instance (for otherwise the properties we normally think of as being uninstantiated might be instantiated, but merely instantiated by the ignorable gerrymandered property fusions). And now that revised principle needs explaining; I suggest that the explanation will not be as elegant nor as straightforward to find as that explanation the mereological nominalist has available in explaining why every property has an instance. Again, then, mereological nominalism has the upper hand.

Class nominalists can do somewhat better. The non-mereological and subclass-part class nominalist can't, as neither thinks the members of the class are parts of the class and are stuck with the original failure to guarantee recombinatorial elegance, but the member-part class nominalist says exactly what is needed. Moreover, the member-part class nominalist can easily explain why properties must have instances, using more or less the same explanation as the mereological nominalist: an uninstantiated property would be a class with a member that doesn't exist, but every class is a class only of existent things so there can be no uninstantiated properties. Here I concede: with regards to this particular benefit, member-part class nominalism is on a par with mereological nominalism – against the other theories, though, it is superior as to how it handles recombination and explanation.

### 3. Ideology

Whilst those are the benefits of **MN**, many will suggest there are outweighing costs. One example cost stems from the Armstrong-Quine objection to mereological nominalism [Armstrong 1978*b*: 34-35; Quine 1950: 624]. This section responds to that objection, whilst simultaneously working into its solution a discussion of what ideology the mereological nominalist should adopt (and whether the adoption of such ideology incurs a theoretical cost).

The Armstrong-Quine objection assumes mereological nominalists will endorse:

**RHS<sub>></sub>:**  $x$  is  $F$  iff  $x$  is a part of the fusion of all  $F$  things.

As **RHS**<sub>></sub> is false (for an electron is a part of the fusion of all Republicans, but no electron is a Republican) **MN** is false. We can avoid this by denying **RHS**<sub>></sub> and giving a different account of instantiation – that is, a different account of **MN**'s ideological commitments.<sup>6</sup> The specifics, however, vary depending upon what rival theory we compare **MN** to (so we will end up with many varieties of mereological nominalism, each suited to convince a different competitor to switch allegiance to endorsing **MN**).

### 3.1 Compared to vanilla realism

Vanilla realists fill out the right hand side of **RHS**<sub>></sub> differently:

**RHS**<sub>INS</sub>:  $x$  is  $F$  iff  $x$  instantiates  $F$ *ness*.<sup>7</sup>

If we are comparing **MN** to vanilla realism, the mereological nominalist should accept that instantiation is primitive, that **RHS**<sub>INS</sub> is true, and that some objects (the instances) stand in that primitive relation to some other objects (the properties). And there's no reason to think **MN** cannot mirror the vanilla realist's ideology – it'd be churlish to think the realist can corral the primitive off just for themselves.

One objection is **RHS**<sub>INS</sub> makes my theory a realist theory. But this is an irrelevant terminological quibble – define 'realism' however you want, for all I care about is whether **MN** is true or not, not how we should label the theory we end up with. And nothing about what we take as primitive undermines the benefits of **MN** from §2, so you should still feel compelled to endorse it (even if you then want to call it a 'realist theory').

A more pressing objection is that the vanilla realist's ideological stock consists only of instantiation, whereas **MN** must have both instantiation *and* a mereological primitive (e.g. proper parthood) given that the latter features in the statement of **MN** itself. So **MN** gets a leaner ontology, but only at the cost of fattening the ideology. But this sounds like a good deal: we accrue one extra primitive in return for the gift of eliminating a whole category of *sui generis* entities – and it's also a straightforward, non-mysterious primitive to boot. At this stage one might say that as we haven't panned out the details of how to weight ideological versus ontological simplicity (and some [e.g. Bennett 2009: 62-65] are highly suspicious of whether it's even possible to give such details) I can't make such claims about my theory being the better deal. There's merit in this objection, but it plays into the hands of the ultimate aim of bringing **MN** back to be considered as a live option in the ontology of properties – if the jury is out on matters of exactly how to weigh parsimonious costs and benefits, then the vanilla realist must accept that the jury is out on which of **MN** or vanilla realism is true.

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<sup>6</sup> Ben Smart pointed out that if our reifying motivation demanded only fundamental properties, and we thought such things were instantiated merely by mereological simples, we could instead avoid the problem by saying:  $x$  is  $F$  iff  $x$  is a mereological simple that is a part of  $F$ *ness*. Whilst the conjunctive antecedent is not implausible, this paper (charitably) assume it is false.

<sup>7</sup> Clearly this only applies if  $F$  is some sort of natural predicate, for some predicates – e.g. '\_\_\_ is non-self instantiating' – cause problems. When discussing **MN** Armstrong ignores this issue, and I follow his lead in treating it as a tangential nuance of no relevance to what follows.

### 3.2 Compared to constituent realism

Constituent realists endorse:

**RHS<sub>CON</sub>**:  $x$  is  $F$  iff there exists a state of affair with ordered constituents, where  $x$  is the first constituent and  $Fness$  is the second.

When we compared **MN** to vanilla realism I imagined a mereological nominalist who endorsed their ideological principle (**RHS<sub>INS</sub>**); similarly, when compared to the constituent realist imagine the mereological nominalist accepts **RHS<sub>CON</sub>**. (If you fear that no object can have a fusion that it is part of as a constituent, forfend this worry until §5.)

As with vanilla realism, one may worry that mereological nominalism is ideologically worse off than constituent realism, for constituent realism has one primitive (concerning constituency) and **MN** has two (parthood and constituency). But just as ontological parsimony is split into two types – qualitative and quantitative – the same applies to ideological parsimony: quantitative ideological parsimony lowers the *number* of primitives in our ideology, whilst the qualitative brand lowers the different ideological categories. As with ontological categories, there are no hard and fast rules as to what counts as a different ideological category, but (just as with ontological categories!) we have a good, intuitive grip of what qualifies e.g. ‘spatiotemporal separation’ and ‘set membership’ are in different categories; ‘parthood’, ‘overlap’ and ‘disjointedness’ are in the same. Just as is the case with ontological parsimony, we should favour qualitative ideological parsimony over and above its quantitative cousin (and, further, there are compelling reasons to do so beyond this analogy with ontological parsimony – see Cowling [2013]). Constituency and parthood are in the same category – after all, constituency is often referred to (quite properly) as ‘non-mereological parthood’ (further, Bennett [2011] presents an extended case for thinking the same) – so **MN** is on a par with constituent realism when it comes to ideology, for it has the same number of *categories* of ideological primitive. (It bears noting that if we could further argue that instantiation and parthood were in the same category – *à la* Forrest [2013] – we could say the same of the comparison to vanilla realism and give no ground to the vanilla realist at all.)

Similar thoughts apply to the variant of constituent realism, which endorses:

**RHS<sub>CON\*</sub>**:  $x$  is  $F$  iff  $Fness$  is a constituent of  $x$ .

The same reasoning applies, and the mereological nominalist can endorse **RHS<sub>CON\*</sub>** to end up with a theory on an ideological par with the (alternative) constituent realist.

### 3.3 Compared to Baxterian realism

Baxterian realists endorse:

**RHS<sub>PI</sub>**:  $x$  is  $F$  iff  $x$  is partially identical to  $Fness$ .

They hold that an instance is identical to the plurality of things that wholly constitute it, where the  $xs$  wholly constitute  $y =_{df}$  the  $xs$  are all and only the constituents of  $y$ . In combination with **RHS<sub>PI</sub>** and a commitment to properties being constituents, we get the results we want (i.e. that electrons instantiate *mass of 0.51 MeV* etc.). When we imagine persuading the Baxterian Realist



that mereological nominalism is true, we should imagine we are comparing their theory to a version of **MN** accepting **RHS<sub>PI</sub>**. The mereological nominalist can now say exactly what the Baxterian says, and that objects have their properties as constituents and that the objects are identical to the plurality of properties that constitute it. There is now no impediment to the mereological nominalist saying whatever the Baxterian says. For instance, where the Baxterian says an electron has *mass of 0.51 MeV* and *charge* as constituents, is identical to the plurality of those two properties, and instantiates the properties because it is partially identical to each of them, the mereological nominalist simply says exactly the same. This does mean that an electron is, e.g., identical to the plurality of two fusions, one being the fusion of every object with a mass of 0.51 MeV and the other being the fusion of every negatively charged object, which might strike some as strange – here you must rely on an earlier issued promissory note and put off those worries until §5 when I give them a full investigation.

One objection to the mereological nominalist would be that they are in trouble if composition is identity (a far from bizarre position to endorse if we already think whole constitution is identity). In that case, the mereological nominalist is faced with two problems that the Baxterian might not be: *Problem One*: my hand is now partially identical to me, but that means (given **RHS<sub>PI</sub>**) I must instantiate my hand, which makes no sense!; *Problem Two*: we can redux the original Armstrong-Quine problem for an electron is part of, and so partially identical to, the fusion of all Republicans and should – given **RHS<sub>PI</sub>** – be a Republican. But, if composition is identity, the first problem is a problem for the Baxterian as well. They, too, must now think there are some things partially identical to other things which are not instantiated by the former i.e. me and my hand. Presumably they'll modify **RHS<sub>PI</sub>** and say that objects only instantiate some of the things they are partially identical to, e.g. only the properties.<sup>8</sup> But then the mereological nominalist can say the same.

Dealing with problem two is trickier, and the details depend upon whether or not we think properties are not just constituents, but mereological parts of their instances. If they are (and, say, being a constituent of an object is just a particular way of being a mereological part of it) a similar problem to problem two arises for the Baxterian. As *mass of 0.51 MeV* is then a part of an electron, which is a part of me, and parthood is transitive, *mass of 0.51 MeV* is a part of me and I'm partially identical to it; clearly, though, I do not instantiate it! The Baxterian must say I don't instantiate every property I'm partially identical to, and will need to develop a further modification to **RHS<sub>PI</sub>** which ensures that only some properties that I am partially identical to I end up instantiating. But if this is possible (and it's not clear that it is – which would be bad for the Baxterian!) the mereological nominalist should be able to mirror this modification, and develop an analogous modification which means that, e.g., an electron only instantiates *some* of the properties it is partially identical to (namely *mass of 0.51 MeV* and not *Being a Republican*).

If, on the other hand, composition is identity but properties are not parts of instances, then problem two (nor any similar problem) isn't an issue for the Baxterian since properties are no longer parts, so the transitivity of parthood doesn't lead to any commitments like instances being

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<sup>8</sup> Indeed, if they accepted the existence of substrata they'd have had to have made that change already lest objects instantiate their substratum.

partially identical to the constituents of their sub-atomic parts. But now the Baxterian thinks there are two ways to be partially identical to something: either by having it as a constituent (as with properties) or by having it as a mereological part (as with electrons and hands). That means we can't analyse what it is to be a constituent (or a part) solely in terms of partial identity; partial identity is no longer primitive. Instead we take as primitive, say, both constituency and proper parthood and analyse partial identity in terms of those primitives. But having done this, the Baxterian has given the mereological nominalist the tools they need to reconsider **RHS<sub>PI</sub>** entirely. The mereological nominalist can instead endorse **RHS<sub>CON\*</sub>**, comparing the Baxterian theory, with its two primitives of constituency and mereology (and which endorses **RHS<sub>PI</sub>**) to a version of mereological nominalism with exactly the same primitives (but which endorses **RHS<sub>CON\*</sub>**). Having endorsed **RHS<sub>CON\*</sub>** the mereological nominalist avoids all of the problems that stemmed from endorsing **RHS<sub>PI</sub>**. Given this type of Baxterian admits that constituency is a primitive in addition to parthood, there seems to be no downside to endorsing the alternate analysis. So – again – some flavour of **MN** and Baxterian realism are in parity and this combination doesn't favour the Baxterian.

### 3.4 Compared to class nominalism

Finally, compare **MN** to class nominalism. Compared to someone who thinks classes are composed of their subclasses – the subclass-part class nominalist – we should imagine a version of mereological nominalism including **RHS<sub>INS</sub>**. The class nominalist will need two primitives (a set-theoretical notion like ‘\_\_is the singleton of\_\_’ to get the singletons and a mereological relation like proper parthood to construct the classes). This is on a par, *qua* quantitative ideological parsimony, with our imagined mereological nominalist's two primitives of instantiation and, say, proper parthood. With regards to qualitative ideological parsimony they are also on a par since the subclass-part class nominalist denies that the set-theoretical primitive is akin to parthood [Lewis 1991: 29-35] (for if they didn't deny it, they'd be member-part class nominalists instead). Moreover, as membership is nothing like parthood it becomes – as Lewis says himself – a somewhat abstruse relation so one of the arguments against accepting instantiation as primitive – that it's mysterious and weird [Armstrong 2010: 26; Forrest 2006] – is no longer an issue when comparing the two theories.

Move, then, to what the mereological nominalist should say of the member-part class nominalist who has accepted a Fine-style mereology whereby classes have members as parts. Now class construction is in the same ideological category as parthood; member-part class nominalism is, whilst quantitatively on a par with a version of mereological nominalism endorsing **RHS<sub>INS</sub>**, qualitatively better as the class nominalist's primitives are now in the same category. When trying to sway the member-part class nominalist, a different tack is called for. Having co-opted Fine's theory of parthood we have 'liberalised' parthood: if classes can have parts then parthood can stretch between different categories e.g. between abstract classes and their concrete members (indeed, the liberalisation extends to principles like weak supplementation being false). Given such liberalisation, particularly in having concrete entities compose not just other concrete entities but abstracta as well, there's little impediment to thinking that objects have a structure whereby properties 'compose' objects i.e. whereby properties are constituents of instances. Given

that, we can endorse **RHS<sub>CON</sub>\***. Alternatively we may say that, as some things compose abstract classes, there's little reason not to think that some things (properties and instances) compose abstract states of affairs; we could, then, endorse **RHS<sub>CON</sub>**. Either ways, the liberalisation of parthood permits us having an ontology whereby we can endorse **RHS<sub>CON</sub>/RHS<sub>CON</sub>\***, taking some constitution relation as primitive, and that relation would – like the member-part class nominalist's primitive of set membership – be in the same ideological category as parthood. Once again we arrive at a version of mereological nominalism that is ideologically on a par, both quantitatively and qualitatively, as its competitor.

The only theory that mereological nominalism fares badly against is one that eschews all temptation to think classes have anything akin to a mereological structure, for they then aren't shackled to taking a mereological notion as primitive in order to construct the classes. That doesn't mean mereological nominalism is definitely worse off compared to such a theory, only that it is worse off ideologically (and such a 'non-mereological class nominalist' might be attracted to mereological nominalism's other qualities and be willing to make a trade-off at the cost of one extra primitive). This leaves us in much the same situation as the comparison to vanilla realism: not obviously better, but not so much worse off that it's inconceivable that a proponent of this view will be swayed. That is enough for the conclusion of this paper – that mereological nominalism should be taken seriously once more – to stand.

### 3.5 Taking Stock

Compared to realism, then, **MN** is almost always on a par, ideologically speaking, to its competitors. The exceptions were vanilla realism and non-mereological class nominalism where, it was argued, the competitor theory was better off but methodological considerations nonetheless left open that we might still favour such theories given the benefits offered in §2. This means that many moved by the reifying motivations, who currently favour some flavour of realism or class nominalism, should now *ceteris paribus* favour **MN**. Doubtlessly, though, people will say that all else is not equal and **MN** has debilitating (and, one might think, obvious) costs that outweigh any benefits from §2 quite apart from worries concerning ideological parsimony or the Armstrong-Quine objection. §§4-6 discuss possible costs, and why they should not be seen as too worrying.

## 4. Armstrong's Objections

We shall start with other objections Armstrong raised to **MN** other than that described at the start of §3.

### 4.1 The Order of Analysis

Where the symbol ' $\Rightarrow_v$ ' stands for the relation 'The proposition \_\_ is true in virtue of the proposition \_\_ being true', Armstrong [1978*b*: 35; *cf* 2010: 8-9] believes mereological nominalists should endorse:

**Commitment:**  $\langle x \text{ is } F \rangle \Rightarrow_v \langle x \text{ is a part of the fusion of all } F \text{ things} \rangle$

This is problematic given two other principles. The first Armstrong says is obvious (and I'll charitably agree, although I have my doubts):

**Obvious:**  $\langle x \text{ is a part of the fusion of all } F \text{ things} \rangle \Rightarrow_v \langle x \text{ is } F \rangle$

The second is that  $\Rightarrow_v$  is asymmetric:

**Virtue Asymmetry:**  $\langle A \rangle \Rightarrow_v \langle B \rangle \rightarrow \sim \langle B \rangle \Rightarrow_v \langle A \rangle$

Given all three, we have a contradiction.

Mereological nominalists should deny **Commitment**. Perhaps if **RHS<sub><</sub>** was true, **Commitment** would be true, for we might think that the bi-conditional in **RHS<sub><</sub>** bespake the  $\Rightarrow_v$  relation. But **RHS<sub><</sub>** is not true, and some other principle is favoured, which doesn't justify **Commitment**. For instance, if we accepted **RHS<sub>INS</sub>** it'd – at best – justify:

$\langle x \text{ is } F \rangle \Rightarrow_v \langle \text{The fusion of all } F \text{ things is instantiated by } x \rangle$

This doesn't conflict with **Obvious**. (Similarly for **RHS<sub>PI</sub>**, **RHS<sub>CON</sub>**, **RHS<sub>CON\*</sub>** etc.) Once mereological nominalism takes upon itself different ideological trappings than initially assumed, this objection falls by the wayside.

## 4.2 The instantiation regress

The instantiation regress goes as follows: we should explain the instantiation of *Fness* by some  $x$  by saying that *Fness* and  $x$  jointly instantiate the property *Instantiation*; to explain that fact we need to say that *Fness*,  $x$  and *Instantiation* jointly instantiate *Instantiation* etc. Assuming it's a vicious regress, we have a problem.

This problem fades when we compare **MN** to the competing theories: whatever opt-out the competitor utilises when faced by the regress, the mereological nominalist can rely upon as well. For instance, class nominalists / regular realists might embrace the regress as being benign [Armstrong 1997*a*: 118-19] (in which case, so can **MN**) or repudiate the existence of *Instantiation*, saying instantiation is a matter of brute fact (which **MN** can do as well). In short, if the regress is a worry, it's a problem for everyone and not a cost in comparison.

Consider a worked example of how the mereological nominalist could co-opt a competitor's response, namely Armstrong's 'fundamental ties'. Armstrong argues that realism escapes the regress for, unlike primitives such as membership and resemblance, instantiation is a 'fundamental tie' rather than a relation, and as it is a 'tie' it escapes the regress [1989: 108-10; 2010: 27]. Armstrong isn't explicit over what makes something a fundamental tie rather than a relation, but indicates that it's to do with the level of 'intimacy' between the relata [1978*b*: 109-10]. For instance, distance relations are relations, and not ties, because I'm not intimately connected to things I'm 20 metres away from, whereas the size and shape of an object are distinct, but intimately connected, features of something. Instantiation, says Armstrong, is intimate in that respect.

But mereological nominalists can ape this move. Take a version of **MN** mirroring Armstrong's position, and so endorsing **RHS<sub>INS</sub>**, thereby having two primitives that might prove worrisome: instantiation and parthood. With instantiation, the mereological nominalist can say exactly what Armstrong says: if instantiation is intimate enough to be a tie for Armstrong, it can be intimate enough to be a tie for the mereological nominalist. Then, if we accept that composition is identity, we can say that parthood is also a fundamental tie as it, too, is a brand of identity. So no regress can arise from that either, and Armstrong's escape route is one open to **MN** as well.

### 4.3 Co-extensive properties

Armstrong's next problem is of co-extensive properties [Armstrong 1978*b*: 35-36; see also Quine 1950: 626-8]. If every cordate was a renate, and vice versa, then both *Cordate* and *Renate* would be fusions of the same instances. Given:

**Uniqueness:** If  $x$  and  $y$  are both composed of the  $\xi$ s, then  $x = y$ .

*Cordate* and *Renate* would then, wrongly, be one and the same property.

But, thirty years on from the publication of Armstrong's *Nominalism and Realism*, we are well acquainted with the problems surrounding such moves, mostly through the problem of the statue and the clay where two apparently distinct objects (a clay lump and the statue it is shaped into), with two differing sets of properties (e.g. being Romanesque versus not [Fine 2003: 207], or being capable of surviving being crushed versus not) are composed of the same things (the clay atoms). Clearly that is similar to two apparently distinct properties being composed of the same instances. Some resolution is called for the former, which I dare say will resolve the latter. For instance, the clay atoms could (somehow, someway) compose *both* the lump and the statue (i.e. **Uniqueness** is denied). If that's acceptable, the cordates/renates could compose two distinct properties. Alternatively we might bite bullets and say that the statue and lump don't have different properties e.g. we should revise our beliefs about the lump and say that it *cannot* survive being crushed and *can* be Romanesque. But then **MN** can say the same about *Cordate* and *Renate* and say that they are identical and, e.g., revise our belief that a creature could instantiate one property but not the other. Or we might endorse a theory of Abeldarian predication [Noonan 1991] whereby the reference of the predicate is affected by the subject term it is attached to. But then **MN** can say the same. Or we might rely on relative identity. But then **MN** can say the same. etc. In short, many resolutions to the statue/lump problem relieve us of the cordate/renate difficulty. It should be noted that it is not every solution. For instance, if we avoid the statue/lump paradox by endorsing mereological nihilism, the mereological nominalist probably cannot say the same (for no non-single instanced properties could then exist). Or if we endorsed a theory (say Koslicki's theory of formal parts [2008]) whereby properties being constituents of objects resolves the paradox, the mereological nominalist is denied this on pain of circularity. But this does little to diminish the main claim of this paper: that a broad swathe of people should find **MN** appealing. As neither nihilism nor Koslicki's theory are the overwhelming orthodoxy, I shall press on.

## 5. Constitutional Issues

### 5.1 The inheritance of location

If properties are constituents of their instances then, given **MN**, we have the odd situation of a huge, gerrymandered, and scattered, fusion being a constituent of one of its small, localised, instances (similarly, a mereological nominalist endorsing ‘whole constitution as identity’ must say that an instance is identical to a plurality of larger fusions, of which it is a part of each). We’d have no problem if we simply took umbrage at the very idea of constituency (see, e.g., Gilmore [Forthcoming] or van Inwagen [2011]), but it’d be better if **MN** coped with constituency – particularly as some of the versions of **MN** mooted above demand it.

I’ll start by sketching one way of posing the worry. Introduce the notion of ‘exact location’ (which is the same as Gilmore’s [2008: 1228], and McDaniel’s ‘occupation’ [2007: 132-33]). An object’s exact location is that place where all of it can be found and nothing more (e.g. a human would be exactly located at a human shaped region, a cube at a cube shaped region etc.). Define:

$x$  is partially located at  $r =_{df}$   $r$  is a (proper or improper) sub-region of a region that  $x$  is exactly located at.

One might then endorse:

**Constituent Location:** If  $x$  is a metaphysical constituent of  $y$  then  $y$  is partially located where  $x$  is exactly located.

They’ll endorse it because people often think that constituency is analogous to parthood. In the mereological case all wholes are partially located where their parts are, so **Constituent Location** holds by analogy. But **Constituent Location** leads **MN** awry when combined with the normal understanding of what universalism entails. To demonstrate, imagine that all that exists are three electrons ( $e_1$ ,  $e_2$ , and  $e_3$ ) each exactly located at disjoint spatiotemporal regions ( $r_1$ ,  $r_2$ , and  $r_3$ ). It follows that:

**$e_1$  location:**  $e_1$  is exactly located at  $r_1$  and not partially located at  $r_2$  or  $r_3$ .

Assuming universalists take fusions to be singularly located they accept:

**Universalism<sub>SL</sub>:** For all  $y$ s, the  $y$ s compose an object that is exactly located at the fusion of the regions the  $y$ s exactly occupy.

Given **MN**, some fusion of the three electrons is the property of negative charge: call it  $Q$  for short. Given **Universalism<sub>SL</sub>**,  $Q$  is exactly located at  $r_1+r_2+r_3$ . Given **Constituent Location**,  $e_1$  is partially located at  $r_1+r_2+r_3$  (as  $e_1$  has  $Q$  as a constituent). By definition an object is partially located at every sub region of any region it is partially located at, so it follows:

**$e_1$  location\*:**  $e_1$  is partially located at  $r_1$ ,  $r_2$ , and  $r_3$ .

Clearly that contradicts  **$e_1$  location** so one of **Constituent Location** and **Universalism<sub>SL</sub>** has to go.

I want to explore denying **Universalism<sub>SL</sub>**. We need some version of universalism to guarantee the gerrymandered fusions which **MN** identifies with properties, but we don't need **Universalism<sub>SL</sub>**. Consider instead:

**Universalism<sub>ML</sub>**: For any disjoint objects, the  $y$ s, and any regions, the  $r$ s (where each  $y$  exactly occupies an  $r$  and every  $r$  is exactly occupied by some  $y$ ) and any regions, the  $R$ s (where each  $R$  is either an  $r$  or is composed of some  $r$ s), there is an object composed of the  $y$ s which is exactly located at each of the  $R$ s.

**Universalism<sub>ML</sub>** entails not only that there's the regular, singularly located, fusion of  $e_1$ ,  $e_2$ , and  $e_3$  (exactly located at  $r_1+r_2+r_3$ ) but lots of other fusions multiply located at all combinations of  $r_1$ ,  $r_2$ ,  $r_3$  and their fusions. Most importantly, there's a fusion, which we can identify  $Q$  with, exactly located at each of  $r_1$ ,  $r_2$ , and  $r_3$ . To show how this helps our problem, consider immanent realism. According to immanent realism  $Q$  is both a constituent of  $e_1$  and exactly located at each of  $r_1$ ,  $r_2$ , and  $r_3$ , yet we don't standardly worry that immanent realism is committed to  **$e_1$  location\***. And rightly so, as can be shown by an analogy. Imagine a time travelling particle is such that its past version is a part of me and its time travelling future version is somewhere near Pluto. Normally we think I am partially located where my parts are, but we shouldn't now think I am partially located near Pluto! My partial location isn't determined by the location of the future version of the time travelling particle, only the past version that is a part of me (see also Effingham [2013: 332-3]). Analogously,  $e_1$  only has to be partially located where *its* 'version' of  $Q$  is – namely, only at  $r_1$  and not at either of  $r_2$  or  $r_3$ . This is true whether  $Q$  is a multi-located universal of immanent realism or a multi-located fusion of mereological nominalism. So, if the worry is posed in this way, there is no problem. And other ways of posing the problem are just variations on a theme. For instance, if the mereological nominalist endorses 'whole constitution as identity', whilst it initially seems odd that an instance is identical to the plurality of larger fusions, when we see that the larger fusions are multi-located it's not a problem – just as the immanent realist can think the properties  $Q$  and *mass of 0.51 MeV* are the sole constituents of electrons, and that the electrons they constitute are not, thereby, identical, the mereological nominalist can think the same.

So mereological nominalists have no problem if **Universalism<sub>ML</sub>** is true. And, crucially, it can be independently motivated. First, consider a motivation for universalism: resolving certain kinds of disagreements. Take some temporal parts of a car, some of which (those from earlier times) are within a garage (call them the  $x$ s), and some of which (those from later times) are outside the garage (call them the  $y$ s). Imagine we are having a dispute with a tribe of 'Garagists' who believe that the  $x$ s compose a further object (an 'incar'), and the  $y$ s compose a further object (an 'outcar'), but that the collection of the  $x$ s and  $y$ s together compose nothing (i.e. there is no car). We disagree, believing that neither the  $x$ s compose nor that the  $y$ s compose (i.e. there are no incars or outcars), but that together the  $x$ s and  $y$ s compose a car. There seems to be no easy way to resolve this dispute, for no microscope – no matter how strong – will ever detect the 'compositron particle' which appears when composition takes place. So to take sides seems to risk a form of prejudice for you have no good reason to favour one side over the other. One suggested resolution is to endorse universalism, for then composition always takes place, and everyone is right when they say there is an object composed of such-and-such things, and wrong when they

say that there isn't [Gilmore Forthcoming; Hawthorne 2006: xii; Sider 2008: 257-61; see also Bennett 2004]. But why stop there? We can further imagine people agreeing over the issues concerning composition, but having disputes over where the composite objects are located. One side says that cars are exactly located at a single spacetime region  $R$ , extended across four-dimensions; the other side says that cars exactly occupy many spacetime regions, namely the slices of  $R$  that are maximal sub-regions the times that the car exists at. Indeed, one reading of the endurantist/perdurantist debate is that exactly this dispute is taking place [see, e.g. Effingham 2012: 184-87]. Again, there does not seem to be any straightforward, empirical way to resolve it, so we're left with just philosophical reflection. And if we should endorse universalism to solve the mereological dispute, we should make the same move here: both sides are right, and there's both an object that is singularly located at  $R$  and an object that is multiply located at many slices of  $R$ . Once we generalise this lesson we will see that we will need a principle that populates our ontology with objects exactly occupying all sorts of regions, in all sorts of combinations e.g. that we should endorse **Universalism<sub>ML</sub>**. So **Universalism<sub>ML</sub>** has appeal independent of saving **MN**.

## 5.2 Dependency Issues

A second problem with gerrymandered fusions being constituents of their instances is that most endorse the following three theses:

**Dependence<sub>CON</sub>**: Objects ontologically depend upon their constituents.

**Dependence<sub>></sub>**: Wholes ontologically depend upon their parts.

**Dependence Asymmetry**: If  $x$  depends upon  $y$  then  $y$  cannot depend upon  $x$ .

Given **Dependence<sub>></sub>** the fusion of instances will depend upon its instances, but given **Dependence<sub>CON</sub>** (in conjunction, of course, with **MN**) each instance will depend upon that fusion. Given **Dependence Asymmetry**, that is impossible, so a premise must go. Fortunately, neither of the first two is impossible to deny (indeed, even **Dependence Asymmetry** has come under flak [Barnes MS; Bliss 2011; Thompson MS]). For instance, Armstrong says that the fundamental entities are the states of affairs, upon which everything else depends [2010: 27], but this means that the constituents of the states of affairs (e.g. particulars and universals) depend upon the states of affairs i.e. **Dependence<sub>CON</sub>** is false. Alternatively we might deny **Dependence<sub>></sub>** because we endorse priority monism (the thesis that all things depend upon the fusion of everything). This is no niche position [Cameron 2010; Schaffer 2010, 2013] and also, in that **MN** plus **Dependence<sub>CON</sub>** entails that wholes depend on certain objects that they are a part of (namely, their properties) and priority monism entails that objects depend on all objects that they are a part of, **MN** and priority monism are natural partners. So the mereological nominalist has live, and dialectically appropriate, responses to this worry.

## 6. Intrinsic Revulsion

Finally, you may fear that **MN** is simply ludicrous, and that a gerrymandered, scattered fusion of electrons could no more be the property *charge* than my mental state of being in pain could be identified with a cucumber from 1898 AD – it is just *obvious* that one cannot be the other. Put



differently: **MN**'s identification of properties with objects engenders an intrinsic revulsion that piles too high a cost on the theory to be believed. Connected to this would be worries like, e.g., *charge* and *red* having a mass, or a specific shade of a specific red rose, which nothing else possesses, smelling nice because its sole instance smells nice etc.<sup>9</sup>

This should not faze us for such concerns arise given many similar ontological reductions on offer. **MN** being true (and, e.g., some colours smelling) seems as unintuitive as: (i) works of music being perduring fusions of their performances (and, e.g., Beethoven's Piano Sonata No. 13 flitting in and out of existence when it goes from being played to unplayed); (ii) people being events (and, e.g., Barack Obama occurring); (iii) people being places (and, e.g., where I am having a pleasant day); (iv) organisations being objects (and, e.g., Barclays Bank Plc having a mass in kilograms); and (v) possibilities being spacetimes (and, e.g., the possibility that the world is flat being a concrete universe). But all have been suggested as reductions: Caplan and Matheson [2006] *vis a vis* (i); Campbell [2007] *vis a vis* (ii); Effingham [2009a: 42] lists supporters of supersubstantialism *vis a vis* (iii); Effingham [2010: 254] lists those who believe organisations are fusions of their members *vis a vis* (iv); and, obviously, Lewis [1986] *vis a vis* (v). So if we are happy with reductions in general (and ignore, or allay worries about, our intrinsic revulsion concerning those reductions), we should be happy with such reductions in the case of **MN**. And it's orthodox to think the antecedent is true for, as the examples above show, it is a common meme in ontology that such reductions are plausible.

With that objection dealt with, the renewal is complete. Whilst one may need certain assumptions to motivate it (unrestricted composition, priority monism, Koslicki's theory of constitution being false etc.) – and so I shy away from arguing that everyone should think **MN** is true – these assumptions are far from radical. Mereological nominalism looks to be far more viable than previously given credit for, and those who accept a reifying motivation, and who were previously driven towards realism or class nominalism, should now hesitate and consider (and, hopefully, accept) the third option.<sup>10</sup>

## 7. Bibliography

Armstrong, D. 1978a. *A Theory of Universals*, Cambridge: Cambridge University Press.

Armstrong, D. 1978b. *Nominalism and Realism*, Cambridge: Cambridge University Press.

Armstrong, D. 1983. *What is a Law of Nature?*, Cambridge: Cambridge University Press.

Armstrong, D. 1989. *Universals: An Opinionated Introduction*, Boulder: Westview Press.

Armstrong, D. 1997a. *A World of States of Affairs*, Cambridge: Cambridge University Press.

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- Armstrong, D. 1997*b*. Properties, in D.H. Mellor and Alex Oliver (eds.) *Properties*, Oxford: OUP.
- Armstrong, D. 2004*a*. *Truth and Truthmakers*, Cambridge: Cambridge University Press.
- Armstrong, D. 2004*b*. How do particulars stand to universals? *Oxford Studies in Metaphysics* 1, 139-54.
- Armstrong, D. 2010. *A Sketch for a Systematic Metaphysics*, Oxford: OUP.
- Armstrong, D. and Forrest, P. 1987. The nature of number, *Philosophical Papers* 16, 165-86.
- Barnes, E. MS. Symmetric Dependence.
- Baxter, D. 2001. Instantiation as partial identity, *Australasian Journal of Philosophy* 79, 449-64.
- Bealer, G. 1982. *Quality and Concept*, Oxford: Clarendon Press.
- Bennett, K. 2004. Spatio-temporal coincidence and the grounding problem, *Philosophical Studies* 118, 339-71.
- Bennett, K. 2009. Composition, co-location, and metaontology, in Chalmers, Manley and Wasserman (eds.) *Metametaphysics*, Oxford: OUP.
- Bennett, K. 2011. Construction area (no hard hat required), *Philosophical Studies* 154, 79-104.
- Bliss, R. 2011. *Against Metaphysical Foundationalism*, Ph. D. University of Melbourne.
- Borghini, A. 2012. The Adverbial Theory of Properties, *Metaphysica* 13, 107-23.
- Cameron, R. 2007. The contingency of composition, *Philosophical Studies* 136, 99-121.
- Cameron, R. 2008. Truthmakers and necessary connections, *Synthese* 161, 27-45.
- Cameron, R. 2010. From Humean Truthmaker Theory to Priority Monism, *Notis* 44, 178-98.
- Campbell, S. 2007. The Conception of a Person as a Series of Mental Events, *Philosophy and Phenomenological Research* 73: 339-58.
- Caplan, B. and Matheson, C. 2006. Defending Musical Perdurantism, *British Journal of Aesthetics* 46, 59-69.
- Caplan, B., Tillman, C., and Reeder, P. 2010. Parts of Singletons, *Journal of Philosophy* 107, 501-33.
- Cowling, S. 2014. Instantiation as Location, *Philosophical Studies* 167, 667-82.
- Cowling, S. 2013. Ideological parsimony, *Synthese* 190, 3889-908.
- Darby, G. and Watson, D. 2010. Lewis's principle of recombination: a reply to Efrid and Stoneham, *dialectica* 64, 435-45.
- Dasgupta, S. 2009. Individuals: an essay in revisionary metaphysics, *Philosophical Studies* 145, 35-67.

- Dretske, F. 1977. Laws of Nature, *Philosophy of Science* 45, 173-81.
- Effingham, N. 2009a. Universalism, Vagueness and Supersubstantivalism, *Australasian Journal of Philosophy* 87: 35-42.
- Effingham, N. 2009b. Composition, Persistence and Identity, in *The Routledge Companion to Metaphysics* ed. Le Poidevin, Simons, McGonigal and Cameron, 296-309.
- Effingham, N. 2010. The Metaphysics of Groups, *Philosophical Studies* 149, 251-67.
- Effingham, N. 2012. Endurantism and Perdurantism, in *Continuum Companion to Metaphysics* ed. Barnard and Manson, 170-97.
- Effingham, N. 2013. Impure sets may be located: Reply to Cook, *Thought* 1, 330-36.
- Efird, D. and Stoneham, T. 2008. What is the principle of recombination?, *dialectica* 62, 483-94.
- Fine, K. 2003. The non-identity of a material thing and its matter, *Mind* 112, 195-234.
- Fine, K. 2010. Towards a Theory of Parts, *The Journal of Philosophy* 107, 559-89.
- Forrest, P. 1986. Ways worlds could be, *Australasian Journal of Philosophy* 64, 15-24.
- Forrest, P. 2006. The Operator Theory of Instantiation, *Australasian Journal of Philosophy* 84, 213-28.
- Forrest, P. 2013. Exemplification and Parthood, *Axiomathes* 23, 323-41.
- Gilmore, C. 2008. Persistence and Location in Relativistic Spacetime, *Philosophy Compass* 3/6, 1224-54.
- Gilmore, C. Forthcoming. Quasi-Supplementation, Plenitudinous Coincidentalism and Gunk, in Robert Garcia (ed.) *Substance: New Essays*, Philosophia Verlag.
- Goodman, N. and Quine, W. 1947. A step towards a constructive nominalism, *The Journal of Symbolic Logic* 12, 105-22.
- Hawthorne, J. 2006. *Metaphysical Essays*, Oxford: OUP.
- Hawthorne, J. and Sider, T. 2001. Locations, *Philosophical Topics* 30, 53-76.
- Hofmann, F. 2006. Truthmaking, Recombination, and Facts Ontology, *Philosophical Studies* 128, 409-40.
- Jackson, F. 1977. Statements about universals, *Mind* 86, 427-29.
- Koslicki, K. 2008. *The Structure of Objects*, Oxford: OUP.
- Lewis, D. 1983. Postscripts to 'Counterpart Theory and Quantified Modal Logic', in D. Lewis (ed.) *Philosophical Papers Volume I*, Oxford: OUP.
- Lewis, D. 1986. *On the Plurality of Worlds*, Oxford: Blackwell.

- Lewis, D. 1991. *Parts of Classes*, Oxford: Blackwell.
- Maddy, P. 1990. *Realism in Mathematics*, Oxford: Clarendon Press.
- McDaniel, K. 2007. Extended Simples, *Philosophical Studies* 133, 131-41.
- Melia, J. 2007. A World of Concrete Particulars, *Oxford Studies in Metaphysics* 4, 99-124.
- Miller, K. 2009. Defending Contingentism in Metaphysics, *dialectica* 63, 23-49.
- Nolan, D. 1996. Recombination unbound, *Philosophical Studies* 84, 239-62.
- Nolan, D. 1997. Quantitative Parsimony, *The British Journal for the Philosophy of Science* 48, 329-43.
- Noonan, H. 1991. Indeterminate identity, contingent identity and Abelardian predicates, *The Philosophical Quarterly* 41, 183-93.
- Oliver, A. 1996. The metaphysics of properties, *Mind* 105, 1-80.
- Paul, L. 2002. Logical Parts, *Noûs* 36, 578-96.
- Paul, L. 2012. Building the world from its fundamental constituents, *Philosophical Studies* 158, 221-56.
- Parsons, J. 2013. Conceptual conservatism and contingent composition, *Inquiry* 56, 327-39.
- Quine, W. 1940. *Mathematical Logic*, New York: Norton.
- Quine, W. 1950. Identity, Ostension and Hypostasis, *The Journal of Philosophy* 47, 621-33.
- Rosen, G. 2002. A study in modal deviance, from Szabó Gendler and Hawthorne (eds.) *Conceivability and Possibility*, Oxford: OUP.
- Schaffer, J. 2010. Monism: The Priority of the Whole, *Philosophical Review* 119, 31-76.
- Schaffer, J. 2013. The Action of the Whole, *Proceedings of the Aristotelian Society* 87, 67-87.
- Sider, T. 2008. Temporal parts, in T. Sider, J. Hawthorne and D. Zimmerman (eds.), *Contemporary Debates in Metaphysics*, Malden: Blackwell.
- Thompson, N. MS. Metaphysical Interdependence.
- Tooley, M. 1977. The Nature of Laws, *Canadian Journal of Philosophy* 7, 667-98.
- Tooley, M. 1987. *Causation*, Oxford: Clarendon Press.
- van Cleve, J. 1985. Three versions of the bundle theory, *Philosophical Studies* 47, 95-107.
- van Inwagen, P. 2011. Relational vs. Constituent Ontologies, *Philosophical Perspectives* 25, 389-405.