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8. Brutal Simples

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1. INTRODUCTION

An object is a simple if and only if it has no proper parts. (x is a proper part of y just in case x is a part of y but x is not identical to y.) This is a *definition* of the word ''simple'', not a substantive criterion for being a simple. The *Simple Question* asks ''under what circumstances is a material object a simple?''[1] An answer to the Simple Question is an *informative* instance of the following schema:

Necessarily, x is a simple if and only if _____.

In other words, an answer to the Simple Question must provide necessary and sufficient conditions for being a simple, and it must not employ a mereological term on the right-hand side of the biconditional. An answer to the Simple Question is a substantive criterion for being a simple.

I will argue that there is no correct, finitely statable, and non-circular answer to the Simple Question. There is no non-mereological criterion for being a simple. I call this view *the Brutal View*.[2]

My argument for the Brutal View is indirect. I argue that every reasonable answer to the Simple Question faces serious objections. Consequently, the Brutal View is the only view left standing. In Section 2, I motivate the quest to answer the Simple Question and briefly describe the space of possible answers. In Sections 3, 4, and 5, I present arguments against the competitors of the Brutal View. In Section 6, I respond to a possible worry about the Brutal View. In Section 7,

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[1] The Simple Question was first raised by Ned Markosian in Markosian (1998a).

[2] The Brutal View is inspired by a related view that answers the Special Composition Question: the Brutal View of Composition. The Special Composition Question was first raised by Peter van Inwagen in van Inwagen (1990). (I will discuss the Special Composition Question momentarily.) On the Brutal View of Composition, see Markosian (1998b).

I present some final reflections on the Brutal View and the philosophical considerations that support it.[3]

2. THE SIMPLE QUESTION

Why care about the Simple Question? First, issues involving the nature of simplicity are not independent of other concerns in the metaphysics of material objects. Philosophical puzzles concerning material constitution have received a deserved share of the attention of contemporary philosophers; much of it focused on what Peter van Inwagen has dubbed the *Special Composition Question*, which is: What are the necessary and jointly sufficient conditions that some objects must meet in order to compose a single object? Ned Markosian, the philosopher to whom we owe gratitude for raising the Simple Question, notes the connection between these two questions in the following passage:

> simples are the basic building blocks that, when combined in various ways, make up all other objects. Thus it is natural to think that what we say about the nature of simples will have considerable bearing on what we say in response to the Special Composition Question. (Markosian 1998a: 214)

To see that Markosian is correct, let us consider a radical answer to the Special Composition Question called *Nihilism*.[4] Nihilism is the view that, necessarily, nothing is a composite object. Nihilism obviously conflicts with common sense concerning what objects exist, since one consequence of Nihilism is that there are no such things as tables, rocks, and living human organisms.[5] But the advocate of Nihilism at least agrees with common sense that there are material objects. However, given Nihilism, these must be mereological simples. If it turns out that nothing could satisfy what it takes to be a simple, or even if nothing in fact does satisfy what it takes to be a simple, then Nihilism is refuted.

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[3] In what follows, I make few substantive assumptions about parthood in general: I assume that there is exactly one parthood relation defined on material objects, and that it is transitive and reflexive, but I do not assume any other controversial mereological thesis, such as the claim that no two objects can have exactly the same parts. I suspect that the arguments for the Brutal View would still work even if these meager assumptions were dropped.

[4] The name ''Nihilism'' was coined by Peter van Inwagen in van Inwagen (1990: 72–4).

[5] Strictly speaking, this is a consequence of Nihilism only given certain facts about the actual world. It is a fact about the actual world that, if there are tables, chairs, etc., then these objects have parts.

That the Special Composition Question is an interesting question is established by the fact that so many metaphysicians are interested in it. Since answering the Simple Question could shed light on the Special Composition Question, we should be interested in it as well.

Secondly, an answer to the Simple Question could help us decide whether *atomless gunk* is possible. An object is *gunk* just in case every part of it has proper parts. There are longstanding debates about whether gunk is possible. The question of the possibility of gunk is also relevant to answering the Special Composition Question; recently, Theodore Sider has argued that certain answers to the Special Composition Question are false because they rule out the possibility of gunk (Sider 1993). Additionally, Dean Zimmerman has argued that certain theories about the nature of masses are ruled out given the possibility of atomless gunk (Zimmerman 1995). If gunk is impossible, then these arguments have no force. An answer to the Simple Question may help us assess these arguments.

Another strange and putatively possible kind of object that has attracted its share of defenders is the *extended simple*. An object is an *extended simple* just in case it is extended in space (or spacetime) and yet lacks proper parts.[6] Speculation about the possibility of extended simples is not confined to philosophy. In a recent article, Mark Scala presents evidence that Isaac Newton believed that the fundamental objects of this world are extended simples (Scala 2002: 394).[7] And, more recently, in a popular book on string theory, the physicist Brian Greene seriously entertains the possibility that fundamental physics will imply the existence of extended simples:

What are strings made of? There are two possible answers to this question. First, strings are truly fundamental—they are ''atoms'', uncuttable constituents, in the truest sense of the ancient Greeks. As the absolute smallest constituents of everything, they represent the end of the line . . . From this

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[6] Friends of extended simples include Ned Markosian (Markosian 1998a), Neil McKinnon (McKinnon forthcoming), Josh Parsons (Parsons 2000), Mark Scala (Scala 2002), and Theodore Sider (Sider forthcoming).

[7] Here is the quote from Newton's *Opticks* that Scala discusses: ''It seems probable to me that God in the Beginning formed Matter in solid, massy, hard, impenetrable moveable Particles, of such Sizes and Figures, and with such other Properties; and in proportion to space, as most conduced to the end for which he formed them; and as these primitive Particles being Solids, are incomparably harder than any porous Bodies compounded out of them; even so very hard as never to wear or break in pieces; no ordinary Power being able to divide what God himself made in one first creation.''

perspective, even though strings have spatial extent, the question of their composition is without any content. Were strings to be made of something smaller, they would not be fundamental. (Greene 1999: 141)

If we had an answer to the Simple Question, this presumably would help us determine whether extended simples are possible.

So we should agree with Markosian that an examination of the Simple Question is relevant to an examination of the Special Composition Question. Moreover, it is an interesting question in its own right. Markosian should be commended for raising it.

Unfortunately, we are unable to answer the Simple Question satisfactorily. I will argue that there is no correct, finitely statable, non-trivial answer to the Simple Question. In short, the Brutal View of Simples is true.

It is not part of the Brutal View that there are no informative *necessary* conditions on being a simple. In fact, I believe that there are. But there are no informative conditions that are *both* necessary and sufficient for being a simple and finitely statable. I also distinguish the Brutal View from the claim that, for any simple *S*, it is a *brute fact* that *S* is a simple. We can call the latter view *the Brutal View of Facts about Simplicity* (BFS).[8] If there are informative sufficient conditions for being a simple, then BFS is false. But, as long as these sufficient conditions are not necessary conditions (or not finitely statable), then the Brutal View is unthreatened by the falsity of BFS.[9]

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[8] The distinction between the Brutal View and BFS is perfectly similar to the distinction drawn by Markosian between the views he calls the Brutal View of Composition and the Brutality of Compositional Facts (Markosian 1998b).

[9] I thank Ben Caplan and Cody Gilmore for helpful discussion on this point. Interestingly, Markosian himself ignores the difference between the Brutal View and BFS when arguing against the Brutal View. Markosian writes:

For the record, here is what seems to me like a good argument against The Brutal View of Simples. A pointy object would have to be a simple. Moreover, such an object would be a simple in virtue of being pointy. (Either because The Pointy View of Simples—according to which x is a simple iff x is a pointy object—is true, or because MaxCon is true, or because some other "topological" theory of simples is true.) But the Brutal View of Simples implies that even if a pointy object were a simple, this would not be the case in virtue of its being pointy; instead, according to The Brutal View of Simples, the fact that some pointy object is a simple would have to be a brute fact about that object. Therefore, The Brutal View of Simples is false. (Markosian 2004: 333 n. 2)

There are two problems with Markosian's argument against the Brutal View. First, as already mentioned, he conflates the Brutal View with BFS. If he's hit something, he's hit the wrong target. Secondly, Markosian assumes that being point-sized is sufficient for being a simple. But, as I will argue in Section 3, this is not the case.

It is also not part of the Brutal View that there are no features that are contingently correlated with being a simple. It is my hope that there are. But, whatever they are, it is up to empirical science and not a priori philosophy to discover them.

Still, it is unfortunate that the Brutal View is true. For the Brutal View sheds no light on the question of whether atomless gunk is possible, whereas other answers to the Simple Question appear to. And the Brutal View provides us with no help with the question of whether extended simples are possible, whereas other answers to the Simple Question have something to say about the possibility of extended simples. The Brutal View does not tell us that atomless gunk or extended simples are possible, and it does not tell us that they are impossible.

Although the Brutal View of Simples is a dissatisfying answer to the Simple Question for these reasons, I believe that there is a compelling reason to embrace it: the competitors to the Brutal View face problems serious enough to warrant rejecting them. If this is the case, the Brutal View is the only game in town.

What are the competitors to the Brutal View? As I see things, the other main contenders can be divided into three classifications, each with two sub-headings. They are as follows:

(A) *Spatial Accounts*

    (1) *The Pointy View of Simples* (PV)
    (2) *The Maximally Continuous View of Simples* (MaxCon)

(B) *Fundamentality Accounts*

    (3) *The Instance of a Fundamental Property View of Simples* (Instance)
    (4) *The Independence View of Simples* (Independence)

(C) *Indivisibility Accounts*

    (5) *The Physically Indivisible View of Simples* (PIV)
    (6) *The Revised Metaphysically Indivisible View of Simples* (MIV)

In Section 3, I present and argue against the spatial accounts.[10] In Section 4, I present and argue against the fundamentality accounts. In Section 5, I present and argue against the indivisibility accounts. This will complete my case for the Brutal View of Simples.

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[10] Markosian also presents several arguments against the Pointy View in Markosian (1998a: 216–19).

3. SPATIAL ACCOUNTS OF SIMPLICITY

As the name suggests, spatial accounts of simplicity appeal to spatial features to provide a criterion of simplicity. The two most promising are:

> **The Pointy View of Simples (PV)**: necessarily, x is a simple if and only if x is a point-sized object.
> **The Maximally Continuous View of Simples (MaxCon)**: necessarily, x is a simple if and only if x is a maximally continuous object.[11]

According to the Pointy View, simples are all and only point-sized objects. If you want to make a simple, create a point-sized object. (Don't ask me how to do that!) The Pointy View is probably the traditional view of the nature of simples.

The Pointy View has two interesting features. First, if material objects without point-sized parts are possible, then the Pointy View implies that gunk is possible (Markosian 1998a: 216). Secondly, the Pointy View clearly implies that extended simples are impossible.

MaxCon is not for traditionalists! Given MaxCon, if you want to make a material simple, here is the recipe you should follow. First, pick the region of space that you want the simple to exactly occupy. Let us call that region ''R''. If R is a continuous region of space, then proceed to the next step. Otherwise, start again. Assuming that R is a continuous

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[11] MaxCon is the view that Markosian endorses in Markosian (1998a). Markosian employs the following definitions in the explication of his view:

1. Object O *occupies* region R $=_{df}$ R is the set containing all and only those points that lie within O.
2. *O* is *spatially continuous* iff *O* occupies a continuous region of space.
3. R is *continuous* $=_{df}$ R is not discontinuous.
4. R is *discontinuous* $=_{df}$ R is the union of two non-null separated regions.
5. R and R' are *separated* $=_{df}$ the intersection of either R or R' with the closure of the other is null.
6. The *closure* of R $=_{df}$ the union of R with the set of all its boundary points.
7. p is a *boundary point* of R $=_{df}$ every open sphere about p has a non-null intersection with both R and the complement of R.
8. R is an *open sphere* about p $=_{df}$ the members of R are all and only those points that are less than some fixed distance from p.
9. The *complement* of R $=_{df}$ the set of points in space not in R.
10. x is a *maximally continuous object* $=_{df}$ x is a spatially continuous object and there is no continuous region of space, R, such that (i) the region occupied by x is a proper subset of R, and (ii) every point in R falls within some object or other.

Markosian borrows (2)–(9) from Cartwright (1975). (Richard Cartwright uses ''connected'' and ''disconnected'' instead of ''continuous'' and ''discontinuous''.)

region of space, completely fill R with matter; make sure that there is no subregion of R where matter cannot be found. Finally, make sure that R is not part of some larger continuous region of space that is also filled with matter. If it is not, then R now contains a material simple.

Presumably, R can be any size or any shape; the only constraint on R is that it be occupiable by a material object. Given MaxCon, there can be extended simples of any shape or size.[12] What about gunk? If MaxCon is true, then gunk is impossible.[13] MaxCon is a stunningly unorthodox answer to the Simple Question.

The main argument against spatial accounts of simplicity is based on the possibility of co-located point-sized objects.[14] Two objects are co-located if they exactly occupy the same region of space (at the same time).[15] The argument is as follows: (1) co-located point-sized objects are possible; (2) if co-located point-sized objects are possible, then mereologically complex point-sized objects are also possible. But then both the Pointy View and MaxCon are false.[16]

One way to motivate premise (1) is to appeal to the conceivability of co-location. We can form a clear and distinct conception of co-located material objects; they are conceivable. This gives us a reason to believe that they are possible.[17] For example, we can imagine two different kinds of stuff that are capable of interpenetrating. But we need not base

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[12] More cautiously, MaxCon does not imply that there are restrictions on the shape or size of extended simples. There might be other restrictions on the shape or size of material objects that are consistent with MaxCon.

[13] Hudson argues this in Hudson (2001: 84–7).

[14] I thank Ryan Wasserman for pressing me on this point. See Wasserman (2003) where he also discusses this objection. Markosian acknowledges this worry, which he credits to Theodore Sider. See Markosian (1998a: 217 n. 20). Other arguments against MaxCon (but not PV) can be found in McDaniel (2003).

[15] Two points should be stressed. First, co-location in this sense must be distinguished from complete mereological overlap. Two objects completely overlap each other if and only if the two objects have exactly the same parts. Secondly, regions and material objects form distinct ontological categories. If we drop this assumption, the argument from co-location is undercut. There is no way to make sense of co-located regions of spacetime. I think that this is a reason to reject the reduction of material objects to spacetime regions, but others may differ. I thank Carl Matheson for helpful discussion of this point.

[16] Since MaxCon implies that any point-sized material object is a simple, the possibility of mereologically complex point-sized objects also refutes MaxCon.

[17] Perhaps this is a defeasible reason, if conceivability does not entail metaphysical possibility. But, nonetheless, it does provide us with (as of yet undefeated) evidence that they are possible. On the relation between conceivability and possibility, see the fine collection of papers published in Gendler (2002).

the case for the conceivability of co-located objects on the strange thought experiments of a philosopher. There is an interesting debate in the philosophy of quantum mechanics about whether *bosons*, a kind of fundamental particle, are counter-examples to the Identity of Indiscernibles.[18] Bosons are counter-examples to this law only if two or more of them can be at the same place at the same time. Peter Simons, in a recent paper on the bundle theory of objects, makes the point nicely:

> *Fermions*, which include electrons, are characterized by [properties] which obey the *Pauli Exclusion Principle*: no two fermions can be in exactly the same state. Thus the reason that a helium atom may have two electrons in its innermost shell is that their spins are in opposite directions, so they differ in one [property] (maybe a second-order [property]: spin-*direction*).... The other sort of particles are *bosons*. They do not obey the Pauli Principle, and so *two or more bosons can be in the same state at the same time, in particular they can be in the same place at once and not differ in any* [property] *at all*. If electrons were bosons, they could all three occupy the same space around a lithium nucleus. The most familiar bosons are photons, and it is their superposability in large numbers that makes lasers possible. (Simons 1994: 379–80)[19]

I am no expert on quantum physics, so I am unable to evaluate Simons's claim here. But I am not trying to argue that co-located objects are *actual*. What this example shows is that co-located material objects are not merely conceivable, but that a tremendously detailed conception of them has been formed: co-located objects play a role in the interpretation of certain physical theories. It might be that at the end of the day speculative physics will postulate co-located material objects. It seems to me that we should not disregard this possibility a priori. That both spatial accounts of simplicity do eliminate this possibility a priori is problematic.

Finally, there is the argument from systematic modal metaphysics: the mere metaphysical possibility of co-located objects follows from familiar Humean principles involving the denial of necessary connections

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[18] For interesting discussions about this issue and the question of whether bosons violate the Identity of Indiscernibles, see Cortes (1976), Barnette (1978), Ginsberg (1981), and Teller (1983).

[19] I have emphasized the relevant part of the quote; also, in the original passage, Simons talks about tropes, whereas I have substituted the word "property" for "trope" uniformly. I don't think this change makes a difference in this context.

between distinct existences. Suppose two point-particles are approaching each other at a rapid clip. If co-located material objects are impossible, then they must swerve out of each other's way. Or they must stop dead in their tracks. Or one of them must spontaneously disintegrate. Some event must occur in each world that prohibits them from occupying the same space. There is a *de re* necessary repulsion between these two objects. The price of denying the possibility of co-located objects is accepting brute *de re* modal facts like these. The price is too high.[20]

The state of affairs in which an object x occupies a particular region of space R (at t) is distinct from the state of affairs in which an object y occupies the same region (at the same time). From the fact that the first state of affairs obtains, we can infer nothing about the location of y. Both states of affairs obtain contingently. If any recombination of distinct, contingent states of affairs yields a genuine possibility, as I am inclined to hold, then there are possible worlds at which both x and y occupy R (at t).[21]

Why believe premise (2), which says that if co-located objects are possible, then so are objects composed of them? Suppose that in some possible world two point-sized objects occupy the same region of space. Then there could be a thing made out of those objects. For example, suppose the two objects always move together because they are held by a fundamental physical force. Surely there are possible worlds in which the laws of nature guarantee this sort of interaction. If this scenario arose, we would say that the two objects were ''joined together'', ''bonded'', or ''fused''. In such a case, one would be hard pressed to say that they do not compose something. I suspect only the mereological nihilist could resist

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[20] In response to this argument, David Robb suggested to me that a Humean could say that it is analytic that material objects do not interpenetrate; co-located objects are by definition not material objects. If co-located material objects are impossible for this reason, we still need to explain why they seem to be conceivable. Perhaps what we are envisioning is what David Robb called *phony matter*: non-material objects that have the same effects on our sensory states as do material objects. I think this suggestion won't work, for *material object* is an ontological category. If x belongs to an ontological category C, then x has the *intrinsic* property *being a C-entity*. So every duplicate of a material object is itself a material object. But our allegedly co-located material objects are duplicates of genuine material objects. So they themselves are material objects. So it is not analytic that material objects cannot interpenetrate.

[21] For defenses of these principles, see Armstrong (1989), Armstrong (1997: 148–84), and Lewis (1986).

this pressure. But, if the objects do compose something, then this composite object is a counter-example to the spatial accounts of simplicity.[22]

One more remark on co-location before I move on: I am inclined to accept that the following is a *sufficient* condition for being a simple: being point-sized and not co-located with any other point-sized object. Given this, some point-sized objects might be simples in virtue of having this property.[23] But it is not a necessary condition on being a simple. For the two co-located simples that composed the counter-example to the spatial accounts are still simple, despite their being co-located.

4. FUNDAMENTAL ACCOUNTS OF SIMPLICITY

Both of the views that I wish to discuss here tie simplicity to some ultimate feature of objects. They are:

> **The Instance of a Fundamental Property View of Simples (Instance):** *x* is a simple if and only if *x instantiates* a perfectly natural property.[24]
>
> **The Independence View of Simples (Independence):** *x* is a simple if and only if it is metaphysically possible that *x* is the only material object that exists.

I will examine Instance first. In order to state Instance properly, I need to invoke some metaphysical machinery. I assume the existence of *perfectly natural properties*.[25] It is these properties that ground *objective similarity*: if two things instantiate the same perfectly natural property, then they are objectively similar in that respect; *duplicates* are objects such that there is a one-to-one correspondence between their parts that preserves perfectly natural properties (and perfectly natural

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[22] Note that, if composition is unrestricted, then we do not need the additional supposition that the co-located objects are bonded in order to ensure that they form a composite object.

[23] I thank Ben Caplan for stressing this point.

[24] For the most part, I ignore questions concerning the nature of the properties in what follows, such as whether the properties are repeatable *universals* or are themselves particulars, i.e. tropes. On the issue of tropes vs. universals, see Lewis (1997b) and Simons (1994).

[25] On naturalness in Lewis's sense, see Lewis (1997a), Lewis (1997b), Lewis (1986: 60–1), Schaffer (forthcoming), Sider (2001), and Sider (1995).

relations). Whether two things are objectively similar is metaphysically independent of our interests, desires, beliefs, or classificatory schemes.[26]

Once we have the concept of a natural property, we can define other useful concepts (Lewis 1986: 62–3). Intrinsic properties are properties that never differ between duplicates; if A and B are duplicates and A has intrinsic property *F*, then so does B. External relations do not supervene on the qualitative character of their relata; however, they do supervene on the qualitative character of the fusion of the relata. External relations should be contrasted with *extrinsic* relations, which do not even supervene on the qualitative character of the fusion of their relata. An example of an extrinsic relation is ownership. Ownership does not supervene simply on the qualitative character of the owner and the owned; instead, it supervenes on that character taken along with the various social facts that accompany it.

The perfectly natural properties (and relations) are those that are both required and jointly suffice to provide a complete description of the world (Lewis 1986: 60). The distribution of every other property supervenes on the distribution of the perfectly natural properties (and relations); the perfectly natural properties (and relations) are the minimal supervenience base of every world.[27]

Instance ties together the concepts of simplicity and naturalness. According to Instance, an object is a simple if and only if it *instantiates* a perfectly natural property.

Instance is a theory about the nature of material simples that is also in principle capable of answering the Fully General Simple Question, which is: Under what circumstance is an entity of *any* ontological category a simple? We might think that, for any category of entity we care to include in our ontology, it makes sense to divide the entities in that category into those that are simple and those that are complex. Accordingly, it would be nice to have a unified and fully general account of what it is to be a simple *simpliciter*. Theories that characterize simples in terms of spatial (or spatiotemporal) concepts cannot provide a unified account of the nature of *all* simples. This is because not every entity has spatial or spatiotemporal features. Similar remarks seem to apply to accounts that characterize simples in terms of indivisibility.

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[26] More generally, since objective similarity also comes in degrees, the degree to which a given property is natural is independent of our beliefs, desires, or interests.
[27] The fundamental qualitative properties I discussed in Section 2 form a subset of the perfectly natural properties.

However, the concept of having a natural property is not a concept that necessarily applies only to material objects, for it is possible that there are natural properties that are had by non-physical objects. For example, certain psychological properties might be perfectly natural. (In fact, I hold that this is the case.) Cartesian spirits, which are paradigmatic examples of non-physical objects, could have these properties. Accordingly, Instance is in a better position to provide a unified account of simplicity than either Spatial Account.

One initial worry about Instance stems from the fact that many, if not all, of the fundamental properties at the actual world are determinables.[28] For example, consider *rest mass*. It is reasonable to think that this is a fundamental property. However, objects such as my body, this table, and the planet have rest mass. Should I conclude then that all of these things are simples? Clearly not.

Strictly speaking, it is the *determinates* of rest mass that are the best candidates for being perfectly natural. So perhaps this worry arises only if *some*, but not *all*, of the determinates of mass are perfectly natural. We could call these determinates *the fundamental quantities* of rest mass if we liked. If the fundamental quantities of mass are had only by physical simples, whereas the non-perfectly natural determinates of rest mass are had by complex material objects, then this particular version of the objection would be circumvented.

There are two problems with this maneuver. First, it is not certain whether there are fundamental quantities of rest mass in this sense. So this move is risky. Secondly, and more damaging, it seems that this sort of maneuver does not work in other cases. Consider, for example, *charge*. *Being –1 charged* is a fundamental quantity of charge if any is. An electron, which is arguably a simple, has a charge of –1. However, consider a negatively charged isotope that has a charge of –1 because it has an extra electron. It has a fundamental quantity of charge and hence instantiates a perfectly natural property. This isotope is clearly not a simple.[29]

Perhaps a way around this problem is to claim that the isotope has a charge of –1 *derivatively*, that is, in virtue of the charge of its *parts*, and

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[28] Jonathan Schaffer brought this argument to my attention.

[29] A third worry is that this move seems to violate an intuitive principle governing determinates and determinables: *p* and *q* are determinates of the same determinable *only if* *p* and *q* are equally natural properties.

so on for the other quantities. Similarly, one might hold that in some sense, I *inherit* the mass that I have from the mass of my parts; my mass is supervenient upon the mass of these objects, and likewise for the charge of the isotope. We could revise Instance so that it takes account of this intuition:

Instance*: *x* is a simple if and only if *x* instantiates a perfectly natural property non-derivatively.

However, to say that an object has a property derivatively is to say that it has the property in virtue of its parts having that property. So Instance* is actually circular; it violates one of the constraints on being an answer to the Simple Question, and hence (even if true) is no competitor to the Brutal View. (And, even if there is a way around this worry, Instance* would still face the previously discussed problems.)

Here is probably the best response to this worry: instead of moving to Instance*, the friend of Instance should instead distinguish the property of *having a net charge of –1* from the property of having a charge of –1.[30] An object has a net charge of –1 just in case the sum of the quantities of charge of its proper parts is equal to –1. According to this strategy, the isotope has a net charge of –1 but it does not have the property of having a charge of –1. If this strategy is viable, this kind of counter-example to Instance fails. It's not clear to me, however, that the composite object does not have the property of having a charge of –1 as well as the property of having a net charge of –1. So I am unsure whether this move is successful. On the assumption that this is an acceptable response to this kind of worry, I shall press on.

One might try to motivate Instance by appealing to the idea that there are many ways in which nature can be divided in hierarchies or levels.[31] One kind of hierarchy is *mereological*: some objects are parts of others, which in turn have parts of their own. This hierarchy terminates at the lowest level with mereological simples. Another kind of hierarchy is *qualitative*: some properties supervene on other properties, which in turn supervene on more basic or natural properties. This hierarchy terminates at the level of the perfectly natural properties. Or perhaps each of these hierarchies descends ''forever''; there are no mereological

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[30] I owe this suggestion to Phillip Bricker.
[31] See Jonathan Schaffer (2003b) for a lengthy discussion of this picture.

simples or perfectly natural properties. But it is reasonable to hope that these hierarchies march in step, so that the simplest material objects enjoy the most natural properties. This is one motivation for Instance.

A second motivation for Instance is the intuition had by many that the properties of wholes are strongly dependent on the properties and relations of their proper parts. For some properties of wholes, that there is this kind of dependence is obvious, for example, the shape of a complex material object is fixed by the shapes of its parts and the spatial relations obtaining between those parts. But some people have the intuition that this kind of dependence holds for every intrinsic property of a whole. Perhaps they hold this view because they think they hold some form of the view that *composition is identity*.[32] If a whole just is its parts, then the properties of the whole should in some sense also be nothing more than the properties and relations of its parts. Given composition as identity, the intrinsic character of a whole is fixed by the characters and relations of its parts. The following principle is a way of formally stating this kind of dependence:

> (PWD): For every object x and all objects ys such that x is the fusion of the ys, and for all worlds $w1$ and $w2$, if each of the ys has the same intrinsic properties in $w1$ as it has in $w2$, and the ys stand in the same relations to each other in $w1$ as they do in $w2$, then x has intrinsic property F in $w1$ if and only if x has F in $w2$.[33]

In other words, given PWD, a whole cannot enjoy intrinsic variation across possible worlds unless either one of its proper parts enjoys intrinsic variation across possible worlds or its proper parts change with respect to the relations that they bear to each other.

I will now argue that, if you like PWD, you have some reason to like Instance. My first premise is a Humean principle to the effect that there are no necessary connections between the instantiations of the perfectly natural properties of contingent beings.[34] I formulate the Humean Principle as follows:

> (HP): If (1) x has F and y has G, (2) x and y are contingently existing material objects, and (3) F and G are perfectly natural properties, then

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[32] On some of the ways of formulating the idea that composition is identity, see Sider (forthcoming).

[33] When I speak of relations here, I mean *external* relations.

[34] See Armstrong (1989) and Armstrong (1997).

there is a possible world in which both x and y exist, but in which x has F and y does not have G.

Informally, the instantiation of any perfectly natural property or relation is metaphysically independent of the instantiation of any perfectly natural property or relation.

Suppose that there is a complex material object x that instantiates a perfectly natural property F. Because F is perfectly natural, its instantiation is independent of the instantiation of other perfectly natural properties (for the Humean reason just given). So there is a possible world in which all of x's proper parts have the same perfectly natural properties and stand in the same perfectly natural relations, but in which x does not instantiate F. Since F is perfectly natural, F is also an intrinsic property. Since x's proper parts all have the same perfectly natural properties and stand in the same perfectly natural relations to each other, all of x's parts have the same intrinsic properties. So there is a possible world in which all of x's proper parts have the same intrinsic properties and stand in the same relations as they do in the actual world, but in which x differs intrinsically. So our assumption that a complex object has a perfectly natural property has led us to the conclusion that PWD is false.

So, at the very least, there is an argument from PWD for the claim that instantiating a perfectly natural property is *sufficient* for being a simple. One can also produce an argument for the claim that having a perfectly natural property is *necessary* for being a simple. Its premises are straightforward. First, every object, whether simple or complex, must have some intrinsic properties. Suppose that a simple x has an intrinsic property P. Either P is a perfectly natural property, or it supervenes on the perfectly natural properties and relations had by objects that are not identical with x, or P supervenes on the perfectly natural properties had by x. If the first disjunct is true, then x has a perfectly natural property. The second disjunct cannot be true, for if it were, then P would not be an intrinsic property; P would be an extrinsic property.[35] This leaves the third disjunct. Obviously, if the third disjunct is true, then x has a perfectly natural property. So, since every material object must have some intrinsic properties, then having a perfectly natural property is necessary for being a simple. If we conjoin

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[35] Since x is a simple, any object to which x bears a relation is not a proper part of x.

these two results, we arrive at Instance: an object is a simple if and only if it instantiates a perfectly natural property.

At this point, one might naturally worry that the Humean Principle is too strong. The Humean Principle rules out cases in which the perfectly natural properties of a whole might be necessarily connected to the perfectly natural properties of some of its parts. One might then also worry that the principle is not supported by the familiar Humean intuition that there are no necessary connections between *distinct* existences. These intuitions could be seen to support only a weaker principle. Accordingly, one might want to relax HP and replace it with a weaker principle:

> (WHP): If (1) *x* has *F* and *y* has *G*, (2) *x* and *y* do not overlap, (3) *x* and *y* are contingently existing material objects, and (4) *F* and *G* are perfectly natural properties, then there is a possible world in which both *x* and *y* exist, but in which *x* has *F* and *y* does not have *G*.

These worries are misguided. The Humean Principle is not too strong, but WHP is too weak. To see this, consider a different sort of case that the Humean Principle correctly rules out but that WHP allows. Consider two properties, *F* and *G*, such that *F* and *G* are both perfectly natural, can only be instantiated by simples, and are necessarily connected in the sense that, necessarily, something has *F* only if something has *G*. (Something, however, can enjoy *G* without having *F*.) Clearly, this necessary connection is mysterious, and the sort of connection that any decent Humean will want to rule out. Since both *F* and *G* are perfectly natural, why can't something be *F* without being *G*? The mystery is not diminished when we learn that the things that have *F* always overlap (and are in fact identical with) some of the things that have *G*.

The Humean thinks that every perfectly natural property is a *distinct* existence, even if the things that instantiate them are not always distinct. And so there should be no necessary connections between perfectly natural properties, even if there are necessary connections between overlapping objects that instantiate them.

So an interesting case can be made for Instance given HP and PWD. I am inclined to endorse HP, but there is a good reason to reject PWD. This reason for rejecting PWD is also a reason to reject Instance.

I think that it is possible for mereologically complex objects to instantiate perfectly natural properties. I think this because I think

that some mereologically complex objects actually instantiate perfectly natural properties. Specifically, I am a mereologically complex material object who instantiates perfectly natural properties. I hold that certain mental properties, such as having a blue sensation or being in pain, are perfectly natural properties, or, at the very least, supervene on perfectly natural properties had by complex objects.

The argument that some phenomenal properties are perfectly natural is reasonably straightforward, but, of course, very controversial. The first premise is that there is a *zombie world*. A zombie world is a possible world that satisfies the following conditions: (1) every fundamental particle that exists in the actual world exists in the zombie world, (2) no fundamental particle exists in the zombie world that does not exist in the actual world, (3) every fundamental particle has the same intrinsic properties in the actual world as it has in the zombie world, (4) the fundamental particles stand in the same external relations to each other in the zombie world as they do in the actual world, and (5) nothing experiences episodes of phenomenal consciousness, such as having a blue sensation or feeling pain, in the zombie world.[36] I accept the first premise, because I seem able to conceive of a situation in which everything is just alike at the microscopic level, but in which no one enjoys qualitative experiences. (I also note that I am presupposing that every fundamental particle is a mereological simple and that there are no non-physical mereological simples such as Cartesian spirits.) The second premise is that phenomenal properties are *intrinsic* properties. I do not know how to argue for this claim; it seems intuitive to me, although I acknowledge that there is some controversy about whether it is true.[37]

These two premises imply that PWD is false. If they are true, the case for Instance has been undercut. Moreover, when supplemented with a third premise, they provide a reason to reject Instance. The third premise is this: if zombie worlds are possible, and phenomenal properties are intrinsic properties, then phenomenal properties are perfectly natural properties or supervene on perfectly natural properties had by

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[36] On the possibility of zombies, see Chalmers (1996: 94–9). I note that the defender of the irreducibility of phenomenal properties to physical properties need not reject Instance, if she is willing to embrace a form of *panpsychism*, according to which phenomenal properties supervene on *proto-psychical* properties. For more on this interesting issue, see Chalmers (1996: 26–127).

[37] On this issue, see Merricks (2003) and Sider (2003).

mereologically complex objects. Since phenomenal properties are had by complex wholes, these three premises imply the falsity of Instance.

Why believe the third premise? Recall that the distribution of every qualitative property supervenes on the distribution of the perfectly natural properties and relations. So there can't be two worlds that differ qualitatively without differing with respect to some perfectly natural property or relation. A zombie world is a world that differs qualitatively from our world. So it must differ with respect to some perfectly natural property or relation. But it does not differ with respect to any of the perfectly natural properties or relations that are instantiated by the fundamental particles. So it must differ with respect to the perfectly natural properties had by some composite object.[38] So some composite object in the actual world must have a perfectly natural property that is not had by a composite object in the zombie world. So a composite object in the actual world has a perfectly natural property. This state of affairs is a counter-example to Instance.

I have presupposed that mereologically complex material objects are the bearers of phenomenal properties, and I stand by this presupposition. But one could maintain Instance if one rejected this claim. The existence of perfectly natural properties is not a problem for Instance if there exist mereological simples that instantiate them. In fact, one could argue for the existence of simple immaterial substances from the premises that (1) Instance is true, (2) being in pain is a perfectly natural property, (3) something is in pain, and (4) no material simple instantiates being in pain.

In general, Instance rules out the possibility of genuinely emergent properties. This is a reason to be concerned. Independently of concerns stemming from the philosophy of mind, it seems to me that we can conceive of situations in which perfectly natural properties are instantiated by mereologically complex objects. Suppose, for example, that physicists discover that bodies that appear to be particle-per-particle duplicates nevertheless behave differently when in the presence of a

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[38] Strictly speaking, there is another alternative: the worlds may differ with respect to some perfectly natural relation instantiated by composite objects, upon which the phenomenal properties supervene. These composite objects would have to be parts of the objects that have the phenomenal properties on pain of these properties being extrinsic. On this alternative, zombie worlds do not provide a counter-example to Instance. However, I suspect that anyone who takes the possibility of zombies seriously will not be tempted by this alternative.

third kind of thing. That is, although A and B have the same subatomic structure, when in the presence of a third object clearly qualitatively different from A and B, effect E1 is produced when A is present, whereas effect E2 is produced when B is present. Suppose that these physicists observe a large number of instances of this kind of event. They accordingly divide bodies into sorts: those that behave like A, and those that behave like B. From a microphysical perspective, all of these bodies appear to be duplicates. It is reasonable to think that something else accounts for the difference in their behavior.[39] So, since nothing yet discovered at the level of microphysics does, that difference must be a difference at the macrophysical level. Some bodies must have a feature that others lack. In this kind of case, scientists would be justified in postulating natural properties that are had by macrophysical wholes, not their parts. Instance, however, rules out the possibility of macrophysical wholes enjoying fundamental properties a priori.

And we need not rest the case for the conceivability of emergent properties on the bare bones thought experiment just given. For on some interpretations of quantum mechanics, the quantum state of the universe is a perfectly natural property assigned to a complex whole: the entire physical universe. This has recently been argued by Jonathan Schaffer (Schaffer, forthcoming). In a passage by Tim Maudlin (quoted also by Schaffer), Maudlin notes:

In quantum theory, then, the physical state of a complex whole cannot always be reduced to those of its parts, or to those of its parts together with their spatiotemporal relations, even when the parts inhabit distinct regions of space. (Maudlin 1998: 56)

As Schaffer puts it, ''In other words, *mereological supervenience fails*. The properties of entangled wholes do not supervene on the intrinsic properties and arrangements of their parts'' (Schaffer, forthcoming).

Again, I'm not a quantum physicist, so I'm in no position to evaluate whether the universe or any complex part of the universe enjoys this kind of quantum entanglement. But I'm not trying to argue (in this

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[39] Although perhaps we are not *required* to think that this is the explanation. An alternative explanation is that the laws of nature at this world are indeterministic. (I thank C. L. Hardin for bringing this point to my attention.) Of course, we are not required to think this either. My point is that there are possible situations in which we could be justified in positing genuinely emergent properties.

context) that emergent properties are *actual*. I'm arguing that they are conceivable. Their conceivability is demonstrated by the fact that actual respectable scientific theories appeal to emergent properties. This provides a reason to think that emergent properties are metaphysically possible, which is sufficient to eliminate Instance as an answer to the Simple Question.

This completes my case against Instance. I will now discuss:

The Independence View of Simples (Independence): x is a simple if and only if it is metaphysically possible that x is the only material object that exists.

The basic motivation for Independence is this: since simples are the fundamental building blocks of reality, they can be fully recombined. The idea that simples can be fully recombined finds its clearest statement in the work of D. M. Armstrong in *A Combinatorial Theory of Possibility*. In that book, Armstrong develops a Humean account of modality that implies that any simple can coexist with any other simple and that if something is a simple, then it is metaphysically possible for it to exist alone (Armstrong 1989: 37–48, 61–2).

I endorse the Humean program in modal metaphysics, so I will not challenge the claim that, if something is a simple, then it is metaphysically possible that it is the only material object that exists. However, this is not to say that the claim will be acceptable to all. Many philosophers claim that objects have their *origins* essentially. Suppose that an electron was created as a result of the big bang. Suppose that the big bang would not have happened had there not been an initial singularity, that is, a point-sized object of enormous density. If objects have their origins essentially, then our electron could not have existed unless that singularity had also existed. But nevertheless the electron is still an excellent candidate for being a simple. So Independence will be accepted only by those who reject certain kinds of essentialist views.

My first worry about Independence is that it seems that some composite objects could satisfy the right hand-side of the biconditional. For consider a composite object that could have been a simple.[40] If this

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[40] Markosian discusses the inverse of this, specifically, the possibility that a simple become a composite in Markosian (1998a: 221). Admittedly, it is controversial whether these alleged possibilities are genuine. For example, mereological essentialists will deny that these possibilities are genuine.

object could have been a simple, then it, like other simples, could have been the only material object in existence.[41] But then it satisfies the right-hand side of the biconditional. But, since it is not actually a simple, Independence is false.

The advocate of Independence can avoid this worry by revising her view as follows:

> **Independence***: x is a simple if and only if there is a possible world w at which (1) x is the only existing material object and (2) x instantiates an intrinsic property P at the actual world if and only if x instantiates P at w.

Independence* avoids the counter-example that plagued its ancestor. Perhaps a composite object could have been a simple. But any object has a different intrinsic character in worlds in which it is a simple than in worlds in which it is complex.

I am inclined to think that Independence* is true. I think that Independence* provides necessary and sufficient conditions for being a simple. My worry is that Independence* violates the non-circularity requirement on being an answer to the Simple Question. Independence* appeals to the notion of an intrinsic property, and this concept is partly mereological. Recall the definition of ''intrinsic property'': a property is intrinsic if and only if it never differs between duplicates. Now recall that the analysis of duplication also appealed to the concept of parthood: x and y are duplicates if and only if there is a one-to-one correspondence between their *parts* that preserves perfectly natural properties and relations. So Independence* may provide necessary and sufficient conditions for being a simple, but Independence* is consistent with the Brutal View.[42]

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[41] I assume here a modal logic at least as strong as S4.

[42] It is worthwhile to see a second attempt to salvage Independence. Consider *Independence***, according to which an object x is a simple if and only if there is a possible world w at which (1) x is the only existing material object and (2) x instantiates a perfectly natural P at the actual world if and only if x instantiates P at w. (This version was suggested to me by Ben Caplan.)

Since the concept of a perfectly natural property is not a mereological concept, Independence** is not circular. However, I think we can construct a possible counter-example to Independence**. Consider a possible world w in which a composite object o does not instantiate any perfectly natural properties. Suppose that o could have been a simple such that for any property p it instantiates, there is a property q such that q is more natural than p. In such a world, o does not instantiate a perfectly natural property either. If such a case is possible, then Independence** implies that o is actually a simple, which is false.

A deeper worry along the same lines is that it may turn out that *modal* concepts are partly mereological as well. If this is the case, Independence* is doubly guilty of violating the non-circularity requirement on being an answer to the Simple Question. Consider, for example, David Lewis's account of modality (Lewis 1986). According to Lewis, a proposition is possibly true just in case it is true at some possible world. A possible world is the *mereological sum* of maximally spatiotemporally related entities. So, on Lewis's view, mereological terms appear in the analysis of modality. If a view like Lewis's is correct, then any putative answer to the Simple Question that appeals to modal concepts violates the circularity requirement and hence is not a competitor to the Brutal View.

Obviously, I can't prove here that the correct analysis of modality must appeal to mereological concepts. The chapter is long enough as it is! Suffice it to say that this worry is one that a friend of Independence should take seriously.

This completes my case against Independence.

5. indivisibility accounts of simplicity

As the name suggests, Indivisibility Accounts appeal to the concept of *indivisibility* when answering the Simple Question. The main idea behind the Indivisibility Accounts seems to be this: simples are things without proper parts, and hence cannot (in some sense) be split apart. So things that can be divided must not be simple. On the other hand, things that cannot be divided must have no parts to be separated, and so must be simple.

Markosian distinguishes two versions of the Indivisibility Account, which he calls:

> **The Physically Indivisible View of Simples (PIV)**: x is a simple if and only if it is not physically possible to divide x.
> **The (Revised) Metaphysically Indivisible View of Simples (MIV)**: x is a simple if and only if it is not metaphysically possible to divide x without first changing x's intrinsic properties. (Markosian 1998a: 220–1)[43]

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[43] Markosian also discusses an unrevised version of MIV; since I believe the argument he makes against it is sound, I will not discuss it here.

My first worry about the Indivisibility accounts is that they appear to violate the non-circularity condition on being an answer to the Simple Question, and hence, even if true, will not be competitors to the Brutal View. It seems that the concept of divisibility cannot be explicated without appealing to mereological concepts in the explication. Consider the following analysis of *divisibility*:

> (D1): x is *divisible* if and only if it is possible that there are objects y and z such that (1) x is composed of y and z and (2) the union of the regions occupied by y and z is discontinuous.

D1 has two interesting features. First, it does not imply that divisible objects have proper parts, but it does imply that divisible objects possibly have proper parts. Secondly, D1 implies that divisible objects can survive division. A different account of divisibility that does not have these features is:

> (D2): x is divisible if and only if there are objects y and z such that (1) x is composed of y and z and (2) it is possible that the union of the regions occupied by y and z is discontinuous.

D2 implies that divisible objects have proper parts, but it does not imply that divisible objects can survive division.

Notice that both accounts of divisibility employ mereological concepts. So any account of simplicity that employs the concept of divisibility and then explicates this concept along the lines of D1 or D2 violates one of the conditions on being an answer to the Simple Question by appealing to mereological concepts in the right-hand side of the answer. Without a non-circular account of *divisibility*, the divisibility accounts are not competitors to the Brutal View.

Perhaps we could appeal to the concept of *matter* or *stuff* when giving an account of divisibility. (Markosian argues that the MaxConist needs to appeal to the persistence of *matter* in order to account for the qualitative heterogeneity of extended simples in Markosian (1998a: 223–6). Perhaps the advocate of the Indivisibility Accounts should also appeal to *stuff* to solve some of her theoretical problems.) Consider the following account of divisibility:

> (DM): x is divisible if and only if there is some matter M such that M ''makes up'' x and it is possible that M occupies a discontinuous region.

In order for this account to be intelligible, we need a clear account of the notion of matter and what the nature of the relation between an object and the matter that makes up or constitutes the object. So a brief digression is necessary.

Some philosophers hold that the material world is fundamentally a world of *stuff*, not of *things*. One friend of stuff is Michael Jubien, who writes:

the world does not come *naturally* divided into a definite array of discrete things. Instead, it consists of ''stuff'' spread more or less unevenly and more or less densely around space-time.... I am taking it as a fundamental onto-logical doctrine that the raw material of the physical universe is *stuff*, not *things*, and that the organization of (some of this) stuff into things is done by *us*. (Jubien 1993: 1–2)

Jubien claims that a complete description of the physical universe need not employ the concept of a thing (Jubien 1993: 2). Andrew Cortens says something similar in his sympathetic description of the stuff ontology:

According to [the stuff ontology], reality is to be thought of, not as a collection of objects, but rather, as being made up of stuff of various kinds.... On this view, mass terms serve as the best vehicle for representing reality in a perspicuous way. [Stuff ontologists] will resist any attempt to recast ''stuff-talk'' into standard object idioms. Any attempt to do so, however ''elegant'' from a purely formal point of view, they will view as being a move away from, rather than toward, greater perspicuity. In view of this, it seems reasonable to say that the stuff-ontologist endorses a picture of reality which excludes objects. (Cortens 1997: 46–7)

I take it that the central doctrine of the stuff ontology is that truths about the properties and relations of things—if there are any such truths—always supervene on the truths about the properties and rela-tions had by various stuffs. If we wish to assert these truths in a maximally perspicuous way, we should use sentences employing mass terms, not count nouns.[44]

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[44] In a similar vein, Theodore Sider writes:

It is important to be clear on how radical this view must be, if it is to be a genuine alternative to a thing-ontology. Some philosophers talk as if they defend a stuff-ontology, when they really just believe in things in stuff's clothing: 'The world consists of quantities of stuff; we can decide to interpret thing-quantifiers as ranging over any of the quantities of stuff we choose. One could use thing-quantifiers to range only over small bits of stuff, in which case the nihilist is right. Or one could use the thing-quantifiers to range over *all* the

I reject the stuff ontologist's attempts to eliminate things or reduce talk about things to talk about stuff. Now a friend of stuff need not endorse wholeheartedly the stuff ontology; she need only hold that some truths about stuffs are not reducible to any class of truths about things. Some facts about stuff are basic facts about the world, even if not all of the basic facts about the world are about stuff. This I reject as well: the truths about the properties and relations stuffs bear—if there are any such truths—supervene on more fundamental truths about the properties and relations had by things. The world is a world of things, not stuff.[45] (And, moreover, every world is a world of things, not stuff.)[46]

Suppose that the properties and relations instantiated by mereologically complex objects supervene on the properties and relations instantiated by mereological simples. That is, suppose that, once we have fixed the properties and relations of all of the material simples, we have fixed the properties of and relations of every complex object. If this is the case, and the world is a world of things, then there is nothing else that the properties and relations of the simples supervene on. There is no ''fundamental stuff'' that (i) ''constitutes'' or ''makes up'' these simples, and (ii) is such that the properties and relations of the simple objects supervene on the properties and relations of this stuff. This is one metaphysical consequence of the doctrine that the world is a world of things.

quantities of stuff, in which case there exists scattered objects.' In fact, this view assumes that the world is a world of things: *quantities* of stuff. . . . A genuine no-conflict stuff ontologist must claim that a truly fundamental description of the world must completely eschew a thing-language. This requires completely eschewing the usual quantifiers and variables—the backbone of contemporary logic. . . . A whole new language must be developed. Somehow, 'quantifiers' over stuff must be introduced without slipping into talk of things; somehow language must be invented to express all the facts about the world we take there to be, while not slipping into thing-language in disguise. (Sider 2001: pp. xvii–xviii)

[45] For a contrary view, see Markosian (forthcoming), in which he defends a mixed ontology including both things and stuff.

[46] This doesn't mean that we must eschew mass terms. That would be an entirely inappropriate response to the claim that the world is a world of things. We are still allowed to say, ''Some water is wet'' and ''More mashed potatoes is always better than less''. But the truth-values of these sentences are determined by facts about things. Specifically, that some portions of water—which are *things*—are wet suffices to ensure the truth of ''Some water is wet''; likewise, the fact that it is always better to receive a larger portion of mashed potatoes than a smaller portion entails the proposition expressed by ''More mashed potatoes is always better than less''.

I've argued elsewhere against including stuff into our ontology along with things; I won't repeat the argument here.[47] Suffice it to say that this way of formulating the notion of divisibility carries with it a high ontological price, which some may not be willing to pay.[48] There are other worries about the divisibility accounts, to which I now turn.

My second worry is that the physical divisibility account seems to be a non-starter. My worry stems from the fact that *being physically indivisible* seems to be an *extrinsic* property. An object might be physically indivisible in world w and yet be physically divisible in a world with different natural laws. Yet that object may have the same intrinsic nature in both worlds.

But *being a simple* is not an extrinsic property. It is provably an intrinsic property. Suppose that x and y are duplicates and that x is a simple. Since x and y are duplicates, there is a one-to-one correspondence between their parts that preserves perfectly natural properties. But then there is a one-to-one correspondence between their parts. So y is a simple. So simplicity is preserved by duplication. So being a simple is an intrinsic property.

If two properties are necessarily co-extensive, then one of them is an intrinsic property if and only if the other property is. *Proof*: assume P and Q are necessarily co-extensive. Then P never differs between duplicates if and only if Q never differs between duplicates. Intrinsic properties are properties that never differ between duplicates. So P is intrinsic if and only if Q is intrinsic.

Since *being physically indivisible* is an *extrinsic property* and *being a simple* is an intrinsic property, and since it is impossible for an extrinsic property to be necessarily co-extensive with an intrinsic property, PIV is false.

I will now discuss the Revised Metaphysically Indivisible View of Simples. Markosian writes this about MIV:

Unfortunately, [MIV] is equivalent to the Pointy View of Simples. For it seems clear that all and only pointy objects would satisfy the right-hand side of the

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[47] See McDaniel (2003).

[48] Markosian argues that any friend of extended simples must accept both stuffs and things in her ontology (Markosian, forthcoming). Although I am dubious about this claim (see Gilmore (forthcoming) for a convincing argument that postulating stuff does not eliminate worries about extended simples), it is interesting to note that the friends of the Indivisibility Accounts of simples may also need to make this commitment, despite the apparent fact that Indivisibility accounts are hostile to the possibility of extended simples.

bi-conditional.... Thus the above objections to the Pointy View of Simples would also apply equally well against this view. (Markosian 1998a: 221)

I think that this is mistaken, although it is hard to tell, since we do not have a clear account of the notion of metaphysical divisibility. However, if we operate with our shaky but intuitive grasp of this concept, I think we can agree that some possible point-sized objects are metaphysically divisible. Consider a point-sized object that is composed of two other point-sized objects. (I argued that this kind of case is possible in Section 2.) This object seems to be divisible, for it is possible for its parts to be in distinct regions of space. The Pointy View incorrectly implies that this object is a simple; MIV does not have this implication. MIV and the Pointy View are not equivalent.[49]

So Markosian's reason for rejecting MIV doesn't work. Nonetheless, I think there is a good reason to reject MIV as an answer to the Simple Question: MIV faces the circularity worry in a second (and perhaps third) guise. In addition to appealing to the concept of divisibility, MIV also appeals to the concept of an intrinsic property. And this concept is partly mereological, as I argued in the previous section. So MIV is guilty twice-over of sneaking mereological concepts into the analysis of simplicity. (It may be thrice guilty if modal concepts are also partly mereological, as I suggested they might be in the previous section.)

This completes my case against MIV.

6. UNKNOWABLE SIMPLES?

Here is a commonly told story: we used to think that chemical atoms were also atoms in the original sense, that is, mereological simples. But then we discovered that atoms are not mereological simples: we discovered that atoms are composed of a nucleus and the electrons in the outer-shells surrounding the atom. Perhaps there is further structure yet to be discovered? As Jonathan Schaffer writes:

Indeed, the history of science is a history of finding ever-deeper structure. We have gone from ''the elements'' to ''the atoms'' (etymology is revealing), to the subatomic electrons, protons, and neutrons, to the zoo of ''elementary particles,'' to thinking that hadrons are built out of quarks, and now we are

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[49] This example also shows that it is not the case that something is divisible if and only if it is extended in space.

sometimes promised that these entities are really strings, while some hypothesize that the quarks are built out of preons (in order to explain why quarks come in families). Should one not expect the future to be like the past? (Schaffer 2003b: 503)

There are two related worries that this picture seems to generate for the Brutal View. First, it seems that we often discover that certain objects are not simple. We might worry that, if the Brutal View of Simples is true, then we could not discover whether these objects were simple. What criterion could we use to rule that some object is not a simple if the Brutal View of Simples is true?

Secondly, it seems as if the search for the fundamental physical objects, by which I mean material mereological atoms, is one of the large projects in the history of physics. But it is hard to see how we could hope to succeed in this endeavor—*even if the world does divide without remainder into mereological* atoms—if the Brutal View of Simples is true.

Many answers to the Simple Question do not face these worries. For example, consider MaxCon. We have discovered that the nucleus of, for example, a hydrogen atom is actually some distance apart from the electron. This means that a hydrogen atom is not a maximally continuous object. So MaxCon correctly implies that a hydrogen atom is not a simple. Moreover, MaxCon can guide us in our search for the fundamental level: if we wish to find out which objects are mereological atoms, we should find out which objects are maximally continuous.

Similarly, the Pointy View can guide us in our search for the fundamental level: if we wish to find out which objects are mereological atoms, we should find out which objects are point-sized. Many of the other answers to the Simple Question seem to have this feature as well. Instance, for example, implies that the fundamental physical objects are also the basic bearers of perfectly natural properties. So once we discover those properties on which all others supervene, we will have discovered the true atoms of the world as well.

But it seems that the Brutal View of Simples cannot provide any guidance in our search. How then, given the Brutal View of Simples, could we ever know that our search had come to a conclusion? Perhaps some objects really are the true elements of the world. But the Brutal View of Simples won't tell us that they are. How then could we know that they are? We might be tempted to say that discovering what

objects are the actual mereological simples is the job of scientists, not philosophers, but without some idea of what they are looking for, how will they know when they have found it?

It is true that the Brutal View of Simples does not provide this sort of guidance. But this does not mean that the Brutal View of Simples is inconsistent with other principles that could provide us with aid in our quest to discover the true atoms of the world. As I noted in Section 2, the Brutal View of Simples is consistent with the existence of necessary conditions on being a simple, provided that these conditions are not both sufficient and informative. Similarly, it is consistent with the Brutal View of Simples that there are sufficient conditions for being a simple; as long as these sufficient conditions are not both also necessary and informative the advocate of the Brutal View of Simples need not do without them.

7. CLOSING REMARKS

The Brutal View is a somewhat unsatisfying answer to the Simple Question. But, if the most plausible alternatives to the Brutal View fail, a reasonable hypothesis why they fail is that simples per se have no nature.

Many of the premises employed in the arguments against the Brutal View's rivals are controversial. And, since the direct argument for the Brutal View is an argument via elimination, the case for the Brutal View is somewhat shaky. Specifically, I am aware that some of the modal principles I cherish and employ throughout this chapter—specifically, recombination principles conceived in a broadly Humean spirit—are not cherished by all.[50]

In the closing remarks of the paper in which he first raised the Simple Question, Markosian makes this observation:

Many of the above reasons in support of MaxCon, as well as the arguments I have given against MaxCon's rivals, are based on appeals to intuitions about what should be said concerning various possible cases. Such "modal intuitions" are notoriously difficult to defend. I understand that many philosophers who read this paper will not be convinced by my arguments, precisely because they do not share my modal intuitions about the relevant

[50] But they are cherished by enough philosophers to ensure that arguments employing them will not be without interest.

cases. But this is a common phenomenon, especially in discussions of fundamental metaphysical issues, and it would be a mistake to expect anything else. I hope that the arguments of the paper will nevertheless be valuable even to those who do not share my modal intuitions. For it can be worthwhile to see what there is to be said for a given view, and what are the consequences of that view, even if one does not share the intuitions that motivate the view. (Markosian 1998a: 227)

I do not share Markosian's modal intuitions. But I share his sentiments about the value of arguments that employ modal intuitions. Although arguments employing modal intuitions will not persuade those who do not share them, it is worthwhile to see how far views motivated by them can be pushed.

Secondly, since the case for the Brutal View is an argument via elimination, I must acknowledge the possibility that I have failed to consider other possible answers to the Simple Question. My defence is that I am unable to think of what they might be. I would be happy if someone else were to produce a new plausible answer to the Simple Question. As Markosian noted, the Simple Question deserves more attention.[51]

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