MUST THERE BE A TOP LEVEL?

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I first explore the notion of the world’s being such that everything in it is a proper part. I then explore the notion of the world’s being such that everything in it both is and has a proper part. Given two well recognized assumptions, I argue that both notions represent genuine metaphysical possibilities. Finally I consider, but dismiss, some possible objections.

A world $w$ is gunky iff each thing in $w$ has a proper part. The metaphysical possibility of the world’s being gunky is well discussed in the literature. In contrast, a world is junky iff each thing in it is a proper part. Despite the fact that the metaphysical possibility of the world’s being junky has wide implications for various metaphysical debates, especially those concerning the nature of the parthood relation and mereological composition, it is not well discussed in the literature; in fact it is almost completely ignored.

In this paper I shall therefore explore what is required in order for the world to be possibly junky. Given a few assumptions, I am sympathetic to the possibility of junky worlds. In §II I explore what is required in order for the world to be possibly hunky, i.e., both gunky and junky. Given the possibility of junky worlds, I see no reason to deny the possibility of hunky worlds. In §III I consider some further pros and cons concerning the possibility of junky and hunky worlds.


2 I have adopted the term ‘junk’ from J. Schaffer, ‘Monism: the Priority of the Whole’, Philosophical Review (forthcoming). Schaffer briefly mentions worldless junk, but as will emerge below, there is no reason to think that junk must be worldless. Cf. §III below.

3 For some further ramifications, see Schaffer, and also J. Parsons, ‘Theories of Location’, Oxford Studies in Metaphysics, 3 (2007), pp. 204–92. It is also worth considering both the purpose behind any form of ontological reductionism and the notion of ontological dependence, if the world could be both gunky and junky (at once).
Even though hybrid worlds seem possible, I shall for simplicity consider only worlds that are exclusively gunky, exclusively jumpy, or exclusively hunky.

I. JUNK

A junky world has a rich mereological structure. Everything in it is a proper part. Hence a junky world cannot be a fusion, because if it were there would be nothing for it to stand in the proper parthood relation to. Consequently a junky world must be an infinite plurality \( xx \) such that each one of \( xx \) is a proper part of another one of \( xx \). It follows that a junky world is incompatible both with universal composition, the view according to which any collection of things composes something, and also with nihilistic composition, the view according to which no collection of two or more things composes something. Hence a junky world demands the truth of restricted composition: some collections of things compose something and some collections of things compose nothing. The challenge for any such restrictionism is of course to come up with the contrastive conditions under which some things compose something.

So what could these contrastive conditions be in a junky world? The following seems to be a natural suggestion: all and only finite collections compose something. For a world of infinite cardinality, this principle says that there exist all the fusions there can exist in that world except infinite fusions, and hence except the universal fusion. For a world of finite cardinality, the principle says that there exist all the fusions there can exist in that world, including the universal fusion. Thus if this principle were necessarily true

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4 I need some standard terminology: \( x \) is a proper part of \( y \) iff \( x \) is a part of \( y \), but is not identical with \( y \); \( x \) overlaps \( y \) iff \( x \) and \( y \) share a common part; \( x \) is a simple iff \( x \) has no proper parts; \( x \) is a composite iff \( x \) is not simple; \( xx \) compose \( y \) iff each one of \( xx \) is a part of \( y \) and each part of \( y \) overlaps at least one of \( xx \); and \( y \) is the fusion of \( xx \) iff \( xx \) compose \( y \) (where ‘\( xx \)’ is a plural variable). The variables should be taken to range unrestrictedly over your favourite building blocks of the concrete world (e.g., spacetime points, concrete objects, events, or what have you).

5 Proof 1: Assume universal composition is true. Then any collection of things composes something. Hence the collection of everything composes something. Hence the universal fusion \( U \) exists. But then \( U \) is not a proper part of something, and hence it is not true that everything in the world stands in the proper parthood relation to something. Hence the world in question is not junky. Proof 2: Assume nihilistic composition is true. Then no two or more things compose something. But then there are no composite objects and hence nothing stands in the proper parthood relation to anything. But then it is obviously not the case that everything stands in the proper parthood relation to something, and hence the world in question is not junky.
true, then any infinite world of simples would be a junky world and any finite world would not be.

But it is clear that this principle cannot be necessarily true. If it were, then necessarily the only existing fusions would be of finite cardinality. But in a gunky world any fusion must be of infinite cardinality, since any part of it has a proper part. Hence gunky worlds would be impossible if this principle were necessarily true. But there is, as far as I can see, no reason whatsoever to think that this principle could trump the possibility of gunky worlds. Hence the principle cannot be necessarily true. But since it is perhaps the most simple and plausible principle of composition which allows junky worlds, there seems to be no other plausible and necessarily true principle which does. It thus seems that the possibility of junky worlds demands that the principle of composition must be a contingent matter, differing from world to world. Is that plausible?

In the spirit of a Humean denial of necessary connections, I think it is. I shall now provide some remarks in favour of this view. But first I need to make two assumptions explicit. Composition is a many–one relation defined as follows: \( xx \) compose something \( y \) iff each one of \( xx \) is a part of \( y \) and each part of \( y \) overlaps at least one of \( xx \). My first assumption is that this relation is nothing like identity: if \( xx \) compose \( y \), then \( y \) is numerically distinct from \( xx \). This assumption is justified by the fact that the thesis that composition is some form of identity is controversial. My second assumption is that gunky worlds are metaphysically possible. I take this assumption to be justified by the available literature.

Now for the remarks in favour of composition’s being a contingent matter. First, nihilistic composition is incompatible with gunky worlds. In a nihilistic world the only composition that takes place is the trivial one of any one thing’s composing itself. That is, in a nihilistic world there are only simples. But in a gunky world there are only fusions with proper parts and no simples. Hence a nihilistic world and a gunky world are incompatible. So by the above assumption that gunky worlds are possible, nihilistic composition must at best be a contingent matter. I shall henceforth call the conditions under which some things compose something ‘\( C \)’; let \( \{ C \} \) be neutral between universal composition and any version of restricted composition. Assuming that

Necessarily, all and only things that satisfy (C) compose something can either of any two non-overlapping objects \( x \) and \( y \) exist without the other? If the answer is ‘No’, there is no plausible explanation of \( why \) the one cannot exist without the other. This leaves a very mysterious necessary connection between two distinct things which have no parts in common. Because of this mystery, many ontologists accept something like the following Humean denial of necessary connections between non-overlapping existents:

PP1. For any plurality \( xx \) of non-overlapping objects of the same world, and for any \( y \) among \( xx \), there is a world which contains a duplicate of \( y \) and which contains no duplicate of any other object among \( xx \) unless that duplicate is a part of the duplicate of \( y \).

But now I ask: why restrict the principle to non-overlapping things? Does not assumption (\( \alpha \)) also imply a very mysterious necessary connection, this time not between non-overlapping things, but rather between two non-identical things? Why, if \( xx \) are not identical with what they compose, must they compose anything at all? Why could not \( xx \) exist without composing anything? Why are two distinct things thus necessarily connected? No plausible explanation seems forthcoming. Given (\( \alpha \)) and the assumption that composition is nothing like identity, composition must be understood as a relation necessarily obtaining between distinct things, but with no explanation of why it obtains necessarily. But this is just too mysterious to be acceptable. Hence, given that composition is nothing like identity, (\( \alpha \)) must be rejected. But given my earlier conclusion that nihilistic composition is at best a contingent matter, this amounts to accepting the following principle:

(\( \beta \)) Possibly, but not necessarily, all and only things that satisfy (C) compose something.

But accepting (\( \beta \)) is accepting that composition under conditions (C) is contingent.

I call this a \emph{principle of plenitude}. Most proponents of (PP1) will also accept the following principle of plenitude (PP2): For any two possible individuals, there is a world containing non-overlapping duplicates of both. For discussion, see D.K. Lewis, \emph{On the Plurality of Worlds} (Oxford: Blackwell, 1986), §1.8. A \emph{duplicate} of \( x \) is a thing that shares all perfectly natural properties with \( x \), and whose parts can be put in one–one correspondence with the parts of \( x \) so that corresponding parts share all perfectly natural properties and stand in the same perfectly natural relations to each other. For a discussion of natural properties and relations, see Lewis, pp. 59–60.

The rejected mysterious necessary connections in question are given by the \emph{de dicto} claim that \( xx \) cannot exist without composing some \( y \) or other, not the \emph{de re} claim that \( xx \) cannot exist without composing some one particular \( y \).
I am, of course, not alone in claiming that the spirit behind the Humean denial of necessary connections should be extended beyond non-overlap. For example, Cameron says that

Given that, in general, it seems proper parts of things could exist without being parts of the things they are actually parts of, it looks just as mysterious to me if the existence of some thing which is a proper part of \( a \) or which overlaps \( a \) necessitates the existence of \( a \), as if something which is wholly distinct from \( a \) necessitates the existence of \( a \). So I reject the claim that the allowable necessary connections are those between overlapping objects.\(^9\)

One might at this point object as follows: if composition is contingent, then, by plausible recombination principles, there is a possible world \( w \) in which some things \( a, b, c, \ldots \) satisfy conditions (\( C \)) and hence compose something \( o_1 \), while some other things \( d, e, f, \ldots \) which are duplicates of \( a, b, c, \ldots \) satisfy (\( C \)) as well but do not compose something \( o_2 \); that is absurd; hence composition is not contingent.

I do not see why such mixed worlds are absurd. They are certainly not absurd in the sense in which it is absurd that something is blue and yellow all over at the same time, or in the sense in which it is absurd that \( p \) and \( \neg p \) are both true, or in the sense in which it is absurd that something \( x \) is not \( x \). So in what sense is it absurd that some things compose a further thing \( o \), while some duplicates of those things satisfying the same conditions compose nothing? I shall call the chair I am sitting in Chair. As far as I can see, it is simply not absurd that in some possible world \( w \) Chair is a composite object, while duplicates of all its parts arranged Chair-wise next to Chair is not a composite object. To me it seems weird indeed, but not absurd. But weird does not mean metaphysically impossible.\(^10\)

One might of course ask ‘In virtue of what is Chair a composite object and the duplicates of its parts arranged Chair-wise not a composite object?’ I think this is a good question, but it simply amounts to the question ‘In virtue of what do composite objects exist?’ But this is a question faced by anyone committed to composite objects, not just by a defender of (\( \beta \)) in particular.

Thus, on the basis of the two assumptions that gunky worlds are metaphysically possible and that composition is nothing like identity, I conclude that composition is a contingent matter: no one of the three possible principles of composition is necessarily true. If composition is a contingent

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10 Cameron has a similar attitude to these cases, but he also suggests another interesting response involving mereological laws. See Cameron, ‘The Contingency of Composition’, *Philosophical Studies*, 136 (2007), pp. 99–121.
matter, then of course there is no principled obstacle to the possibility of junky worlds.

II. HUNK

A hunky world is such that everything in it both has and is a proper part. A hunky world is thus both gunky and junky. Hence whatever is incompatible with either a gunky or a junky world is also incompatible with a hunky world; and many (though not all) things true of gunky and junky worlds are also true of hunky worlds. A hunky world must not only be, like a gunky or junky world, infinite in cardinality, but must, like a junky world (and for the same reasons), also not be a fusion. A hunky world is thus an infinite plurality \( xx \) such that each one of \( xx \) stands on both sides of the proper parthood relation. Further, a hunky world is, like a gunky world (and for the same reasons), incompatible with nihilism, and, like a junky world (and for the same reasons), incompatible with universalism. Thus in a hunky world some version or other of restrictionism must be true.

So what is a plausible principle of hunky composition? A subset of a set of things is standardly said to be \( co-finite \) iff its complement is finite. A natural suggestion for a hunky principle of composition is thus that all and only things that are not \( co-finite \) compose something. In other words, no things that leave out finitely many things compose something. For a world of continuum-many things with no mereological atoms, this provides a hunky world.

But it can easily be seen that this principle cannot be necessarily true. Assume it is, and that some world \( w \) is of finite cardinality. Then no things would compose something in \( w \) (since they would be \( co-finite \)). But if \( w \) is finite, \( w \) must contain simples. But a simple trivially composes itself. Hence some things would compose something in \( w \) – contradiction. Hence if the principle were necessarily true, no possible world could be of finite cardinality. But that no possible world can be of finite cardinality seems just plain false, and hence the principle cannot be necessarily true. But since this principle seems to be the most simple and plausible principle of composition that allows hunky worlds, there seems left no other plausible and necessarily true principle of composition allowing hunky worlds. It thus seems as if the possibility of hunky worlds demands that the principle of composition is a contingent matter, differing from world to world. But the claim that composition is contingent was defended in §I; so no principled obstacle to the possibility of hunky worlds seems to be left.
III. PROS AND CONS

One might think that the possibility of gunky worlds has a certain right to be taken seriously, because it has been considered a viable thesis throughout the history of philosophy. But has anyone ever thought that the world is junky or hunky?

Leibniz believed that even though there are ultimate metaphysical simples, namely monads, the material world (i.e., bulk) is hunky:

For, although there are atoms of substance, namely monads, which lack parts, there are no atoms of bulk [primary matter], that is, atoms of the least possible extension, nor are there any ultimate elements, since a continuum cannot be composed out of points. In just the same way, there is nothing greatest in bulk nor infinite in extension, even if there is always something bigger than anything else, though there is a being greatest in the intensity of its perfection, that is, a being infinite in power.11

Alfred North Whitehead is another worthy proponent of hunky worlds. His second mereological axiom of events reads ‘Every event extends over other events and is itself part of other events’, where ‘part’ means ‘proper part’ and ‘x extends over y’ means that y is a proper part of x.12 According to Simons, ‘that the world is “open” both above and below seems to have been something which Whitehead found self-evident, for he gives no argument for it’.13 Thus at least some worthy philosophers have seriously entertained the thesis that the world is junky or hunky. This by itself gives the thesis some degree of credibility.

One might think that the phrase ‘junky world’ is close to being a contradiction in terms, since ‘is junky’ is a plural predicate, not a singular predicate: i.e., it is applicable only to many objects, not to a single object. But ‘world’ (and its cognates) refers only to a single object, not to many objects; hence the phrase ‘junky world’ makes no sense. The phrase is simply ill formed, or perhaps ungrammatical.14

But this objection is too hasty. First, in order for this objection to work, ‘junk’ must be irreducibly plural. But there are no obvious reasons why that

11 Leibniz, On Nature Itself, in Ariew and Garber (eds), p. 162. Today we of course believe that a continuum can be composed of points. But why does Leibniz say ‘nor infinite in extension’? Because he believes that there is no one chunk of bulk (primary matter) that is infinite in extension, even though there is always something bigger than something else. Interestingly, that is compatible with the principle mentioned above: all and only non-co-finite things compose something.
14 Something like this objection is found in Schaffer.
must be so. Why cannot the semantics of ‘junky world’ be ultimately cashed in terms of sets: ‘world \( w \) is junky’ is true iff \( w \) is a member of the set of all sets whose members are such that each one of them is a proper part of some other member of that set? That is, why cannot ‘world’ (and its cognates) refer to a set, and ‘junky’ be a predicate of such sets? Secondly, why assume that ‘world’ (or any of its cognates) must be a singular term in the first place? Why cannot ‘world’ be a plural term? Surface grammar is not always a good guide to deeper logical form. Finally, and I think most importantly, semantics should not dictate ontology. What if some cosmologists claimed tomorrow that the world is infinitely extended and that there exists no universal object comprising it all? Should one deny their claim, for dubious semantic reasons? I do not think so. (The above objection and the corresponding replies apply of course equally well to the phrase ‘hunky worlds’.)

One might further think that junky worlds should be deemed impossible because they are inconceivable. But if so, it seems one must also deem gunky worlds impossible on the same ground, as the following thought-experiment shows. Suppose everything is extended and everything extended has two extended halves. This generates a Zeno sequence with no end. Or, following Pascal, suppose every physical ‘atom’ of the universe houses a miniature replica universe, every ‘atom’ of this mini-universe housing its own mini-universe, and so on ad infinitum. If you can coherently conceive of this, presumably you have conceived of what amounts to a gunky world. That is, this thought-experiment requires us to conceive of a model of the formula \( \forall x \exists y (y < x) \), which presumably amounts to conceiving of a gunky world. But now, in a slightly modified version of this thought-experiment, suppose everything is extended and everything extended is one of two extended halves that compose one extended thing. This generates a reversed Zeno sequence with no end. Or else suppose our universe is a miniature replica universe housed in an ‘atom’ of a bigger replica universe, which again is a miniature replica universe housed in an ‘atom’ of another bigger replica universe, and so on ad infinitum. If you can coherently conceive of this, presumably you have conceived of what amounts to a junky world. That is, this thought-experiment requires us to conceive of a model of the formula \( \forall x \exists y (x < y) \), which presumably amounts to conceiving of a junky world.

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15 This is not as crazy as it might sound. For example, both van Fraassen and Simons argue that ‘world’ is not the name of an object. See B. van Fraassen, “‘World’ is not a Count Noun”, Nous, 29 (1995), pp. 139–57; P. Simons, ‘The Universe’, Ratio, 16 (2003), pp. 236–50. Against Simons, see A. Varzi, ‘The Universe Among Other Things’, Ratio, 19 (2006), pp. 107–20. Mereological nihilists must also accept that ‘world’ is a plural term.

16 The cosmologists’ imaginary claim would still not imply that the world is junky (or hunky). This would most likely have to be argued on a priori grounds.

17 I have adopted this thought-experiment from Schaffer.
There simply seems *prima facie* to be no *substantial* difference between conceiving of a junky world and conceiving of a gunky world. Hence if gunky worlds are conceivable, junky worlds are also conceivable. Contrapositively, if junky worlds are inconceivable, then gunky worlds are inconceivable. But I have assumed that gunky worlds are possible, and hence, I take it, are conceivable. Hence junky worlds are conceivable. If one can conceive of both gunky and junky worlds, then of course there is no obstacle to being able to conceive of hunky worlds.\(^\text{18}\)

I thus conclude that given the two premises that composition is nothing like identity and that gunky worlds are possible, junky and hunky worlds are possible too.\(^\text{19}\)

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\(^{18}\) In his *Letters to Johann Bernoulli*, in Ariew and Garber (eds), pp. 169–70, Leibniz says ‘Furthermore, I am not joking, but clearly admit, that there are animals in the world as much larger than ours are, as ours are larger than those tiny animals of the microscopists, for nature knows no boundary. And, on the other hand, there could be, indeed, there have to be, worlds not inferior in beauty and variety to ours in the smallest motes of dust, indeed, in tiny atoms... there might be a system like ours which is the pocketwatch of some enormous giant.’ This all points towards the same kind of conceivability-experiment as I have just put forward.

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