

A version of this paper appears in *Australasian Journal of Philosophy* 76 (1998), pp. 213-226.

# SIMPLES

Ned Markosian

## 1 A Question About Simples

Since the publication of Peter van Inwagen's book, *Material Beings*,<sup>1</sup> there has been a growing body of philosophical literature on the topic of composition. The main question addressed in both van Inwagen's book and subsequent discussions of the topic is a question that van Inwagen calls "the Special Composition Question." The Special Composition Question is, roughly, the question *Under what circumstances do several things compose, or add up to, or form, a single object?* For the purposes of formulating a more precise version of the Special Composition Question, we can adopt the following technical terms.

$x$  overlaps  $y$  =df there is a  $z$  such that  $z$  is a part of  $x$  and  $z$  is a part of  $y$ .<sup>2</sup>

The  $x$ s compose  $y$  =df (i) the  $x$ s are all parts of  $y$ , (ii) no two of the  $x$ s overlap, and (iii) every part of  $y$  overlaps at least one of the  $x$ s.<sup>3</sup>

Then the Special Composition Question can be put this way:

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<sup>1</sup> Ithaca: Cornell University Press, 1990.

<sup>2</sup> Cf. van Inwagen's definition on p. 29 of *Material Beings*, and David Lewis's definition on p. 73 of *Parts of Classes* (Oxford: Basil Blackwell, 1991). Here and in what follows I leave out temporal relativizations. Cf. Theodore Sider's remarks on parthood and temporal relativization in his paper, "Four-Dimensionalism," *The Philosophical Review*, forthcoming.

<sup>3</sup> Cf. van Inwagen's definition on pp. 28-29 of *Material Beings*. For an explanation of plural quantification, see Section 2 of *Material Beings*.

**The Special Composition Question (SCQ):** What necessary and jointly sufficient conditions must any xs satisfy in order for it to be the case that there is an object composed of those xs?<sup>4</sup>

The three rival views in response to this question that have received the most support in the literature so far are (i) Nihilism, which is the view that there are no objects composed of two or more parts;<sup>5</sup> (ii) van Inwagen's view, according to which the only objects composed of two or more parts are living organisms;<sup>6</sup> and (iii) Universalism, which is the view that any non-overlapping objects whatsoever, no matter how disparate, far apart, or otherwise unrelated, compose a single object.<sup>7, 8</sup>

One of the most crucial concepts in discussions of the Special Composition Question turns out to be the concept of a *mereological simple*. If we take the notion of parthood as a primitive, then we can define 'mereological simple' as follows.

*x* is a *proper part* of *y* =df *x* is a part of *y* but *y* is not a part of *x*.

*x* is a *mereological simple* =df *x* has no proper parts.

The notion of a mereological simple (hereafter I will just say "simple") is crucial to discussions of composition because simples are the basic building

<sup>4</sup> My formulation of the Special Composition Question differs slightly from van Inwagen's, but amounts to the same thing. See van Inwagen, *Material Beings*, pp. 30-31.

<sup>5</sup> For arguments that support this view see Peter Unger, "There Are No Ordinary Things," *Synthese* 41 (1979): 117-54; Peter Unger, "Skepticism and Nihilism," *Nous* 14 (1980): 517-45; and Horgan, "On What There Isn't," *Philosophy and Phenomenological Research* 53 (1993): 693-700.

<sup>6</sup> This view is defended by van Inwagen in *Material Beings*.

<sup>7</sup> Universalism is defended by various people. See, for example, David Lewis, *On the Plurality of Worlds* (Oxford: Basil Blackwell, 1986), pp. 211-13, and *Parts of Classes*, pp. 72-87; and Michael Jubien, *Ontology, Modality, and the Fallacy of Reference* (Cambridge: Cambridge University Press, 1993), pp. 14-17.

<sup>8</sup> I have argued elsewhere for a fourth response to the Special Composition Question, namely, that there is no informative answer to the question, and that facts about composition are "brute facts." See my "Brutal Composition," *Philosophical Studies*, forthcoming.

blocks that, when combined in various ways, make up all other objects.<sup>9</sup> 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. For this reason it is natural to ask the question, *Which things are simples?* That is, *Under what circumstances is it true of some object that it has no proper parts?* Here is a more precise formulation of this question:

**The Simple Question:** What are the necessary and jointly sufficient conditions for an object's being a simple?<sup>10</sup>

Answers to the Simple Question will typically be instances of this schema:

(S) Necessarily, x is a simple iff \_\_\_\_\_.<sup>11</sup>

It is important to note that the Simple Question is not a request for an analysis of the concept of a simple, just as the Special Composition Question is not a request for an analysis of the concept of a composite object. For we already know the correct analysis of the concept of a simple - simples are

<sup>9</sup> Unless it turns out that some objects are composed of "atomless gunk." See Section 2 below.

<sup>10</sup> Although there are interesting questions about non-physical mereological simples, I will not be concerned with any such questions here. That is, I will be concerned here only with questions about physical, mereological simples. For a discussion of what counts as a physical object, see my "What Are Physical Objects?" (unpublished manuscript).

<sup>11</sup> Not just any instance of (S) will count as an informative answer to the Simple Question, however. For one thing, an instance of (S) in which a mereological term appears in the expression that goes in the blank is likely to be uninformative. The following is an example of such a sentence.

(S1) Necessarily, x is a simple iff x has no proper parts.

And even an instance of (S) in which no mereological term appears in the expression that goes in the blank can be uninformative. For example, Nihilism, the answer to the Special Composition Question according to which there are no objects composed of two or more parts, entails this instance of (S):

(S2) Necessarily, x is a simple iff x is identical to itself.

(S2) is uninformative because it does not give any information about what simples would have to be like. Similar remarks apply to the instances of (S) that are entailed by other answers to the Special Composition Question.

objects with no proper parts. The Simple Question is, rather, a question about how the concept of a simple is linked up with other, preferably non-mereological, concepts.

Although various views have been proposed in response to the Special Composition Question, including the three mentioned above, there has been little or no discussion of the Simple Question in the recent literature on the topic of composition. In fact, I do not know of a single philosopher, recent or otherwise, who has explicitly addressed the Simple Question.<sup>12</sup> This strikes me as very surprising and downright odd. For, as I have suggested, if we are to try to figure out how it is that several things can be combined in order to compose a single thing, then we will likely be aided in our investigation if we have some idea of the nature of the basic building blocks that are meant to be combined in order to form composite objects. Moreover, the nature of simples is an important and fundamental topic in metaphysics, and should not be neglected. The purpose of this paper is to address this topic. In what follows I will formulate what I take to be the leading candidates among answers to the Simple Question, and then defend one of those answers.

## 2 Simples and Atomless Gunk

It is important to note that we should not assume at the outset that there even *are* any simples. For it may well turn out that there simply are no things without proper parts. In other words, it may well turn out that the world itself is what David Lewis has called “atomless gunk,” i.e., an object whose parts all have proper parts, which all have proper parts, and so on.<sup>13</sup> Indeed, this is a possibility that Anaxagoras, and perhaps Leibniz, believed to be actual.<sup>14</sup>

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<sup>12</sup> Democritus apparently came close when he suggested that simples are small, extended lumps of various shapes and sizes. But I think that in the end Democritus neither formulated the Simple Question, either implicitly or explicitly, nor proposed a clear answer to it. Similar remarks apply to Locke, Leibniz, Russell, Wittgenstein, and every other philosopher whose writings I am aware of.

<sup>13</sup> See for example Lewis, *Parts of Classes*, p. 20.

<sup>14</sup> For evidence that Anaxagoras held this view, see Jonathan Barnes (editor and translator), *Early Greek Philosophy* (London: Penguin Books, 1987), p. 227. For evidence that Leibniz held the view, see Leibniz, “Primary Truths,” in Leibniz, *Philosophical Essays* (edited and translated by Roger Ariew and Daniel Garber; Indianapolis:

Now, it seems to me that it is a contingent matter whether the world happens to be composed of atomless gunk. In fact, it seems to me possible that the world is composed of simples, possible that the world is composed of atomless gunk, and also possible that some parts of the world are composed of simples while other parts are composed of atomless gunk.<sup>15</sup> (It is worth noting that any object that is composed of atomless gunk will have an infinite number of parts, since its parts will have parts, and those parts will have parts, and so on.)

By my lights, then, the concept of a simple is a concept that may be instantiated, but also one that may be uninstantiated. And the Simple Question is not a question about whether this concept happens to be instantiated, but, rather, the question *What would an object have to be like in order to instantiate this possibly instantiated concept?*

### 3 The Pointy View of Simples

One natural way of thinking about simples involves saying that simples have no proper parts because they are too small to have such parts; they simply have no extension in space. According to this way of thinking, simples are *point-sized* objects. The following definitions will come in handy for spelling out this view.

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Hackett Publishing Company, 1989), pp. 33-34. But elsewhere Leibniz seems to commit himself to denying the possibility of atomless gunk. See for example "The Principles of Philosophy, or, the Monadology," in Leibniz, *Philosophical Essays*, especially p. 213.

<sup>15</sup> Cf. Theodore Sider's remarks about the possibility of atomless gunk in his "Van Inwagen and the Possibility of Atomless Gunk," *Analysis* 53 (1993): 285-89. But note that Democritus and others have thought that it is a necessary truth that everything is ultimately composed of simples. Peter van Inwagen has suggested, in conversation, an argument for this conclusion. Unfortunately, however, I am not confident that I could faithfully reproduce van Inwagen's argument. So for the purposes of this paper I will set aside the question of whether it can or cannot be shown that everything must ultimately be composed of simples. Instead I merely note that it seems to me that atomless gunk is a genuine possibility.

Object *O* occupies region *R* =df *R* is the set containing all and only those points that lie within *O*.<sup>16</sup>

*x* is a *pointy object* =df the region occupied by *x* contains exactly one point in space.<sup>17</sup>

The view can be stated as follows.

**The Pointy View of Simples:** Necessarily, *x* is a simple iff *x* is a pointy object.

I suspect that the Pointy View of Simples will strike some people as strange. For it is hard to conceive of a physical object that is not extended in space. In fact, it might be thought that it is a necessary truth that there are no pointy objects. That is, the following principle might be taken to be true:

**The Necessary Extension of Physical Objects (NExPO):**  
Necessarily, every physical object is spatially extended.<sup>18</sup>

If NExPO were true, then, although it would not follow that the Pointy View of Simples is false, it *would* follow that *if* the Pointy View of Simples were also true, then there could be no simples. Thus, if NExPO were true, then the Pointy View of Simples would entail that everything is composed of atomless gunk.<sup>19</sup> And that would be a strange consequence in a view about the nature of simples.

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<sup>16</sup> This is van Inwagen's definition of occupation (minus the temporal relativization) from footnote 2 of "The Doctrine of Arbitrary Undetached Parts," *Pacific Philosophical Quarterly* 62 (1981): 123-37. I follow van Inwagen and Richard Cartwright (*cf.* Cartwright's "Scattered Objects," in his *Philosophical Essays* (Cambridge, MA: MIT Press, 1987): 171-86) in taking regions of space to be sets of points.

<sup>17</sup> When temporally relativized, the definition of 'pointy object' would look like this:

*x* is a *pointy object* at *t* =df the region occupied by *x* at *t* contains exactly one point in space.

<sup>18</sup> Richard Cartwright seems to endorse NExPO on p. 171 of his "Scattered Objects."

<sup>19</sup> Unless, that is, the simples that compose physical objects are not themselves physical objects. But here is what seems to me a good principle about the mereology of physical objects: If *x* is a physical object, and *y* is a part of *x*, then *y* is a physical object, too. *Cf.* my "What Are Physical Objects?"

Even those who are willing to grant the possibility of pointy objects might think that we could never have any reason to believe in the actual existence of such things. For it is plausible to think that if a pointy object existed, then it would necessarily be completely undetectable to us. We couldn't see it, or smell it, or sense it in any other way, according to this line of reasoning, because it would simply be too small to interact in the relevant ways with our sense organs.

Both of these considerations - that NExPO seems true, and that it is plausible to think that pointy objects, if they existed, would be undetectable to us - are good reasons to have initial reservations about the Pointy View of Simples. But I think that any reservations raised by these considerations are in the end misplaced. I don't think that these considerations show that there is anything wrong with the Pointy View of Simples. First, consider NExPO. It seems to me to be a classic case of trying to turn a contingent matter into a necessary matter. I think that whether it is rational to believe that there are any pointy objects depends on one's evidence. It seems perfectly possible that one could have evidence that there are pointy objects, in the form of a best physical theory that posits objects without extension but with other characteristics that would make them seem appropriately classified as "physical." In fact, it seems to me that we are at this moment in exactly that situation with regard to our evidence! So I think that it is not at all a necessary truth that there are no pointy objects. That is, despite its initial plausibility, I think that NExPO is false.

I also think the claim that pointy objects, if they existed, would have to be undetectable to us is, although initially plausible, equally false. If the physicists are right about the existence and nature of quarks, then there are pointy objects that are detectable to us. In general, if a pointy object could generate such fields as electromagnetic and gravitational fields, then there is no reason why it could not be detectable even to the naked eye.

So I think that the Pointy View of Simples survives objections to it based on the considerations raised in the preceding paragraphs. And, indeed, I think that the Pointy View of Simples is certainly half true. For I think that it must be true that if something is a pointy object, then it is a simple. After all, how could something with no extension have proper parts? So the "if" part of the Pointy View of Simples seems clearly true. We might call this clearly true part of the Pointy View of Simples "The Simplicity of Pointy Objects:"

**The Simplicity of Pointy Objects:** Necessarily, if  $x$  is a pointy object, then  $x$  is a simple.<sup>20</sup>

But I have grave doubts about the “only if” part of the Pointy View of Simples. My doubts have to do with certain consequences of the Pointy View of Simples. Imagine a possible world in which there is only one physical object, a perfectly solid sphere made of some homogeneous substance, floating in otherwise empty space. If you can imagine such a world - and I think you can - then the Pointy View of Simples is false. For the Pointy View of Simples entails that any extended object that occupies a continuous region of space must be composed of an infinite number of parts.

I think that it will be worthwhile spelling out exactly what this consequence of the Pointy View of Simples amounts to and why the Pointy View of Simples entails it. First of all, by ‘a perfectly solid sphere’ I mean an object that occupies a spherical region of space. Such a sphere would be a *spatially continuous object*,<sup>21</sup> and the Pointy View of Simples entails the following claim about spatially continuous objects.

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<sup>20</sup> Theodore Sider has suggested, in correspondence, a possible counterexample to the Simplicity of Pointy Objects. The example involves a world where the laws of nature allow two pointy objects to “cross paths” in such a way that they are spatially coincident for a moment. If there is such a thing as the fusion of those pointy objects at that moment, then there exists a composite, pointy object - with the two original pointy objects as parts - at that moment.

It’s not clear to me that this is a description of a genuine counterexample to the Simplicity of Pointy Objects, however. For the alleged counterexample rests on two assumptions: (a) that it is possible for two objects to occupy exactly the same place at the same time, and (b) that if (a) is true, then in a case involving two pointy objects spatially coinciding at a moment of time, there would exist a fusion of the two objects at the relevant time. But (a) and (b) are controversial, and I for one am inclined to think that they are both false. Nevertheless, I admit that if both (a) and (b) are true, then there can be counterexamples to the Simplicity of Pointy Objects.

<sup>21</sup> We can say that a *spatially continuous* object is one that occupies a *continuous* region of space, and then, following Cartwright, we can define ‘continuous’ as follows.

$R$  is *continuous* =df  $R$  is not discontinuous.

$R$  is *discontinuous* =df  $R$  is the union of two non-null separated regions.



- (1) Necessarily, if any extended and spatially continuous object exists, then an infinite number of objects exist.

That the Pointy View of Simples entails (1) can be shown by means of the following argument. Suppose that the Pointy View of Simples is true, and that there exists an extended, spatially continuous object, O. Then there are only two possibilities: either there are some simples that compose O, or else it is not the case that there are some simples that compose O. Put another way, either O is composed of simples, or else at least some part of O is composed of atomless gunk. But if at least part of O is composed of atomless gunk, then every part of that part of O must have parts, and so on, which means that O itself will be composed of an infinite number of parts. So if any part of O is composed of atomless gunk, then an infinite number of objects exist. That takes care of one case. Consider, next, the case in which O is composed of simples. Since we are supposing that the Pointy View of Simples is true, then it must be that O is composed of some pointy simples. But in that case, O must be composed of an infinite number of pointy simples, since O is extended and spatially continuous. For a finite number of pointy simples would not be sufficient to compose an object that occupies a region containing an infinite number of points, and O is such an object. So if O is composed of simples, then an infinite number of objects exist. And that takes care of the other case. Therefore, whether O is composed of simples or at least partly composed of atomless gunk, there will be an infinite number of objects in the world.

R and R' are *separated* =df the intersection of either R or R' with the closure of the other is null.

The *closure* of R =df the union of R with the set of all its boundary points.

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.

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.

The *complement* of R =df the set of points in space not in R.

(Cartwright uses 'connected' and 'disconnected' in place of 'continuous' and 'discontinuous'.) For these and many other interesting definitions, see Cartwright's "Scattered Objects," pp. 171-74.

So the Pointy View of Simples entails (1). And since a perfectly solid sphere would be an extended, spatially continuous object, the Pointy View of Simples entails that if such a sphere exists, then an infinite number of objects exist. Thus the expression 'a world containing just one physical object, a perfectly solid sphere' is not a description of a possible world, according to the Pointy View of Simples.

Of course, one who accepts the Pointy View of Simples can consistently allow the possibility of a *roughly spherical* object that is *not* spatially continuous, even in a world containing only a finite number of physical objects. Such an object might *appear* to the naked eye - or even to an eye aided by a very high-powered microscope - to be a perfectly solid sphere, and it might be solid in the sense that you couldn't pass your finger through it; but such an object would not be a *perfectly solid* sphere in the sense defined above.

A second consequence of the Pointy View of Simples that I find unacceptable is this:

- (2) It is not possible that there exists just one physical object in the entire world, and that that object is spatially extended.

The Pointy View of Simples entails (2) because it entails that no spatially extended object is a simple, so that every spatially extended object must be composed of two or more proper parts. Hence the Pointy View of Simples entails that if there is a spatially extended object, then there are at least three objects in the world: the spatially extended object itself, and its two or more proper parts.

Both (1) and (2) seem unacceptable to me. Why should it not be possible that the only physical object that exists is a perfectly solid sphere? This seems to me like a perfectly possible state of affairs. But the Pointy View of Simples is inconsistent with this possibility. If the Pointy View of Simples were true, then if a sphere of the sort described existed, then it would have to have an infinite number of parts, and so it would exist in a very highly populated world. More generally, if the Pointy View of Simples were true, then worlds that contain just one physical object, which happens to be spatially extended, would all be impossible.

I suppose that the best response to these objections available to one who accepts the Pointy View of Simples is to bite the bullet and admit that (1) and (2) are both true. Perhaps one who took this line would appeal to the notion of restricted quantification in accounting for our tendency to say that a world containing a perfectly solid sphere in otherwise empty space contains only

one physical object. The idea would be that we tend not to count all of the parts of the sphere when counting physical objects in such a world, but that all of the parts of the sphere are nevertheless genuine physical objects; and similarly for the two or more proper parts of any spatially extended object.

For my part, however, I find this response unconvincing. It seems to me not only that we do not count any such objects as the proper parts of the sphere in our example, but also that there simply are no such proper parts. It seems to me that the expression 'a world containing a solid sphere and no other physical object' is a perfectly good, and literal, description of a possible world. Similarly, it seems to me that the expression 'a world containing just one physical object, which happens to be spatially extended' is also a perfectly good, and literal, description of a possible world.

#### 4 Simple as Indivisibles

The Greek word 'atom' originally meant *indivisible thing*. So it is natural to think of simples - mereological atoms - as indivisibles. Of course, there are different senses in which a thing can be indivisible. One such sense is this: it can be physically impossible to divide the thing. Here is a conception of simples based on this idea:

**The Physically Indivisible View of Simples:** Necessarily,  $x$  is a simple iff it is physically impossible to divide  $x$ .

Pointy objects would count as simples, according to the Physically Indivisible View of Simples, since it is physically impossible to divide a pointy object.<sup>22</sup> But it would also be possible for an extended object to count as a simple, on this view. For example, if it turned out that quarks were not pointy objects after all but, rather, just very small, extended objects that it is physically impossible to divide, then quarks would still count as simples, according to the Physically Indivisible View of Simples.

The Physically Indivisible View of Simples enjoys some initial plausibility, but it nevertheless faces what seem to be clear counterexamples. Here's one: imagine a chain whose links are made of some physically unbreakable material - material such that it is physically impossible to divide or break into pieces anything made of that material. The Physically Indivisible View of

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<sup>22</sup> Without first changing its intrinsic properties, that is. See below.

Simples entails that such a chain would be a simple. But it seems clear to me that such an object would have proper parts. For surely the links of such a chain would all be proper parts of the chain itself. Here's another apparent counterexample to the Physically Indivisible View of Simples: imagine a bomb made of some relatively mundane materials - bits of metal and plastic, say - that is cleverly arranged so that any attempt to separate the materials making up the bomb from one another will, as a matter of physical necessity, result in the entire thing's being annihilated. Such a bomb would count as a simple, on the Physically Indivisible View of Simples; but it seems clear that such a bomb would have the relevant bits of metal and plastic (not to mention the relevant molecules, atoms, and subatomic particles) as proper parts. I conclude, on the basis of examples like these, that the Physically Indivisible View of Simples is false.

Another somewhat plausible view about simples, also based on the idea that simples are indivisibles, is what might be called "the Metaphysically Indivisible View of Simples."

**The Metaphysically Indivisible View of Simples:** Necessarily,  
x is a simple iff it is metaphysically impossible to divide x.

The Metaphysically Indivisible View of Simples is not susceptible to the kinds of counterexample that refute the Physically Indivisible View of Simples. For even if the chain and the bomb in the above examples are physically indivisible, it remains true that they are at least *metaphysically* divisible. Hence they will not count as simples, according to the Metaphysically Indivisible View of Simples.

Unfortunately, it is not clear that anything will count as a simple, according to this view. Consider any pointy object, x. Is it metaphysically possible that x should become extended and then get divided? If the proponent of the Metaphysically Indivisible View of Simples says that it is, then he or she is apparently committed to the consequence that nothing could count as a simple. For what else besides a pointy object would be metaphysically indivisible?

Perhaps a proponent of the Metaphysically Indivisible View of Simples would say it's possible that some pointy objects are essentially pointy, and that such objects would therefore be metaphysically indivisible. This would allow the proponent of the view to say that there at least could be some simples. But it is difficult to see what could motivate the claim that there could be objects that are essentially pointy.

One who is inclined to say that simples are metaphysically indivisible might, alternatively, make this response to the question about whether it is metaphysically possible for a pointy object to become extended and then get divided. Such a thing is indeed possible, but it is not relevant to the question of whether the relevant object is a simple. The properties of an object that are relevant to that question are, rather, its actual intrinsic properties, such as its size and shape. The important question, according to this line, is whether it is metaphysically possible for a given object to be divided, given its actual intrinsic properties. One who took this line would thus endorse the following, revised version of the Metaphysically Indivisible View of Simples.

**A Revised Version of the Metaphysically Indivisible View of Simples:** Necessarily,  $x$  is a simple iff it is metaphysically impossible to divide  $x$  without first changing  $x$ 's intrinsic properties.

On this view, a contingently pointy object would count as a simple, since it would be metaphysically impossible to divide it without first changing its size and shape.

Unfortunately, the Revised Version of the Metaphysically Indivisible View of Simples 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 biconditional in the Revised Version of the Metaphysically Indivisible View of Simples. Thus the above objections to the Pointy View of Simples would apply equally well against this view.

## 5 The Maximally Continuous View of Simples

So far I have considered, and rejected, several different ways of answering the Simple Question. Now it is time to spell out and defend what I take to be the truth about this matter. The answer to the Simple Question that I endorse involves saying that simples are maximally continuous objects. The following definition will be useful in a statement of this view.

$x$  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.

The view can then be stated as follows.

**The Maximally Continuous View of Simples (MaxCon):**

Necessarily,  $x$  is a simple iff  $x$  is a maximally continuous object.

The intuitive idea behind MaxCon is that simples are objects that occupy the largest matter-filled, continuous regions of space around. Here's an example to illustrate the idea. Suppose you start with some continuous, matter-filled region of space. Then all of the matter in that region belongs to a single object,<sup>23</sup> which itself does not have proper parts. That is, it is not the case that different parts of your region are filled up with different objects. Put yet another way, there is a simple, and all of the points in your continuous, matter-filled region fall within that simple. Moreover, the simple in question that is filling up that region is *at least as big as* the region. It might be bigger. To determine whether it is bigger, you have to determine whether there is a larger, but also continuous and matter-filled, region of which the first region is a proper subset. If there is, then your simple is at least as big as that larger region. And to find out whether the simple is bigger than the larger region, you have to determine whether there is a still larger, but also continuous and matter-filled, region of which the second region is a proper subset. When you have finally found the largest continuous and matter filled region of which the original region is a subset, then you have found the exact region occupied by your simple.

So MaxCon entails that a perfectly solid sphere, for example, would be a simple, even if it were rather large, and even if it were physically divisible. And MaxCon also entails that various other spatially continuous objects - such

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<sup>23</sup> Assuming, that is, that the points in the region fall within an object. For MaxCon is consistent with there being a continuous, matter-filled region of space that is not occupied by any physical object. It might be desirable to add to MaxCon the following thesis, in order to have a theory of physical simples that rules out the possibility of matter without physical objects.

**Against Matter Without Objects (AMWO):** Necessarily, if  $R$  is a continuous, matter-filled region of space, and there is no other continuous, matter-filled region of space,  $R'$ , such that  $R$  is a proper subset of  $R'$ , then there is a physical object that occupies  $R$ .

While I personally endorse AMWO, I have not officially conjoined it to MaxCon in my discussion because I want to consider MaxCon, as an answer to the Simple Question, independently of other, related issues.

as a sphere with a hollow core, and many other more strangely shaped objects that happen to be spatially continuous - would also count as simples.

## 6 Some Objections to MaxCon

Someone might object to the first of the above-mentioned consequences of MaxCon by giving the following argument. (Let the name 'Spero' refer to some perfectly solid sphere.)

### An Argument Against MaxCon

- (i) If any object has some extension, then it has two halves.
  - (ii) If any object has two halves, then it has at least two proper parts.
  - (iii) Spero has some extension.
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- (iv) Spero has at least two proper parts.

But here is what seems to me to be a good objection to this argument: premise (i) is false. In general, not every extended sub-region of the region of space occupied by an object will itself be occupied by an object. So, for example, if Spero occupies region R, and R' is one half of R, then there may not be an object that occupies R'; there may be no "half-sphere." Saying this commits one to denying the notorious "Doctrine of Arbitrary Undetached Parts" that van Inwagen considers (and rejects) in his famous paper of the same name:

**The Doctrine of Arbitrary Undetached Parts (DAUP):** For every material object M, if R is the region of space occupied by M at time *t*, and if sub-R is *any* occupiable sub-region of R *whatever*, there exists a material object that occupies the region sub-R at *t*.<sup>24</sup>

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<sup>24</sup> See van Inwagen, "The Doctrine of Arbitrary Undetached Parts," p. 123.

But there are independent reasons for denying DAUP, including, especially, the fact that DAUP plays a crucial role in generating the Paradox of Undetached Parts.<sup>25</sup>

Rejecting premise (i) of the above argument against MaxCon also commits one to rejecting the following principle.

**A Principle that Generates Many Objects (MANY):** For any region of space, R, if every point in R lies within some object or other, then there is an object, x, such that x occupies R.

But I reject MANY for two reasons: first, it entails DAUP, and second, it entails Universalism, the thesis that any arbitrary objects whatsoever compose an object. (Rejecting (i) also requires rejecting a weaker version of MANY that begins “For any *continuous* region of space...” But the weaker version of MANY entails a corresponding weaker version of DAUP, and that weaker version of DAUP also generates a version of the Paradox of Undetached Parts.)

Moreover, it seems to me that the plausibility of the premises of the above argument for the conclusion that Spero must have at least two parts can be accounted for in a way that does not commit us to accepting the argument’s conclusion. Let us distinguish between two kinds of “part.” On the one hand, there are what we might call “metaphysical parts,” which are the things that actually compose composite objects, and each of which is a genuine object in its own right. And on the other hand, there are what we might call “conceptual parts,” which may or may not be genuine objects, but which correspond to the sub-regions of the region of space occupied by an object, along with the matter, or stuff, that fills those sub-regions. The idea, then, is that in at least some cases, when we talk about the “parts” of an object, we are really talking about its conceptual parts. Moreover, it seems to me that talk about the conceptual parts of an object, whenever it makes sense, can be

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<sup>25</sup> For discussions of the Paradox of Undetached Parts see Cartwright, “Scattered Objects,” van Inwagen, “The Doctrine of Arbitrary Undetached Parts,” and Mark Heller, *The Ontology of Physical Objects: Four-dimensional Hunks of Matter* (Cambridge: Cambridge University Press, 1990), esp. pp. 3-4.



translated into talk about the sub-regions of the region occupied by that object, along with the matter that fills those sub-regions.<sup>26</sup>

Premise (i) of the above argument seems true, I suggest, because it is apparent that anything with some extension will have *conceptual parts*, even if it doesn't have *metaphysical parts*. That is, premise (i) seems true because we understand 'half' to mean *conceptual half*. But premise (i) does not seem so obviously true if we take it to be talking about *metaphysical parts*; for it is not obviously true that every object with some extension must have metaphysical parts. Meanwhile, premise (ii) seems clearly true when we understand 'half' to mean *metaphysical half*, but not when we understand 'half' to mean *conceptual half*; for it is not obviously true that any object with conceptual halves must have at least two proper (metaphysical) parts. And of course if we combine the obviously true readings of the premises into a single argument, then that argument will be invalid.

Here is another objection to MaxCon that is similar to the objection involving Spero. Imagine a statue in the shape of Joe Montana. Let the statue be perfectly solid, so that it, like Spero, occupies a continuous region of space. Now it would be very natural to say that such a statue had a right arm. But according to MaxCon, there is no such thing as a part of the statue that can be accurately described as "the statue's right arm." That's because MaxCon entails that such a statue would have no parts at all; it would be a simple.

Just as this objection is similar to the one involving Spero, so the MaxConist's best reply to this objection is similar to the MaxConist's best reply to the Spero objection. The reply in this case is to bite the bullet and to admit that there is no such thing as the statue's right arm, but to account for our inclination to talk as if there is such a thing by appealing to the notion of conceptual parts. That is, the MaxConist could translate talk that appears to be about the right arm of the statue into talk about the relevant arm-shaped sub-region of the region occupied by the statue, and the matter that fills up that sub-region.

A perhaps more troubling kind of case for the MaxConist is this. Suppose the statue moves in such a way that we would be inclined to say that its right arm is moving, while the rest of it remains at rest. Then it would certainly be very natural to say that the statue has a right arm that is in motion relative to

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<sup>26</sup> Throughout this paper, whenever I use the word 'part' without qualification, and without scare quotes, I mean to be talking about metaphysical parts.

the rest of the statue. But if this is true, then doesn't it follow that the statue *has* a right arm? After all, if two things - the arm and the statue - are in motion relative to one another, then it seems to follow that both things exist.

Nevertheless, I think that there is a perfectly reasonable reply to this objection, namely, that talk about the motion of the arm of the statue can be translated into talk about the motion of the matter that fills the arm-shaped sub-region of the region occupied by the statue at any given time relative to the matter that fills the remaining sub-region of the region occupied by the statue at that time, in a way that does not commit us to saying that there are two objects involved in the case, one in motion relative to the other. Making this response to the objection commits on to denying the principle that, as a general rule, where there is motion, there are two or more objects. But this principle seems false to me. For it seems perfectly possible to me that a simple could have different conceptual parts that are in motion relative to one another, even though that simple has no metaphysical parts. I have in mind a case like this: a long, cylindrical simple, made of some homogeneous material, has one end securely fastened to the ground while the other end sways gently in the breeze.

Here is a final variation on the statue objection to MaxCon. Suppose that, loosely speaking, "part" of the statue - the right arm, say - is made of one type of matter while the rest of the statue is made of another type of matter. Then it will once again be natural to describe the statue as having at least two parts, one made of the first type of matter, the other made of the second type.

Once again, however, I find myself in sympathy with the MaxConist reply to this objection. It seems to me plausible to say that we can capture what is true in the loose talk of "parts" of the statue that are made of different types of matter in literally true talk about the relevant sub-regions of the region occupied by the statue, and the matter filling those sub-regions.<sup>27</sup>

There is one last objection to MaxCon that I would like to discuss here. Suppose there are two qualitatively similar, maximally continuous objects, A and B. Each one will of course count as a simple, according to MaxCon. Suppose that A and B move together until eventually they are actually touching. At that point, according to MaxCon, a strange thing happens to A

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<sup>27</sup> It should be noted, however, that the above replies to objections to MaxCon commit me to the claim that, at least in some cases, talk about matter, or "stuff," cannot be analyzed in terms of talk about things.

and B: they go out of existence. And in the general vicinity of the regions occupied by A and B just before the “merger” there will come into being a new object, C, constituted by the matter that previously constituted A and B.

Here’s why the MaxConist would have to say that A and B would go out of existence in this kind of case. First, the new object, C, would be a simple, according to MaxCon, since it would be a maximally continuous object; which means that C would not have any proper parts; which means that it would have neither A nor B as proper parts. So neither A nor B could exist after the merger in the form of a proper part of C. And secondly, it’s not open to the MaxConist to say that either A or B continues to exist after the merger by becoming C; for it would be implausibly arbitrary to declare either A or B the lone survivor of the merger,<sup>28</sup> and to say that both A and B are identical to C after the merger would be to give up the transitivity of identity.

Thus it is a consequence of MaxCon that one can annihilate a maximally continuous object just by causing it to come into contact with another maximally continuous object.

I admit that this is indeed a consequence of MaxCon, but I am willing to bite the bullet and accept this consequence. In fact, it seems to me that this is exactly the right consequence to get in such a case. I think that in many cases that might be described as “fusion cases,” at least one of the objects that get fused together goes out of existence. For example, when a sperm fertilizes an egg, the sperm goes out of existence. And when two lumps of clay are mashed together, both lumps then go out of existence. Or so it seems to me.

I’m willing to grant that there is an important difference between the case of the sperm and the egg, on the one hand, and the case of the lumps of clay, on the other hand. For when the sperm fertilizes the egg, the proper parts of the sperm separate from one another, making it very natural to say that they no longer compose anything;<sup>29</sup> whereas in the case of the lumps of clay, we can suppose that the proper parts of each lump continue to be arranged more or less exactly as they were before the merger. Thus it might seem more natural to some people to say that the sperm has gone out of existence in the

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<sup>28</sup> If the story is told in the relevant way, that is.

<sup>29</sup> A Universalist will have a different account of this case, for the Universalist will say that the former parts of the sperm continue to compose something even after they become separated.

one case than to say that the original lumps have gone out of existence in the other case.

In spite of this, I think that there is still an excellent reason for saying that the original lumps go out of existence in the case of the lumps of clay. The reason is this: if the original lumps did continue to exist, then they would be arbitrary, undetached parts of the new, bigger lump of clay. And I am assuming that there are good reasons for rejecting DAUP.

Thus it seems to me that the correct thing to say in both the case of the sperm and the case of the original lumps of clay is that those objects go out of existence at the relevant times. And it seems to me that this kind of result is likewise exactly the right result in the case of two maximally continuous objects that come into contact with each other.

I do admit, however, that there is something odd about saying that A and B can be annihilated just by getting them to come into contact with each other. But I think that the oddness can be accounted for even by one who accepts MaxCon. For even the MaxConist can agree that the matter that constitutes each of the original lumps of clay does not go out of existence simply because the two lumps have bumped up against each other. Thus here, as with the earlier objections to MaxCon based on the statue examples, it will be important for the MaxConist to distinguish talk of objects from talk of matter, and to appeal to the latter in satisfying certain intuitions that cannot otherwise be reconciled with MaxCon.

## 7 In Favor of MaxCon

So much for objections to MaxCon. Now let me say something about why I endorse MaxCon. One reason I do so is that all of its main rivals seem subject to convincing objections. Another reason I endorse MaxCon is that it is the answer to the Simple Question that accords best with my pre-philosophical intuitions about parts and wholes. Although it is difficult to argue on behalf of one's intuitions, let me say something about the relevant intuitions that seem to me to support MaxCon over the Pointy View of Simples, which I take to be its principal rival.

Imagine what it would be like to shrink to increasingly smaller and smaller sizes, so that other objects became increasingly larger and larger in comparison to yourself. Now imagine shrinking in this way and being able to dive into the insides of other objects, so that you can see what they are made

of. Imagine shrinking in this way and somehow diving into the insides of Spero, our perfectly solid sphere, as you become smaller and smaller.<sup>30</sup> You are trying to find some sign that Spero is not in fact a spatially continuous object. That is, you are trying to find an “island of matter” inside of Spero that is disconnected from the rest of the matter constituting Spero. And since there is no limit on how much you can shrink, there is no lower limit on the size that such an island inside of Spero would have to be in order for you to be able to detect it. If there is such an island in there, you will find it. But as you shrink down smaller and smaller, examining the insides of Spero on a smaller and smaller scale, you find no such disconnected island. Spero truly is, as advertised, a perfectly solid sphere, which means that Spero is indeed a spatially continuous object.

It seems to me that your activity in this scenario could be correctly described as a failed attempt to identify the proper parts of Spero. It seems to me that at each stage along your journey, if you paused to reflect on whether you then knew that Spero had proper parts, you would be right if you were to say to yourself, “Well, I haven’t found any proper parts yet. Spero might turn out to be a simple, for all I know.” But this intuition is inconsistent with the Pointy View of Simples, and is, as far as I can tell, best accommodated by MaxCon.

Another reason why I prefer MaxCon over the Pointy View of Simples is that even if, as the physicists say, the simples of our world happened to be pointy objects, it seems to me that this would still be a contingent fact. That is, it seems to me that there *could* be a world in which there are simples but there are no pointy objects. For suppose that there were no theoretical reason to postulate the existence of pointy objects; that is, suppose that such a postulation had no role in the best physical theory. Then it seems to me that we would have good evidence against the existence of pointy objects. But I don’t think we would have to have good evidence, under these circumstances, for the claim that ours is a world composed of atomless gunk. That is, I don’t think we would have to have evidence, under these circumstances, that there are no simples. It seems to me that whether there were any simples would still be an open question, under these circumstances. (I suppose that one who endorses the Pointy View of Simples might deny that a world with physical

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<sup>30</sup> Since Spero is spatially continuous, it would actually have to change its shape in order to allow you to do this.

objects but no pointy objects is possible - insisting that any physical object whatsoever must be composed of pointy objects - by appealing to DAUP. But, as I have said, I reject DAUP.)

Finally, I would like to point out that the MaxConist can allow the possibility of pointy simples, but that one who endorses the Pointy View of Simples cannot allow the possibility of extended simples. I consider this a point in favor of MaxCon.

## 8 Conclusion

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 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. More importantly, I hope that this paper will help to generate more discussion of the Simple Question, which, despite its crucial importance to the subject of the mereology of physical objects, has been undeservedly neglected.<sup>31</sup>

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<sup>31</sup> An earlier version of this paper was presented at the 1995 Pacific Division Meeting of the American Philosophical Association, in San Francisco. I am grateful to Panayot Butchvarov, the commentator, and members of the audience for a helpful discussion at that APA session. I am also grateful to Mark Aronszajn, David Cowles, Theodore Drange, Fred Feldman, Sharon Ryan, Theodore Sider, Dean Zimmerman, and an anonymous referee for helpful comments on earlier versions of this paper.