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Composition and Coincidence

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i. Statues and Lumps

Suppose we take a pound of gold and mold it into the shape of Hermes. Then, it would seem, we shall have a golden statue of Hermes, beautiful to behold. We shall also have a lump of gold. And we have the makings of a well-known philosophical puzzle. Many people find it obvious that if we crushed the statue or melted it down, we should destroy the statue but not the lump of gold. The lump can be deformed and still continue to exist, but the statue cannot; that is the nature of lumps and statues. So the lump can outlive the statue. Since nothing can outlive itself, it is natural to conclude that the one-pound gold statue and the one-pound lump of gold in our example are numerically different. And as statues are to lumps, they say, so are brick houses to heaps of bricks, living organisms to masses of matter, and people to their bodies. More generally, certain atoms (or elementary particles or what have you) often compose two numerically different material objects at once. To put it another way, two different material objects may have all the same proper parts (the same parts except themselves) at once. [1] Because of its many defenders and its intuitive attraction, I will call this the Popular View about lumps and statues and other familiar material objects. [2]

I believe that this philosophical puzzle is more profound than it is typically given credit for being, for the Popular View is deeply mysterious. It is hard to see how things could compose more than one material object at once, and it is particularly hard to see how two such things, being physically indistinguishable, could have different persistence conditions. Paradoxically, however, we cannot avoid these difficulties by simply modifying the Popular View or replacing it with something a bit more sophisticated. It is very hard to tell a coherent and plausible metaphysical story about statues and lumps and human beings and other persisting material objects. I will argue that can respect our intuitive beliefs about such commonplace objects--the ones that are taken to support the Popular View, as well as others--only by adopting one of several radical and surprising metaphysical doctrines. I shall discuss three such options: a Quinean ontology of temporal parts, Geach's relative identity thesis, and van Inwagen's view that there are neither statues nor lumps of gold nor any other composite material objects except perhaps living organisms. I say that these are radical views insofar as they have consequences that strike most of us, at first glance at least, as absurd. They are hard to believe. But some such theory is inevitable.

ii. Composition

First two terminological points. I do not intend to build anything special into the notion of an "object". A material object, as I shall use the term, is simply a concrete thing made of matter: a thing that has a mass, a size and shape and location, a net electric charge, and other physical properties. I assume that lumps of gold and masses of matter are intended by those who speak of them to be material objects in this sense, and not events, bundles of properties, or anything else. They may be funny kinds of things, but they are material things all the same, and that will do for my purposes.

I have already used the term 'compose', and I had better explain what I mean by that. Composition is a parthood relation: some things, call them the xs, compose something y just in case each of the xs is a part of y and every part of y shares a part with one one or more of the xs. If a house is built entirely of bricks, those bricks compose it: they are all parts of the house, and every part of the house (which may include things larger than bricks, such as walls, and things smaller than bricks, such as atoms) overlaps or shares a part with one or more of the bricks. The house is also composed of molecules, and of atoms, if there are such things as molecules and atoms. To say that y is a mereological sum or fusion of the xs, as I shall use those terms, is simply another way of saying that the xs compose y.

A trivial consequence of these definitions is that every material object, and in general anything made up of parts (even itself, its "improper" part), is a mereological sum or fusion of those parts. Some philosophers take these words to express something controversial, because they assume that a mereological sum has its parts essentially. I do not make that assumption. Thus you are a mereological sum of all of your elementary particles, even though you presumably lose and gain new particles constantly. That is just to say that all of those particles are parts of you, and every part of you shares a part with one of those particles.

iii. The Popular View

Let us turn now to the Popular View, and to our statue of Hermes. [3]

Because of the way we have arranged the gold atoms, we suppose, they compose a statue and they compose a lump of gold. On the Popular View, the statue and the lump are numerically different because they have different persistence conditions: what it takes for our statue-shaped lump of gold to persist through time is different from what it takes for our gold statue to persist. (If the the atoms composed two things with the same criterion of identity at once--two statues, or two lumps, for example--we should wonder why they composed just two such things, and not one or three or some other number. [4]) If we melted our statue down, or hammered its gold into an ashtray, the statue would not just cease to be a statue; it would cease to exist entirely. The lump, on the other hand, would merely take on a different shape. The resulting ashtray would be numerically different from the statue of yore. So if we said that the

ashtray was once a statue, we could not mean that literally, at least if x's having once been y implies that x and y are one and the same. We could at best mean that the same lump of gold that was once associated with or "constituted" the statue now "constitutes" the ashtray.

Aside from their different criteria of identity, though, the statue and the lump are exactly alike: they are--now, at least--perfect duplicates of one another. They are composed of the same atoms, arranged in the same way. This raises an apparently unanswerable question for the friends of the Popular View: why does crushing or melting destroy the statue but not the lump? What is it about the lump that enables it, but not its concident statue, to survive being deformed? It cannot be any difference in their internal structure, for their internal structures are exactly alike. It cannot be any difference in the forces we applied to them, since they too are the same.

You may say that the lump survives the crushing and the statue does not because the lump is a lump and the statue is a statue; and being able to survive changes of shape is part of the nature of lumps, while being unable to do so is part of the nature of statues. That is, the lump survives and the statue perishes because they have different criteria of identity. This might be a perfectly good way to explain why some particular lump survived, and some particular statue did not survive, on some particular occasion: this lump survived being crushed today because it had the capacity to survive it, and that statue didn't survive being crushed because it lacked that capacity. But that leaves us wondering why the lump can survive deformation and why the statue cannot. What gives the lump and its coincident statue these different capacities or dispositions? We cannot answer this question by appealing to the difference between lumps and statues and the fact that the lump is a lump and the statue is a statue. For all that makes one of the one-pound objects a lump and the other a statue is this dispositional difference; the only difference between a golden statue and a statue-shaped lump of gold is modal or dispositional. The lump can survive crushing because it is a lump, and it is a lump and not a statue just because it can survive crushing. This amounts to saying that there is no reason why the lump but not the statue can survive crushing.

The problem is not how the lump and the statue can be numerically different just in virtue of having different modal or dispositional properties, as some authors have thought (e.g. Johnston 1992, pp. 97f.; Noonan 1993). The problem is how they could have different modal or dispositional properties in the first place.

To be sure, the two objects may have different histories: the lump may have existed before it was molded into the shape of Hermes--before the statue came into being. But this is an accidental feature of our story. On the Popular View, even a lump and its concident statue whose histories are the same have different criteria of identity. And the mere fact that the lump existed before the statue did, or was once different from the statue in some other way, can hardly explain why the lump can now survive something that the statue cannot.

You might try to account for the difference between the statue and the lump by appealing to the notion of emergent properties. Consider an analogy. It is commonly assumed you and your body, though indistinguishable at the molecular level, have different "higher-level" properties: your body does not have conversations or wonder about the future, for example. If this is right, there are after all differences between a person and her body that might explain why one can survive certain adventures that the other cannot survive. And if we look carefully we are certain to find analogous differences in the emergent properties of the lump and the statue.

This is a red herring. Emergent properties must emerge out of something; things cannot have different emergent properties unless there is a difference in the more basic properties that determine their emergent properties. And there is no "lower-level" difference between the statue and the lump that different "higher-level" properties could emerge from.

(But obviously my body did not have a conversation with my brother's body last week, although I had a conversation with my brother. Isn't the Popular View the only way to avoid that absurdity? Perhaps so--if the absurdity of my body's having conversations derives from the fact that my body is a material object that is exactly like me, down to the last atom, except that it lacks any psychological features, and other features that presuppose psychologial features, such as signing checks. But that is questionable. Perhaps the absurdity derives from the fact that the phrase 'my body' calls attention to the purely animal and brute physical properties of me. So 'my body had a conversation' is perhaps not strictly false, but jars because it carries a misleading conversational implicature.)

Nor is it any help to say that the lump of gold constitutes the statue. If they are different things, the lump could outlive the statue in a way that the statue could not outlive the lump. An alteration of the lump not involving any loss of its parts (crushing, for example) would entail and explain the statue's destruction. More generally, the properties of the lump explain the properties of the statue in a way that the properties of the statue do not explain the properties of the lump. So the lump constitutes the statue but the statue does not constitute the lump (according to the traditional lore of lumps and statues).

This is unhelpful for two reasons. First, the lump's constituting the statue does not alter the fact that the lump and the statue are now composed of the same atoms arranged in the same way, and thus are perfect intrisic duplicates of one another. The constitution relation is just as problematic as coincidence per se. It merely enables us to restate the problem without explaining anything. If it is mysterious how one of the two physically identical golden objects could survive something that the other cannot survive, it is just as mysterious how one of them could constitute the other.

The second reason why constitution is of no help is that the mystery of the lump and the statue is not a mystery about coincident objects per se. [5] It is a problem about how any two

material objects, concident or not, can be exact physical duplicates of one another and yet have different persistence conditions. And if there are coincident objects, there are also qualitatively identical noncoincident objects with different persistence conditions. Call our golden statue "Statue 1", and its coincident lump of gold "Lump 1". Imagine that elsewhere there is another golden statue, Statue 2, that is qualitatively identical with Statue 1: the two statues are composed of the same number of gold atoms arranged in exactly the same way. Lump 1 and Statue 2 will then be perfect physical duplicates of one another, yet have different persistence conditions. But they are not coincident, since they are in different places and are composed of numerically different atoms. Whatever questions arise about how Statue 1 and Lump 1 could have different persistence conditions will apply as well to Lump 1 and Statue 2. And even if the constitution relation can answer our questions about Statue 1 and Lump 1, which are coincident, it cannot answer our questions about Lump 1 and Statue 2, which are not concident.

You may think that the lump's capacity to survive something that the statue cannot survive does not need any explanation. Couldn't it be just a brute, unexplainable fact--a cosmic accident--that deformation would destroy the statue but not the lump? Could it not be a matter of chance which of the two one-pound, golden objects survives a given change of shape, and could it not be that we simply call the one that survives 'the lump' and call the one that perishes 'the statue'?

If there were only one change of shape in the lump's career, this account might be plausible. But each time the gold atoms are rearranged, the same object is supposed to survive. Suppose we hammer our Hermes-shaped lump of gold into an ashtray, later into a bust of Descartes, then into a cube, and finally into a shapeless mass. If with each change of shape it were a matter of chance which of the two coincident golden objects survived--the lump on the one hand, or the statue, ashtray, bust, or cube on the other--it would be surprising if the same object persisted through all four changes. The chances against this happening would be eight to one. But the Popular View says that the same object--the lump--is guaranteed to survive throughout, and would continue to survive if we continued to rearrange the gold atoms. So it could not be an accident needing no explanation that the lump survives while the statue perishes.

But there is another reason why the lump's capacity to outlive the statue might be said not to need any explanation. The statue is essentially a statue, and the lump of gold is essentially a lump. Moreover it is a necessary truth that lumps but not statues can survive being crushed. So the reason why the statue and the lump have different persistence conditions is that this is a necessary truth (given that they exist at all); and you cannot explain why a necessary truth is true. If we felt compelled to ask what makes the lump able and the statue unable to survive crushing, that is because we thought it was somehow a contingent matter that one of the golden objects but not the other could survive crushing. We thought that each object might have had the dispositional properties of the other, and that it was therefore in need of explanation why

each object has the persistence conditions it has. But once we recognize that this is a necessary truth, we see that no explanation is possible, for it could not have been otherwise.

If I had to defend the Popular View against the arguments of this section, this is the reply I should try to develop. Let us try to understand the proposal. The idea seems to be that a material object does not have the ability or inability to survive a given adventure by virtue of having certain microphysical properties. Rather, those dispositional features are completely "basic" to a thing, not fixed by the arrangement of its atoms. [6] Two objects with the same nondispositional properties can have very different dispositions--for example one can be such that it would cease to exist if crushed, while the other is such that it would not cease to exist if crushed.

This seems mysterious. Imagine being told that there were two physically identical objects, only one of which was fragile. One of them would break if struck sharply with a hammer, while the other would not break if struck in the same way. If the notion of a dispositional property makes any sense at all, this is absurd. Fragile things must be intrinsically, physically different from non-fragile ones; fragility could not be a "basic" property that did not depend on a thing's internal, structural features. It must be possible, at least in principle, to distinguish fragile things from non-fragile ones without hitting them with hammers and seeing whether they break. It must be possible to distinguish them by comparing their internal, structural features. It would seem on the face of it that the ability or inability to survive crushing must depend on a thing's internal, structural properties in just the same way as fragility or non-fragility does. Someone who holds that the ability or inability to survive crushing does <u>not</u> depend on a thing's intrinsic, nondispositional properties must explain how this dispositional feature is relevantly different from being fragile.

This will not be an easy task. One might try to drive a wedge between fragility and "perishability" by pointing out a thing need not share <u>all</u> of its dispositions with every perfect duplicate of it. Your dog Fritz may have a duplicate somewhere in the universe that is internally exactly like him--an animal that is now composed of the same number of the same kinds of atoms as Fritz is composed of, arranged in just the way that Fritz's atoms are now arranged. But Fritz would still have at least one dispositional property that his double lacks: he would deprive the world of Fritz's existence if he were run over by a truck.

However, there seems still to be an important difference between the property of depriving the world of Fritz's existence if hit by a truck and that of simply ceasing to exist if hit by a truck. It would be absurd to say that while Fritz would perish if run over by a truck, Fritz's double would survive being run over in just the same way by an exactly similar truck. The very same physiological and biochemical changes could not be the end of Fritz without also being the end of his duplicate. Fritz and his double could not have different dispositions of <u>that</u> sort, any more than there could be two physically identical vases, only one of which was

fragile. But being unable to survive being run over by a truck seems very like the property of being unable to survive being crushed. So the fact that Fritz's double must have the same persistence conditions as Fritz has suggests that the statue and the lump must have the same persistence conditions as well, since they too are perfect duplicates of one another. The case for the Popular View looks grim. [7]

For these reasons I claim that the Popular View is false, or at any rate far more problematic than than it is commonly taken to be. A statue cannot share all of its proper parts with a lump numerically different from it; the same particles cannot compose two different things at once. And the same goes for brick houses and heaps of bricks, people and their bodies, and all the other classic examples.

I do not deny that two different things can occupy the same space at the same time. Suppose some ghostly thing squeezed itself exactly into the space our statue occupies. My argument does not apply to this case, for the ghost would have a different internal structure from that of the statue. The ghost isn't made of gold, but of something more subtle that can penetrate ordinary matter. There is no problem about saying that the ghost might outlive the statue, for their different internal structures could account for this dispositional difference. There might also be one or more events that all of our gold atoms and nothing else are caught up in, even though such an event would presumably have the same spatial boundaries as the statue. Although that event would consist entirely of the activities of our gold atoms--the same atoms that compose the statue--the event and the statue might have different criteria of identity, for they differ intrinsically. Their relation to the gold atoms is importantly different: while the statue has those atoms as material parts, the event consists of the activities of those atoms.

iv. Conservative Solutions

So much for the Popular View. I said I was going to argue that the problem of the lump and the statue admits only of metaphysically radical solutions. So let us see why it cannot be solved in any conservative or non-radical way--in a way that does not have the appearance of absurdity. A conservative solution would be to say that the lump is the statue: the gold atoms compose both a lump and a statue in the way that certain organic molecules might compose both a dog and a pet, or man and a philosopher. The lump and the statue are numerically one.

What happens, then, when the statue of Hermes gets hammered into an ashtray? There are two things we might say. We might say that the one Hermes-shaped, golden object survives the change of shape, and simply ceases to be a statue of Hermes and comes to be an ashtray (much as a human being might cease to be a girl and come to be a woman). Or we might say that that thing ceases to exist when its shape changes, and is replaced by something numerically different, though composed of the same gold atoms. [8] Loosely speaking, we might describe the first option as the view that there are really no statues, but only lumps that are sometimes

statue-shaped; and we might describe the second option as the view that there are really no lumps of gold or masses of matter, but only statues and the like that cease to exist when they are deformed. But of course there is no problem with calling the lump a statue, on the first view, as long as we don't understand this as implying that it has persistence conditions unique to statues. And there is no problem with calling the statue a lump, on the second view, as long as we don't think that it therefore has persistence conditions appropriate only to lumps.

Reasonable as they may sound, both of these options are problematic.

Consider the first proposal, that the gold atoms never compose anything but a lump of gold, which has different shapes at different times: now it is Hermes-shaped, later it is ashtray-shaped, etc. At the later time we can to point to a golden ashtray and say truly, "That ashtray is the statue of Hermes you saw here last week, although of course it isn't a statue any longer"--just as one might say, "That woman over there is the little girl you used to bounce on your knee, although of course she isn't a girl any longer". We might speak loosely as if the statue or the work of art has been destroyed, but in reality we have destroyed only a shape or an arrangement of atoms, for no one-pound material object has ceased to exist. That would be like saying loosely that the little girl (who grew into a woman) is no longer, even though no little girl ceased to exist.

Now of those philosophers who claim that we could destroy the statue without destroying the lump by deforming it, many also claim that we could destroy the lump without destroying the statue. If we dissolved one arm of our statue in acid and then replaced that arm with a copy, or if we replaced the gold atoms one by one with silver atoms, the statue we started out with would still be there, but the lump would have ceased to exist (or at any rate ceased to be a lump). If they are right, the "lump-only" proposal faces a problem, for our gold atoms must compose something other than a statue-shaped lump of gold. Their view is that some object--some statue--is first composed of our original gold atoms and later composed of different gold atoms, or of atoms of a different kind. But no lump of gold is composed of different atoms at different times (at any rate no lump could survive the loss and replacement of very many of its component atoms.) If anything survives this replacement of parts, it is not a lump. According to this piece of philosophical lore about lumps and statues, then, the gold atoms could not compose just a lump and nothing else; they must either compose two things--the Popular View--or they must compose no lump at all, but something else instead: something that can survive large-scale exchanges of its parts, such as a statue.

We might throw a sop to those who claim that dissolving an arm in acid would destroy the lump but not the statue by arguing that this is true only loosely speaking. Nothing really survives this adventure, we might say; strictly speaking, nothing is ever composed first of certain gold atoms and later of different gold atoms, or of silver atoms. What makes it true (or at least appropriate) to say, speaking loosely, that the silver statue was once made of gold is

simply that the silver thing and the golden thing are related in some interesting way--that the silver statue inherited its shape, in some materially continuous way, from the golden statue, for example--which could be true even if the silver statue and the golden statue were numerically different. Saying that the silver thing is the same statue as the golden thing would be like saying that Clinton is the same elected official as Reagan was.

But the "lump-only" proposal has a more startling consequence: it seems to entail that there are no cats or dogs or people. If the gold atoms arranged in the shape of Hermes compose a lump of gold or a mass of matter that can survive changes in shape but not changes in its composition, then presumably the atoms that compose Fritz the dog also compose a lump or a mass of something. At any rate it is hard to imagine a reason why gold atoms arranged in the shape of Hermes should compose a lump or mass of gold that is not also a reason why oxygen, carbon, and other atoms arranged in the form of a dog should compose a lump of flesh and bone or a mass of matter, with the same or at least similar persistence conditions. (But see my discussion of Burke, below.)

Fritz himself, though, is not a mass or a lump of anything. By virtue of his metabolism Fritz is constantly expelling atoms that were formerly parts of him and assimilating new ones; in a year or two, most of the atoms that compose Fritz now will no longer compose him or any other dog. But a lump or mass of matter cannot be composed of completely different atoms at different times; that is part of the nature of lumps of matter. So if there are such things as lumps of gold or masses of matter, then for each living organism there is at each time some lump or mass of matter that is numerically different from that organism, but composed of the same atoms. And if my argument of the previous section is correct, that is impossible. (What is it about the lump that prevents it from surviving an exchange of parts, while the animal, which is exactly like it, can?) If there are lumps, then, there are no dogs or other organisms; and there are no such things as you and I, unless you and I are not material objects made of atoms, but things of some other kind. If nothing else, this disqualifies the present proposal as a <u>conservative</u> solution to the problem of lumps and statues.

Turn now to the second proposed conservative view: the gold atoms compose just one object, a statue, which perishes if deformed. If we hammer the statue into an ashtray, no one-pound, golden object is first Hermes-shaped and later ashtray-shaped; all that survives the process are the individual gold atoms. (We might say that <u>the gold</u> has survived, and this would be strictly true as long as 'the gold' does not refer in the singular to any one-pound golden thing, but only in the plural to a lot of gold atoms.) There are no masses or lumps of matter, then, that can survive radical changes in shape. Or at any rate the golden statue is not such a thing.

But now consider Hermes himself, who, though not made of gold, has the same outward shape as the statue. (Pretend that Hermes is a mortal human being made of flesh and blood.) If

the gold atoms arranged in the shape of Hermes compose something that cannot survive being deformed, one would think that Hermes's oxygen, hydrogen, and other atoms, being arranged in the same shape, would also compose something that cannot survive being deformed. Since they weren't arranged in that way by a sculptor, those atoms wouldn't compose a statue. But it would be puzzling if they didn't compose an object of the same ontological kind as statues, with the same persistence conditions: a "morphosome", we might say. Hermes, though, is not a morphosome, for he can survive all sorts of changes of shape and size that a statue of him could not. He increased in size more than a millionfold during the course of his development from an embryo, for example, and underwent many radical changes of shape along the way. Moreover Hermes, unlike a statue of him, could cease to exist even though the atoms that formerly composed him continued to be arranged in the shape they were arranged in when they composed him, as they would if Hermes died while sleeping peacefully. There is no one set of persistence conditions that applies both to the human being Hermes and to the statue.

If there is such a being as Hermes, then, his atoms compose something other than a morphosome, since he himself is no morphosome. However, if there are statues--or more generally if there are morphosomes--then Hermes's atoms presumably compose a morphosome as well. But we have seen that those atoms cannot compose two different things at once. So if there are statues, Hermes does not exist, and neither do you and I. There would be no human beings at all, for any atoms arranged in human form would compose a morphosome and nothing else, and a morphosome is not a human being because it cannot survive the sorts of changes of shape and size that human beings can survive. So the "lump-only" proposal, too, seems to rule out the existence of human beings, and so cannot be counted as a conservative view.

Now I have assumed here that pretty much any atoms that cohere together [9] compose a morphosome if our gold atoms do. But could it not be that while the gold atoms arranged in the shape of Hermes compose a morphosome--a statue--the carbon, hydrogen, and other atoms arranged in human form do not compose a morphosome at all, but a human being instead--something of a completely different ontological kind and with different persistence conditions?

Maybe. But this proposal raises difficult questions. We have a pretty good idea of what it takes for atoms to compose a human being, or an organism of any other kind; it's clear enough why the carbon, oxygen, and other atoms arranged in the shape of Hermes compose a human being (given that they compose anything at all) and why gold atoms arranged in a superficially similar way do not. But what does it take for atoms to compose a morphosome? Perhaps it is obvious that the gold atoms arranged in the shape of Hermes compose a morphosome, since they compose a statue and statues are morphosomes. But why don't the carbon, hydrogen, and other atoms arranged in that same outward shape also compose a morphosome? Is it something about their arrangement? Or something about the fact that they are carbon and hydrogen atoms

rather than gold atoms? And why should either of those differences have any bearing on whether those atoms compose a morphosome? Which atoms compose morphosomes and which do not, and why? These questions must have answers if some maximally connected atoms compose morphosomes and others do not. But it will not be easy to answer them.

One philosopher has recently proposed such an answer. According to Michael Burke (1994), any atoms at all compose something. If the thing they compose is a mere lump of matter and nothing else, it has the persistence conditions associated with the sortal 'lump': it can survive deformation, but no large-scale exchange of atoms. On the other hand, if some atoms compose a statue, that thing has the persistence conditions associated with the sortal 'statue', and cannot survive radical changes of shape. Even though that thing may also be a lump of gold, it is not merely a lump, and its being a statue outweighs, ontologically speaking, its being a lump. If the thing the atoms compose is a human being, it is also not a mere lump of something, and thus has the persistence conditions associated with the sortal 'human being', which are different from those associated with 'statue' or with 'lump'.

Why is it that some lumps of matter have "lump" persistence conditions while others have "statue" or "human-being" persistence conditions? What is special about the property of being a statue, or being a human being, that gives statues and human beings different persistence conditions from those of mere lumps? Burke's answer is that the types of properties common to all statues or all human beings exceed in range the types of properties common to all lumps of matter (pp. 610f.).

We may wonder in what sense being a human being entails a wider range of types of properties than being a lump of flesh and bone does; and we may wonder why this supposed fact should have any connection with a thing's persistence conditions. But let us suppose that we understand Burke's proposal perfectly well. Nevertheless this could not be the right theory of lumps and statues.

Burke's view is that a "mere" lump of gold could survive any change of shape that leaves it a connected object--unless that change of shape makes it (or rather its successor) into a statue. For statues and "mere" lumps have different persistence conditions, and a thing cannot start out with one set of persistence conditions and later exchange them for a different and incompatible set.

Presumably Burke does not think that there is a certain shape, or type of shape, common to all statues, and that that shape alone is fatal to any "mere" lump. A "shapeless" lump beaten into a statue does not cease to exist just because its shape changed; mere shape does not have that sort of ontological power. (Things are not morphosomes merely because of their shape.) A statue can be any shape at all; no shape is intrinsically a statue shape. What makes something a statue is the way it is (or ought to be) treated, or the intention with which it was made, or the like. There could be a statue made by a sculptor and an exactly similar non-statue made

fortuitously by natural forces.

But according to the argument of Section ii--which Burke himself seems to accept (1992)--two things that are exact, qualitative duplicates of one another cannot have different persistence conditions. So a "mere" lump of gold that fortuitously happens to have the same size, shape, chemical composition, and other features that some statue has could not survive being crushed, any more than the statue could. But since a statue can be of any shape at all, any lump of gold has a shape that some statue might have, and so must have "statue" persistence conditions. So all lumps of gold are morphosomes.

Now it may be that Burke is mistaken about gold statues and lumps of gold but right about human beings and lumps of flesh and bone. Perhaps his theory does explain why Hermes's atoms compose something with "human" persistence conditions, even if it cannot explain why gold statues have "statue" persistence conditions. In any case, his theory needs more work. [10]

So it seems that we cannot solve the problem of the statue and the lump by claiming that there are lumps but no statues, or statues but no lumps--at least not without giving up a lot of other cherished beliefs about material objects, such as the belief that there are dogs and cats and human beings (or else taking on what looks like an insoluble metaphysical mystery). But if we are forced to accept some radical metaphysical consequence, there are more attractive solutions to the problem. In the remainder of the paper I shall discuss three such positions.

v. Temporal Parts

Some philosophers solve the problem of the lump and the statue by adopting an ontology of temporal parts. [11] According to that view, material objects such as statues and dogs and men and women are stretched out in time in much the same way as a highway is stretched out in space. Like a football game, you fill up an interval of time, and consist of parts that "occur" earlier and parts that "occur" later. Your childhood may be a part of your history or your career, which (I suppose) is a sort of event that you take part in; but on this view there is a part of you, a talking, flesh-and-blood being, that corresponds exactly with your childhood, extending from your third to your eighteenth birthday, say. At any given time we see only a small segment of you; most of your parts exist at other times, past and future--just as we see only a short segment of the highway we are driving on at any particular time.

The ontology of temporal parts provides a complex but powerful solution to the problem of the lump and the statue. Suppose we arrange a pound of gold into the shape of Hermes and later hammer the gold into an ashtray. Our one-pound lump of gold is extended in time as well as in space, and it consists of earlier and later temporal parts. Some of its temporal parts are Hermes-shaped (more precisely, they have Hermes-shaped temporal cross-sections), while others are ashtray-shaped and still others, perhaps, have no interesting shape at all. Those

contiguous temporal parts of the lump that are Hermes-shaped compose the statue of Hermes. The statue is a proper temporal part of the lump, just as the first quarter of a football game is a proper temporal part of the game, and much as the section of Interstate 90 between Bozeman and Butte is a proper (spatial) part of the whole of that highway.

Although the lump and the statue are numerically different, they aren't composed of the same parts. The lump has parts that aren't parts of the statue: it has ashtray-shaped temporal parts, for example. The statue shares all of its parts with a part of the lump, namely the lump's (largest) statue-shaped part. The gold atoms (or rather those temporal parts of the gold atoms that are arranged in the shape of Hermes) compose both a statue of Hermes and a proper part of the lump of gold. But this is not a problem, for the statue is that proper part of the lump.

Now suppose we dissolve an arm of the statue in acid and replace it with a copy, so that the statue outlives the lump. If the lump and the statue began to exist at the same time, the lump will then be a proper temporal part of the statue. If the lump existed before the statue did, the later part of the lump and the earlier part of the statue will be numerically identical. But no temporally extended atoms, and no temporal parts of atoms, ever compose more than one thing.

The most complicated case is the one in which the statue and the lump have exactly the same career, and so are composed of the very same parts: the lump is Hermes-shaped throughout its career, and the statue of Hermes is composed throughout its career of the same gold atoms. If I have argued correctly that two things cannot have exactly the same proper parts at once, the statue and the lump must be one and the same in this case, and that is what the "four-dimensionalists" say too. But it is part of the lore of lumps and statues that any statue would cease to exist if it were deformed, while a lump would not. So the lump appears to have a property that the statue lacks, namely being capable of surviving changes of shape. If so, the lump cannot be the statue. To put it another way, the lore of lumps and statues tells us that the lump can outlive the statue, even if it doesn't in fact do so. But nothing can outlive itself; and so we seem to have two different things composed of exactly the same proper parts.

The four-dimensionalist must say that the lump and the statue only appear to have different modal and dispositional properties. Qua lump, the lump/statue can survive changes of shape. Qua statue, it cannot. There is no such property as possibly surviving changes of shape, without further qualification. A predicate such as 'could survive a change of shape' expresses different properties in different contexts. So the sentence 'the lump could survive changes of shape' cannot be analyzed in the customary way as 'there is a possible world in which the lump survives changes of shape'. For in such a world the statue would survive a changes of shape, since the lump is the statue; and so it would be possible for the statue to survive changes in shape, contrary to our hypothesis.

In fact we need this view of modal predication to account for the apparent modal difference between lumps and the statues that overlap with them even if they are numerically different.

For when the lump and the statue coincide, there is no difference between them that could make it the case that one of them but not the other could survive a change of shape. Appearances to the contrary, then, when we say that the lump could now survive a change of shape but the statue that now coincides with it cannot, we are not attributing inconsistent dispositions to the lump and the statue; we simply mean different things in each case by 'could survive a change of shape'.

Most four-dimensionalists cash this out in terms of counterpart theory with multiple counterpart relations (Lewis 1971; see also van Inwagen, 1990a). To say that the lump could survive changes of shape is not to say that it survives changes of shape in other possible situations, but to say that some counterpart of it does so. Something that actually exists--you, for example--has a counterpart in another possible world if something in that world is more like you, in some relevant way, than anything else in that world, and enough like you in that way. Since there are many different kinds and degrees of resemblance, there are many different counterpart relations, and which relation figures in any given de re modal claim depends on the context. When we say, "the lump could survive changes of shape", we are saying that in some possible world there is a "lump-counterpart" of the lump/statue--roughly speaking, something that resembles it in its material constitution--that survives changes of shape. When we say, "the statue could not survive changes of shape", we mean that no possible world contains a "statue-counterpart" of the lump/statue--something that resembles it in shape--that survives changes of shape. This is so because anything that did have very different shapes at different times--anything that was Hermes-shaped at one time and Descartes-shaped at another, say--would not resemble our statue closely enough in shape to count as its statue-counterpart. For our statue, by hypothesis, has Hermes-shaped temporal cross-sections all along its temporal extent.

The ontology of temporal parts is a radical view insofar as it requires most of us to change the way we think about concrete objects such as ourselves, about persistence, and about de re modality. We do not ordinarily think about material objects as filling up intervals of time by having different parts that "occur" at different times; we think of them as enduring through time by being wholly present at different times. And we do not ordinarily think that modal and dispositional predicates such as 'could survive a change of shape' are systematically ambiguous, or that de re modal claims need to be analyzed in terms of something like counterpart theory. But the ontology of temporal parts is typically applied to philosophical problems in a way that entails an extremely capacious ontology of material objects, and it is this feature of that view that is perhaps the most radical.

Four-dimensionalists typically assume that every matter-filled region of spacetime contains its own material object. If you are a material object, there is also such a thing as your second or later half: something that is just like you except that it doesn't begin to exist until midway through your career. And there are many beings that are just like you except that they last for a

minute more or a minute less than you do. (For that matter, there are beings just like you except that they lack a single atom that is a part of you.) This means that there are vastly more people, dogs, planets, and the like than most of us ever imagined--uncountably many, if time is infinitely divisible.

Four-dimensionalists insist that their view is consistent with our ordinary non-philosophical beliefs about such matters, for when we say in the ordinary business of life that there is just one chair in the room, what we say is true just in case all of the chairs in the room (all of the many temporally extended things whose present "stages" have chair-shaped cross-sections and are located in the room) overlap in their present stages. Consider one of the temporally extended things we are inclined to call "the chair in the room". In fact there are many other things very like that chair--things a tiny bit larger or smaller spatially, a tiny bit longer or shorter temporally, etc., than that chair. Those many chairs are so much alike that we can't tell them apart; so the words 'the chair in the room' denote all of those objects ambiguously. When we say, "the chair in the room is scratched", what we say will be true just in case all (or most) of those "candidates" are scratched. When we say that there is just one chair in the room, that is true just in case the present temporal parts of each chair in the room overlap. We say that there is more than one chair in the room when the room contains non-overlapping chairs.

As with chairs, so with you and me, if we are material things. When you say 'I', you in fact refer ambiguously to a vast number of rational, conscious beings (who are also all saying 'I'). Which one of those many human beings are you? In fact you couldn't be any of them, for you cannot pick out just one of them uniquely; and even if you could, you couldn't pick that being out again and again. There are far too many thinking beings there for any of them to be you. You are the person you pick out when you say 'I', and on this proposal there is no such being. Strictly speaking, then, there is no such person as you. Rather, there are many such people as you. Of course, when you say, "I am alone", that will be true just in case all of the people in the vicinity are the overlapping ones you pick out by saying 'I'; so it doesn't follow that no one is ever alone in the ordinary sense of the word. But no one is ever alone in the stricter sense of being the only person in the vicinity.

Alternatively, it may be that when all of the "candidates for being you" say 'I', each refers to him- or herself uniquely. In that case there is such a person as you, for you can pick yourself out uniquely and consistently. But you cannot know which person you are--which of the many beings who say 'I' when you do. And nobody else can pick you out uniquely: when I say 'you', I can only denote ambiguously all of the people who overlap with you.

I am not going to claim that these consequences of the temporal-parts ontology are false or absurd. My point is only that they are surprising and at odds with a philosophical picture that many of us hold dear. They are hard to believe, but perhaps not incredible.

Now the doctrine that material objects are temporally extended does not by itself entail that

every matter-filled spacetime region contains an object, and you might wonder whether the four-dimensionalist really needs to say so. As far as I know, all four-dimensionalists do accept that further claim, and for good reason: nearly all of the philosophical work that the temporal-parts ontology is put to requires it.

Think back to the lump and the statue. When the gold is made into a statue of Hermes, later into an ashtray, and finally into a bust of Descartes, the four-dimensionalist solves the puzzle by saying that one temporally extended object (the lump) exists throughout, and that various proper parts of it are the statue, the ashtray, and the bust. When an arm of the statue is dissolved in acid and then replaced, we are told that our statue of Hermes is composed of proper temporal parts of two different lumps of gold. Given the lump of gold, why think that all of its statue-shaped temporal parts compose an object, or that all of its ashtray-shaped parts compose something, or all of its bust-shaped parts? And why think that the statue-shaped region of spacetime that is occupied by part of one lump of gold and part of another lump contains an object? If some matter-filled (or gold-filled) spacetime regions contained objects and others didn't, there would be no guarantee that anything would be "the statue" in these cases, and the four-dimensionalist's solution to the problem would be jeopardized. The most obvious and plausible reason for thinking that there will always be a material object to fill the role of the statue in these cases is the principle that every matter-filled region contains an object.

vi. Relative Identity

The second radical option is the relative-identity thesis (Geach 1962, sec. 31). On that view, the statue of Hermes and the ashtray are the same lump of gold, but not the same statue, or the same artifact, or the same morphosome. In the case in which the statue's arm gets replaced, the original statue and the repaired statue are the same statue, but not the same lump. We ordinarily think that a claim of the form '$\underline{x}$ and $\underline{y}$ are the same $\underline{F}$' means that $\underline{x}$ is an $\underline{F}$ and $\underline{y}$ is an $\underline{F}$ and $\underline{x}$ is $\underline{y}$. Not so, according to the relative-identity thesis. If the statue's being the same lump as the ashtray implied that the statue <u>was</u> the ashtray, we should have one of the views we considered earlier: the statue would survive changes in shape and simply cease to be a statue. And it would be mysterious how the very same thing could be different things--different artifacts or different morphosomes--at different times.

According to the relative-identity thesis, there is no such relation as unqualified numerical identity: there is no relation such that, if any things stand in it, whatever is true of one is true of the other. It makes no sense to ask whether the statue is the ashtray without qualification; we can only ask whether the statue and the ashtray are the same lump of gold or the same artifact or the like. To say that the statue is the ashtray, or that the statue and the ashtray are one rather than two, without further qualification or some disambiguating context, is like saying that Pennsylvania is to the left of New Jersey: it is incomplete, and does not yet express a

proposition. We can only mean that the statue is the same lump or the same artifact or the same something as the ashtray, just as we can only mean that Pennsylvania is to the left of New Jersey from some orientation, such as facing north. If there were such a relation as absolute identity without qualification, the statue and the lump would be either one thing or two, and we should have one of the views discussed earlier.

Just as there is no such relation as "absolute" numerical identity, on this proposal, there is no such thing as coming to be or perishing without qualification. When we crush the statue, we cannot say that the statue has ceased to exist, full stop; that would mean that nothing is now numerically identical, without qualification, with the statue. When we crush the statue, it ceases to exist as a statue, but survives as a lump. When we ask, "Does the statue still exist?" our choice of words implies or suggests that we mean to ask whether anything is now the same statue as the statue--much as, on the temporal-parts ontology, when we say, "The statue could not survive changes of shape," our use of the word 'statue' rather than the word 'lump' signals the statue-counterpart relation rather than the lump-counterpart relation.

On this view, the gold atoms never compose more than one thing at once. Or rather, since the phrase 'more than one thing' is semantically incomplete, there is no kind K such that the gold atoms compose more than one K at once. The atoms now compose a statue of Hermes, and they compose a lump of gold, and the statue and the lump are the same statue and they are the same lump. If the statue and the lump were not the same K, for some kind K, the gold atoms would compose two different things at once--not necessarily two different Ks, but two different Ms for some kind M. In that case we should face the problem discussed in Section ii: how could those two Ms belong to different kinds (statue and lump), with different criteria of identity, when they are perfect physical duplicates of one another?

The relative-identity thesis calls for a revision of all areas of philosophy, logic, and related fields that deal with identity. Singular reference, for example, is a relation that involves identity. The name 'Bill Clinton' refers to Clinton and to nothing else, on the traditional view; but if it makes no sense to ask whether something is or is not Clinton without qualification, that view is inadequate. (Imagine something that is the same lump of flesh as Clinton but not the same human being, for example. Does the name 'Clinton' refer to it?) [12]

So reference, like sameness, will have to be relativized. The same goes for de re modality. On the orthodox view, to say that I might have been six feet tall is to say that in some possible world I am six feet tall. But without absolute identity we cannot say whether a world contains me without qualification. A world might contain something that is the same person as I am and something that is the same lump of flesh as I am, things which are neither the same person nor the same lump of flesh as each other. We cannot say which possible state of affairs is one in which I am six feet tall until we have specified a sameness relation. So the relative-identity theorist, like the four-dimensionalist, is committed to the view that modal predicates such as

'could have been six feet tall' are ambiguous and may express different properties in different contexts.

Set theory too will need revision. The orthodox view is that sets are identical when they have the same members. But suppose that Tim and Tom are the same lump but different statues. Are the set consisting of Tim and the set consisting of Tim and Tom the same set? If we ask whether they have the same members, we shall get a different answer depending on whether we compare their members by the 'same statue' relation or by the 'same lump' relation. For the same reason, we cannot say whether the set consisting of Tim and Tom has one member or two.

No doubt we could develop a system of relativized singular reference, a set theory with a relativized membership relation, an arithmetic with relativized cardinality, and so on. (We have already discussed a relativized account of de re modality.) Nevertheless I think we can agree that the relative-identity thesis is a radical proposal.

vii. Eliminativism

I turn finally to a third radical option: There are no such things as lumps or statues, but only atoms or elementary particles arranged "lumpwise" or "statuewise". Thus there are no philosophical problems about lumps and statues.

This claim doesn't automatically entail that people engaged in the ordinary business of life are wrong to think or say that there are many famous statues in the Louvre, or that bank vaults often contain lumps of gold--any more than the ontology of temporal parts automatically entails that people are mistaken to think that they are ever alone. Like the four-dimensionalist, the "eliminativist" about lumps and statues may adopt a semantic theory that brings her view into line with the things that every sane human being believes. The way to do this is to show how to paraphrase those true sentences that appear to entail that there are lumps or statues into sentences that don't have that appearance, but which "say the same thing as" those sentences. The eliminativist's position is like that of the nominalist, who claims that mathematicians speak the truth when they say, while doing mathematics, that there are prime numbers between five and ten, even though there are really no abstract objects, and so no numbers.

What makes it correct to say that there are statues in the Louvre is roughly this: Certain regions of space within the Louvre--those that most philosophers say are occupied by statues--are filled with particles (gold atoms, perhaps) that are tightly bonded together, more tightly than any particles outside of those regions are bonded to those particles; and the particles are arranged in this way because of a sculptor's intentions. We might abbreviate this by saying that there are particles "arranged statuewise". [13] The eliminativist simply believes that particles arranged statuewise do not thereby compose anything. That is, there is nothing that those particles are all parts of, and every part of which overlaps one or more of those particles. There

is no material object that fits exactly into that statue-shaped region of space, but only many much smaller objects that occupy parts of that region.

What makes it true to say, in the ordinary business of life, that the golden statue of Hermes was destroyed, but the lump of gold that constituted it survived? Perhaps something like this:

> At one time some gold atoms were arranged statuewise, and also arranged lumpwise. At a later time those atoms were still arranged lumpwise, and they were arranged lumpwise at every intervening time. Moreover at each time their lumpwise arrangement was caused, in an appropriate way, by their having been arranged lumpwise previously. But at one of those times the atoms ceased to be arranged statuewise.

Probably what makes it appropriate to say that a statue has survived or perished is more subtle than this paraphrase suggests, so further refinements will be needed. But you get the idea.

There is nothing paradoxical about atoms being arranged lumpwise or statuewise or both. The fact that being arranged statuewise is no different from being arranged lumpwise in this case was a problem for those who say that atoms arranged in that way thereby compose both a statue and a lump numerically different from it. But if those atoms do not compose either a statue or a lump or anything else, this problem does not arise. Nor is there any reason why certain atoms should not cease to be arranged statuewise while continuing to be arranged lumpwise. So the story of the lump and the statue presents no philosophical problems for the eliminativist.

But that is not to say that the eliminativist faces no philosophical problems at all. As statues are to lumps, so are houses to heaps of bricks or boards, dogs to lumps of flesh and bone, and people to their bodies; or at any rate that is the conventional philosophical wisdom. Must the eliminativist say that there are neither houses nor heaps of bricks, neither dogs nor lumps of flesh and bone, and neither people nor human bodies? If so, she would face the apparent absurdity of denying her own existence. If not, we ought to wonder when atoms or particles compose something and when they don't.

Van Inwagen answers this question by saying that particles compose something just in case they are caught up in a life--a self-directed, biological event that takes in and expels particles and imposes a unique sort of unity on them according to an internal plan (1990b, sec. 9). On his view, the only material objects are mereological simples (things without proper parts) and living organisms. Some of those organisms are people, such as you and I.

This too is a radical proposal, though perhaps no more radical, on careful reflection, than the ontology of temporal parts or the relative-identity thesis. The problem facing the Popular View does not arise for van Inwagen, for there is no reason to say that any simples ever compose more than one object at once. Indeed they could do so only by composing two

organisms at once; but there is no reason to think that two different organisms might be composed of the same particles at the same time, and every reason not to think so.

viii. Conclusion

That completes my discussion of radical solutions to the problems facing the Popular View. No doubt there are other solutions; but none, I think, that are any less radical than these.

I have argued that we cannot avoid choosing among these radical proposals, or accepting some some alternative that is equally novel and surprising. In particular, we cannot avoid this by simply giving up the Popular View and the philosophical lore of statues and lumps, for that too led to such radical consequences as that there are no human beings, and that you and I do not exist. The metaphysical puzzles that arise for statues and lumps apply equally to any compound material object--anything composed of smaller parts--that persists through time; and that includes all familiar material objects, including ourselves. So we cannot theorize about statues and lumps as if this were a unique case. If I am right, there is simply no way of making ontological sense of the physical world without embracing some general metaphysical theory that many of us find at best very difficult to believe. There is no conservative ontology of material objects. [14]

Notes

1. For the sake of simplicity I shall ignore one complication. Some philosophers (e.g. Doepke 1982, p. 51) think that two objects could be composed of the same elementary particles at once without having all the same proper parts. For example, although my heart is a part of me, some say it is not a part of the mass of matter that now coincides with me. In general, although some xs might compose both A and B at a time t, there may be some other objects, the ys, that compose A at t but not B. For the sake of simplicity I shall simply assume that if any xs compose A and compose B at some time, then every part of A except A itself is a part of B. My discussion could easily be modified to take this complication into account.

2. An early exponent of the Popular View was Locke, who thought that an organism coincided with a mass of matter (though different masses at different times); see Essay II.xxvii, §§ 2-4. Recent defenders of the view include Brody (1972), Doepke (1982), Hirsch (1982, p. 59), Johnston (1992), Kripke (1971, fn. 19), Lowe (1991, pp. 106f.), Pollock (1989, pp. 32-37), Sanford (1971), Shoemaker (1970; 1984, p. 113), Simons (1987, pp. 235ff.), Thomson (1983), Wiggins (1967, 1968), and Yablo (1987).

3. The following is a development of an argument sketched briefly by Mark Heller (1990, pp. 30f.) and more elaborately by Michael Burke (1992). No doubt its main points have occurred

to others as well.

4. But see Sanford (1970).

5. As Heller points out (1990, p. 31).

6. This seems to be Yablo's position (1987).

7. There is a further possible reply to my arguments that there is not room to discuss here. One might argue that what sort of thing a material object can and does survive is somehow up to us, as members of a linguistic community, to decide. Whether it is correct to say that a thing survives or doesn't survive a given adventure depends on the way in which we think and speak. Statues and their coincident lumps can survive different sorts of treatment because we think and speak about them differently. I have written on this view in another place ("Relativism and Persistence", in preparation).

8. Leibniz seems to accept something like the first option (1982, p. 230), while Chisholm endorses the second (1973, pp. 601f., fn. 10; see also 1976, pp. 92-104).

9. More precisely, I have assumed that any atoms that are maximally bonded together in some way compose a morphosome. Things are maximally bonded if they are all bonded together and nothing but those things and their parts are bonded to any of them.

10. For a more thorough discussion of Burke's view see my "Burke on Statues and Pieces of Copper" (forthcoming).

11. See Quine (1953). The most complete discussion of the ontology of temporal parts is Heller (1990). Gibbard (1976) and Noonan (1993) apply the ontology specifically to the case of lumps and statues.

12. For a discussion of the way relative identity bears on reference see van Inwagen 1988.

13. For an extended discussion of these matters see van Inwagen (1990b), sections 10 and 13.

14. I am grateful to Sam Levey for helpful conversations on this topic.

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