Occupy Wall: A Mereological Puzzle and the Burdens of Endurantism

Paul R. Daniels

Endurantists have recently faced a mereological puzzle in various forms. Here I argue that, instead of presenting a genuine worry, the puzzle actually reveals a common misunderstanding about the endurantist ontology. Furthermore, through this discussion of the alleged problem and the misunderstanding which motivates it, I reveal metaphysical commitments the endurantist has that may not be widely recognized. For instance, she's committed to interesting and perhaps controversial views about shape and location. I highlight these commitments and what they mean for the endurantist.

Keywords: Endurantism, Multi-location, Mereology, Time Travel, Shape

1. Introduction

What happens when you mereologically fuse an object with itself?

Some might think the fusion of an object with itself is always just that object and never a distinct object. (This might be the natural view.) But it's no doubt conceivable that we could have good reason to adopt the alternative view, that the fusion of an object with itself is distinct from that object. Regardless of your inclination here, if any, this mereological question

seems entirely distinct from the question of how objects persist through time—*prima facie*, whether you're an endurantist or a perdurantist should make no difference to what view you adopt regarding the difference between a fusion and its parts.

Surprisingly, though, there seems to be some interesting interaction between views about persistence and what you get when you fuse an object with itself. According to the perdurantist, an object persists by having different instantaneous temporal parts at each three-dimensional (3D) sub-region of the four-dimensional (4D) spacetime region at which that object exists. Since a perduring object has only one location—the 4D region—to fuse it with itself is merely to fuse that which exists at that 4D region with that which exists at that *same* 4D region. Such a fusion will have all the same properties as the object itself and we have no reason to consider this fusion distinct from the object itself; it's uncontroversial that, when you fuse a perduring object with itself, you just get that perduring object again. But what about when you fuse an *enduring* object with itself? In so far as an enduring object persists by being located in its entirety at many 3D spacetime regions, and can change over time, the very same object can have different properties at its different locations. So while, like the perdurantist, the fusion of an enduring object with itself at *the very same* location will have all the same properties as the object itself at that location, what you get when you fuse an enduring object at one location with itself at some *other* location is a genuine question. And there's a puzzle which seemingly compels the endurantist to consider such a fusion a *distinct* object.

2. A Puzzle about Persistence

Here's the sort puzzle the endurantist faces, this version from Effingham and Robson [2007]: imagine an enduring object which looks like an ordinary brick; call it *Brick*. Suppose we use a time machine to send Brick to some earlier time, t_{-1}. Further suppose we use the time machine to repeat this process, such that Brick exists at t_{-1} many times over. Because it's located at

multiple distinct spacetime regions at that time, Brick is multi-*spatially* located at t_{-1}; or, in relativistic terms, Brick is located at multiple spacetime regions that are *spacelike* separated from one another. Now say that, during this process, we arranged them at t_{-1} into a pattern we would ordinarily identify as a brick wall; call the fusion of Brick with itself at t_{-1}, *Wall*. Are Brick and Wall distinct objects?

We seem to have good reason to say that they are distinct—here are some apparent differences between Brick and Wall: Wall seems to weigh more than Brick, Wall seems to have a different shape than Brick, and Wall *looks* like a wall while Brick does not. In so far as two objects with different properties cannot be identical, we seem compelled to consider Brick and Wall distinct objects.[1]

However, the endurantist is also under pressure to consider them the same object. After all, we're merely fusing an object with itself. And consider the following extremely plausible principle that is central to mereology:

> *Extensionality*: if two objects have all and only the same proper parts, then those objects are identical.[2]

In virtue of how objects endure, Brick and Wall have all and only the same parts; neither has extra parts that the other lacks and neither lacks any parts

---

[1] We can press the point further: we suppose we say Brick is a spatially extended simple. At least in so far as Wall is visually indistinguishable from an ordinary brick wall, and ordinary brick walls are certainly composite objects, Wall plainly *looks* like a composite object. And *if* Wall is a composite object, that would seem to be an important difference between the Brick and Wall. (McDaniel [2007], as well as Braddon-Mitchell and Miller [2006], defends the possibility of extended simples.) But we needn't rely on extended simples. Say, instead, that Brick is a quark, classical atom, or whatever you consider the smallest fundamental material object. So conceived, we can recreate a structurally similar case and note similar differences (this case would, then, would mirror the structure of Gilmore's [2007] 'Tubman' case).

[2] Where a proper part is a part not identical to the whole [Lewis 1991: 2].

the other has. Since an enduring object persists by being located at spacetime region at which it exists, all the bricks that make up Wall are identical—even if Brick undergoes changes. So, by the principle of extensionality, Brick and Wall are identical. Brick and Wall *cannot* be distinct, *contra* our initial analysis.

Notice that we only get this tension if endurantism is true: the very same object is located at many distinct regions at t_{-1}. In contrast, *if* perdurantism is true, Wall is clearly a distinct object. If perdurantism is true, persisting objects are temporally composite objects in an analogous way to how you and I are spatially composite objects. When we pick out Brick at any given location along its spacetime trajectory, we merely pick out one of its particular temporal parts within the long collection of its history. Here, then, Wall is a fusion of many different objects. (All those parts which exist at t_{-1} are different from one another; they are *temporal* parts of Brick and *spatial* parts of Wall.) So Wall, like any ordinary wall, *is* composed of many distinct parts; it makes no difference whether they're parts of different perduring objects or parts of one time travelling perduring object that repeatedly doubles back on itself—either way, Wall has different properties and parts than any individual brick; the perdurantist isn't compelled to think Brick and Wall are identical. (We might say that Wall is distinct from Brick in the same way as my youth is distinct from me.) Endurantism is interestingly disanalogous and its defenders uniquely face this problem.

How is the endurantist to escape this worry? Some might be tempted to just deny the possibility of time travel. However rejecting time travel won't do; we can see that same underlying problem results from ordinary persistence as well, courtesy of a case from Barker and Dowe [2003; *cf.* 2005]: imagine our enduring Brick again, but now focus on the latter portion of its persistence. Say that it doesn't do anything after t—it doesn't time travel, it just persists normally. Assume Brick persists like this from t_1 until t_+ and call this 4D region through which it endures during this interval, *R*. Notice that Brick is multi-*temporally* located since it's located at multiple distinct

spacetime regions in *R*; or, in relativistic terms, Brick is located at multiple spacetime regions that are *timelike* separated from one another. (For clarity, we can contrast this with the previous case. In the first case, Brick was multi-*spatially* located; time travel made it case a case of multi-location. In the current case, just by persisting and being an enduring object, Brick is multi-*temporally* located. Nothing turns on spatial/temporal distinction here; both are kinds of multi-location. However enduring objects can only be multi-spatially located if time travel is possible and can only be multi-temporally located if we assume eternalism is true. I say more on if we deny eternalism a bit later on.)

More explicitly, here's how this case brings the endurantist into tension: Because Brick endures, it's located at infinitely many instantaneous 3D sub-regions in *R* with zero temporal extent, r_1 through r_n. For ease of discussion, let's focus on just two of these sub-regions, r_1 and r_2; call Brick at these sub-regions $Brick_{at-1}$ and $Brick_{at-2}$, respectively. In so far as r_1 and r_2 are instantaneous spacetime regions, $Brick_{at-1}$ and $Brick_{at-2}$ each have zero temporal extent; wherever Brick exists, it's a 3D entity (since it's an enduring object, this is what we might expect). But now consider the fusion of Brick at *every* sub-region of *R* (i.e. the fusion of $Brick_{at-1}$, $Brick_{at-2}$ and so on); call this fusion, $F(Brick)$. Since $F(Brick)$ exists at the 4D region *R*, it has *non*-zero temporal extent; $F(Brick)$ is a 4D entity. So we have good reason to think $Brick_{at-1}$ and $F(Brick)$ are distinct. But recall that, as a central thesis of endurantism for identity over time, $Brick_{at-1}$ and $Brick_{at-2}$ are identical; Brick at any sub-region of *R* must be identical with itself at every other sub-region of *R*. And so, by extensionality again, we have good reason to think $Brick_{at-1}$ and $F(Brick)$ are identical. But this means Brick is both a 3D and a 4D entity.[3]

---

[3] Not only that, but since $F(Brick)$ looks like an object with parts at all the sub-regions of *R*—e.g. $Brick_{at-1}$ and $Brick_{at-2}$—some might think $F(Brick)$ looks like a temporally composite object, i.e. an object with temporal parts. (That said, it's important not to conflate claims about temporal extent with claims about temporal parthood. Barker and Dowe aim at showing that the endurantist is committed to

We have a parallel contradiction to that reached through the original case; the first is the spatial analogue of the second and the second the temporal analogue of the first. So the denial of time travel won't get the endurantist out of trouble; time travel is merely an interesting way to highlight a general problem endurantists have to address. However the endurantist wishes to handle Brick and Wall, she'll need to say something likewise about Brick and F(Brick) as well.

We might restate the worry the endurantist faces this way:

(1) Wall, or F(Brick), has property, P.[4]

(2) Brick lacks P.

(3) Identical objects share all the same properties.

(4) *Therefore*: Brick and Wall, or Brick and F(Brick), are *not* identical; they are distinct objects.

(5) Brick and Wall, or Brick and F(Brick), have all and only the same proper parts.

(6) Objects that have all and only the same proper parts are identical.

(7) *Therefore*: Brick and Wall, or Brick and F(Brick), *are* identical; they are not distinct objects.

How is the endurantist to relieve this tension? The endurantist can and should deny that we get a distinct object when we fuse any enduring object with itself. It isn't the case that fusions like Wall and F(Brick) have some property that Brick lacks; the endurantist should deny (2). I argue below that those who think the endurantist is compelled to say that the fusion of an object with itself at different locations composes a distinct object have misunderstood the endurantist picture.

---

contradictory claims about the temporal extent of a persisting object. I'll say more about their discussion of temporal extent later.)

[4] For Wall, P may be weighing one tonne, being wall-shaped, etc.; For F(Brick), P may be existing at a 4D region, having temporal parts, etc.

3. Addressing the Puzzle

While some might have thought that Wall has some property Brick lacks, perhaps because Wall resembles ordinary brick walls (and ordinary walls certainly have properties that bricks lack), Wall is *not* an ordinary wall. Wall differs from ordinary walls in a crucial way: while ordinary walls are fusions of some collection of distinct objects—different bricks—Wall is the fusion of an object with itself. This is the salient difference that separates this case from ordinary walls and other possible fusions. And the sleight of hand here is the same as with *F*(Brick): the apparently distinct fusion is merely a fusion of an object with itself.

This is a salient difference because, independent of the puzzle discussed here, we don't want to allow a plurality of distinct objects into our ontology that result merely by fusing any object with just itself. Consider the following highly plausible mereological principle:

> *Weak Supplementation Principle*: every object with a proper part has some other proper part which doesn't overlap that first proper part [Effingham and Robson 2007: 634-635].

The weak supplementation principle is one way we rule out proliferations of composite objects. What's crucial is just that all these cases concern an allegedly distinct composite object that results from fusing an object with itself. Notice that this doesn't bind the endurantist to deny that ordinary walls are composite objects—ordinary walls are fusions of distinct objects, not fusions of an object with itself. The endurantist can consistently believe in mereological composition while denying that Wall is mereologically composite.[5]

But if a fusion of Brick with itself isn't distinct from Brick, what is it? It's merely Brick, but when we talk of Wall or *F*(Brick) we're picking Brick out with the different relations it has, as an enduring object, with the different

---

[5] Eagle [2010: 75, fn. 27] makes a similar diagnosis.

spacetime regions through which it persists. With the nature of those relations clarified, we'll be able to see why the properties had by Wall are just the properties had by Brick. To think different reveals a misunderstanding about where an enduring object can be located.

Is an enduring object the sort of entity that is located at *R* if it's located at every sub-region thereof? No—but it may be tempting to think otherwise. Since enduring objects are located at temporally instantaneous 3D regions, it may seem natural to think that it follows that enduring objects are therefore also located at the 4D region through which they persist. After all, no part of the object is absent from that 4D region and the object monopolizes that region; one might think, *prima facie*, that an enduring object is located at any region where all of it exists—if *O* is located at every *r* in *R*—surely it follows that *O* is also located at *R*. I take this to be why some conclude that the endurantist is committed to granting that *something* related to *O* is located at *R*. And if that which is located at *R* appears to have different properties than the object in question, it's natural to think they're distinct objects. But this is incorrect.

The endurantist rejects the possibility of locatedness at 4D regions. By that I mean, enduring objects *cannot* be located at *R* since enduring objects are the sort of thing which can *only* be located at 3D regions; *if* enduring objects were the sort of thing that could be located at 4D regions, it would follow that these fusions of Brick with itself are part of the endurantist ontology as distinct objects; however the endurantist, by definition, rejects such objects from her ontology. An enduring object is *not* the sort of object that can be located at a 4D region like *R* even if it is located at every sub-region therein. There is *no* object, according to the endurantist, that is located at *R*, even though there *is* an object that is located at every sub-region of *R*. Wall and *F*(Brick) are merely Brick; this just follows from what endurantism is. However, the endurantist, in virtue of the puzzle at hand, must account for the curious relation enduring objects have with the region through which they persist (and explain away the apparent differences). So let's see what

the endurantist ought to say about how we analyse location and other location relations.

3.1 Enduring Objects and 4D Regions

How are we to describe the curious relation enduring objects have with the 4D region through which they persist if not in terms of locatedness? The endurantist needs to account for how *O* is *located* only at 3D regions and not the 4D region through which it persists. To do this properly, she must adopt a robust account of the different location relations objects can have with spacetime regions.

For instance, if we employ Eagle's [2010] terminology we can clarify that Brick *fills* and is *contained* in the 4D region, *R*, but isn't *located* there—Brick, like all enduring objects, can *only* be located at 3D regions. We can say an object, *O*, *fills* a region *iff* it occupies each sub-region thereof; it's *contained* in a region *iff* each part of *O* occupies a sub-region thereof; and, it's *located* at any region which it (i) both fills and is contained in, but (ii) *doesn't* fill and (iii) *isn't* contained in a sub-region thereof.[6] (To illustrate: We could say that I'm currently *contained* in this room, since each of my parts occupies some sub-region of the room, and we could say that I currently *fill* the region defined by my left foot, since I have parts at each sub-region of my left foot. But I'm only located at that region which is the same size and shape as by whole body.) Notice that in virtue of how containment is defined, according to this taxonomy enduring objects can be multi-located. And, in virtue of how location is defined, enduring objects *cannot* be located at 4D regions; filling and being contained in a 4D spacetime region here is *not* reducible to being located at that 4D region—this is an intended entailment: it prevents the sort of double counting of locations that cause havoc in our Brick cases:

---

[6] Eagle [2010a; 2010b] takes *occupies* to be a primitive notion here, where an object *occupies* any region in which it can be found. Although, what Eagle calls *occupation* may not be the location relation endurantists often talk about; *being in* may be a more appropriate phrase for the notion used here.

'we restrict the locations of an object to those smallest minimal regions that it is contained in and fills' [Eagle 2010: 56]. So the endurantist would only every say 'Brick fills and is contained in *R*'; this is just how the endurantist would describe the relation Brick has with *R*.[7]

While the notion that something can be contained in and fill a 4D region—yet not be located there—might seem strange to some, it accurately describes the endurantist picture. To deny the irreducibility of the one relation to the other is merely to beg the question against the endurantist under Eagle's framework; to deny that something can be located at every instantaneous 3D region in a set of 3D regions, but not at the 4D fusion of those regions, is just to deny endurantism. All the endurantist needs for her view to be coherent is to account for the different relations objects have with the 3D and 4D regions through which they persist. A properly robust theory of location such as this provides that. *Mutatis mutandis* for Wall: Brick can *only* be located at 3D brick-shaped regions and not the overarching wall-shaped region it fills and is contained in—Brick is located at each brick-shaped spatial sub-regions of that greater wall-shaped region it persists through as a result of its atypical trajectory through spacetime. The fact that that wall-shaped region is also a 3D region is not salient, it's just an oddity of allowing time travel that an object could persist through this sort of region.[8]

4. Consequences for the Endurantist

But what about the apparent differences? Some might have thought that Wall is shaped like a wall while Brick, as it sits in the bottom left corner, is not. Instead we can see that Wall and the brick in the bottom left corner are both just Brick—that is, both are just Brick standing in different relations to the regions at which it exists. Because Brick stands in different location

---

[7] In contrast, the perdurantist *would* say that a perduring object is located at a 4D region.

[8] We needn't utilized Eagle's terminology as there are alternatives which can play the same role. For instance, see Gilmore [2007] or Balashov [2010] for other contemporary analysis of location relations that could be employed here.

relations to the regions at which it exists, we can say Brick stands in a 'wall-shaped' relation to the region it fills and is contained in at t_1 and a 'brick-shaped' relation to the regions at which it's located at t_1. This is just a matter of how objects have their shapes—they have them *extrinsically*. By that I mean, the shape of Wall is defined by the relations that hold between its bricks; Wall is wall-shaped, or falls under the sortal *wall-like*, just because its bricks are arranged wall-wise. Were they instead stacked in layers of fewer and fewer quantity, we might say Wall is rather pyramid-shaped, or falls under the sortal *pyramid-like*. This shape isn't had intrinsically by Brick, but extrinsically in virtue of its trajectory through spacetime. In so far as the location relation is different to the fills-and-contained-in relation, it's not incompatible for an object to have a certain shape with respect to the region it's located at and a different shape with respect to the region it fills and is contained in. The unusual case of Brick reveals this.[9]

This may be surprising, in so far as shape might intuitively seem like an intrinsic property, but if the endurantist is motivated to endorse spacetime substantivalism as some have argued (e.g. Sider [2001: 110–20]), the endurantist is committed to consider shape an extrinsic property anyway. According to substantivalism, spacetime regions exist independently from that which occupies them. It follows from this that every material object is located at a spacetime region of the same shape (e.g. a sphere cannot be located at a cubical region) [Skow 2007].

And *Mutatis Mutandis* for other properties. To hammer the point home, let's consider two others. First, how much does Brick weigh? Brick only ever weighs a kilogram. To think that it weighs a tonne at t_1 is to trade on an

---

[9] This aligns with the endurantist reply to *the problem of temporary intrinsics* [Lewis 1986: 202–5] developed by Lowe [1987a; 1987b] and defended by McCall and Lowe [2006; 2009]: they argue that changes in physical objects, e.g. making a fist with my hand, amounts to changing the relations of my hands' parts; 'These changing relations reduce ultimately to configural changes of the bodies' fundamental particles, the latter being internally unchanging in that they retain their own intrinsic properties throughout.' [2009: 279]

ambiguity in what's being weighed and the need to draw this out is just an odd consequence that follows from the fact that this case concerns time travel. Our ordinary understanding of weight is ill-equipped to handle a question like *How much does Wall weigh at t_{-1}?* This can be made clearer if we look at F(Brick); how much does F(Brick) weigh? The most natural way to answer is to implicitly restricted it to those regions at which it's located (e.g. r_1). Our everyday conception of weight provides no intelligible answer to a question like *How much does that which exists at R weigh?* (Other than, perhaps, the same answer as to the question *How much does that which exists at r_1 weigh?*) The endurantist need just reply that Brick consistently weighs a kilogram in relation to each brick-shaped region at which it's located. To ask how much the fusion of Brick with itself weighs is merely to pervert our conception of how we weigh something. This is just less obvious when we have Wall in mind.[10]

Second, does Brick mysteriously go from being a brick to being a wall? No, I argue. Brick is wall-shaped in virtue of the region it fills and is contained in at t_{-1}, which is very similar in shape to the region of an ordinary wall. This is only looks mysterious if we ignore key details. The fact that it bizarrely fills and is contained in this sort of region is just a consequence of its career as a time traveller. While a brick normally isn't the sort of object that can *look* like a wall, this case involves time travel and time travel often has counter-intuitive results; it shouldn't be surprising that we're left a counter-intuitive result here. An endurantist world where time travel is possible can, surprisingly, have a brick that manages to look like a wall. Strange? Certainly. But this is just an oddity that follows from the possibility of time travel.[11]

---

[10] See Handfield [2008: 301–3; *cf.* Cameron 2009] for further discussions on the nature of weight.

[11] So, *contra* Effingham and Robson [2007], it isn't the case that the endurantist must abandon the weak supplementation principle. Since the endurantist denies that F(Brick) and Wall are part of her ontology as distinct objects, the weak

4.1 Objections

Despite all this, some might object that *I* erred: I argue that, for instance, Brick$_{-at-1}$ and *F*(Brick) are identical—that both are just Brick. However, someone may apply pressure: *F*(Brick) and Brick$_{-at-1}$ cannot be identical since *F*(Brick) has relations with spacetime regions that Brick$_{-at-1}$ doesn't. But this worry is based on a confusion about identity. To say Brick$_{-at-1}$ and *F*(Brick) are identical is just to say they're identical with *Brick*. *F*(Brick), Brick$_{-at-1}$, Brick$_{-at-2}$, are all just Brick (or, rather, they are merely different ways to pick out Brick and the relation it has with a particular region of spacetime). There's no distinction between Brick and *F*(Brick) or between Brick and Brick$_{-at-1}$; to say that *F*(Brick) bears a certain location relation with *R* is merely to say that *Brick* bears that location relation with *R*, and to say that Brick$_{-at-1}$ bears a certain location relation with r_1 is only to say that *Brick* bears that location relation with r_1. Again, part of what it means to be an enduring object is to bear different location relations with different spacetime regions. Thus, we can see that Brick$_{-at-1}$ and *F*(Brick) are merely different names for the same thing: Brick. *Mutatis Mutandis* for Wall.[12]

---

supplementation principle isn't violated. And so we needn't follow Smith [2009] and Effingham [2010] down the rabbit hole into a revised mereology. But, if we wanted to follow their lead for other reasons, the endurantist would have the same options available as those available to the perdurantist, at least as for the weak supplementation principle.

    [12] We could further motivate this by drawing parallels with set theory: Consider the set {1} and the set {1, 1}. It's definitional of set theory that, if we call {1} *set A* and call {1, 1} *set B*, *A* and *B* are just different ways to pick out the same numerical set. So anyone that thinks mereology is a physicalized version of set theory is well motivated for theoretical reasons to think the fusion of an object with itself can be nothing other than that object. This is all just to say that Brick and Wall are the same, just as *A* and *B* are the same. Furthermore, we can say that representing Brick as a wall is a misleading way to describe Brick at *t$_{-1}$* in the same way that it's misleading to describe *B* as a set with multiple numbers. Put differently, even though we can describe that Wall as {Brick, Brick, Brick, Brick} and Brick as {Brick}, these are no

When it comes to *F*(Brick), Barker and Dowe [2003; *cf.* 2005] argue that *F*(Brick) is a 4D object while Brick-at-1 is a 3D object; in so far as they're the same object, Brick has incompatible temporal extent. However, my position is just that Brick has a certain kind of location relation with *R* that's not reducible to the *located at* relation. Again, there's nothing *located* at *R* here; *F*(Brick) just picks out the relation this enduring object has with that region. This is salient here because being a 4D object hinges on certain locational facts, which I argue the endurantist isn't committed to. So the endurantist needn't say anything controversial about temporal parthood here, but she does need to endorse what I said here about location to avoid this version of the challenge that focuses on temporal extent. Again, the weak supplementation principle and a robust theory of location enables this reply.

Let's turn to a different sort of challenge to my position. I tacitly assumed that endurantism is a multi-location thesis. However, this only follows if eternalism is true. This is the case since, as Barker and Dowe [2003: 106] point out, theses of multi-location 'hold that one and the same entity can be wholly present and located at distinct spacetime regions.' In so far as an object can only be located at spacetime regions that exist, if eternalism is true all spacetime regions are equally real, so endurantist *is* a multi-location thesis if eternalism is true. In contrast, presentist endurantism cannot be a multi-location thesis for, if presentism is true, past and future times don't exist. Since objects can only exist at those spacetime regions which exist, enduring objects can only exist at those spacetime regions that are part of the privileged present.[13] Normally this means objects will only be (singly)

----

more distinct that the *A* and *B*. (While 1 ≠ {1} and {1} ≠ {{1}}, mereology differs from set theory in this regard; fusions aren't typically thought to have this sort of hierarchical structure that sets do.)

[13] Certainly the presentist endurantist can make sense of past and future locational facts in the same sort of way as she can make sense of other sorts of facts involving distant times, such that she can meaningfully speak of trajectories through spacetime and spacetime region relative parthoodness. But it's still the case that any spacetime region whose temporal co-ordinate is not in the privileged present is not

located in the present, but time travel allows an object to travel back to meet its younger self. Such an object would be multi-spatially located in the present in the sort of way Brick is multi-located at t_{-1}. So even though we assumed eternalism for ease of discussion, if the time travelling Brick is a logically possible case in a presentist world, the rejection of eternalism provides no escape from the puzzle at hand.[14]

While the endurantist could avoid this entire discussion by burying her head in the sand and rejecting both eternalism *and* the possibility of presentist time travel, to do so comes at too high a cost. After all, this is what Dorato [2012] raises as a problem for the endurantist. On the basis of the same misunderstanding of the endurantist picture discussed here, Dorato argues that endurantists are committed to presentism: *if* eternalism were true, it would be the case that enduring objects exist at every instantaneous sub-region of the 4D region through which they persist and the fusion of an object with itself would be a 4D object with temporal parts. In so far as endurantists deny that persisting objects are 4D objects and deny that persisting objects have temporal parts, if this is the case, eternalist endurantism must be an incoherent position. So much the worse for the endurantist. However, in light of what I argue, we can see that the endurantist need not be so conciliatory. Objects just have different relations with the different regions through which they persist; fusing an enduring object with itself at its different locations does not yield an object with temporal extent, temporal parts or some different properties than that object itself. To deny eternalism and the possibility of presentist time travel is merely to agree with Dorato; an unattractive option when the alternative I defend here is available.

---

part of her ontology. While such regions did or will exist, including whatever did or will exist at them, that which exists can only ever be that which exists *right now*. Enduring objects can never be multi-*temporally* located in a presentist world.

[14] Keller and Nelson [2001; *cf.* Daniels 2012] defend the possibility of presentist time travel.

5. Conclusions

To think endurantism entails that you get a distinct object when you mereologically fuse an object with itself is based on a misunderstanding of the endurantist picture. But by highlighting this misunderstanding, we reveal some surprising things about the endurantist. For one, that she seems required to consider shape as an extrinsic, rather than as an intrinsic, property. Furthermore, she seems required to give (or adopt) a robust theory of location to explain why enduring objects are 3D, rather than 4D, objects.[15] What strikes me as surprising is that the endurantist—just by being an endurantist—has to provide these to make her position coherent and intelligible.[16]

References

Balashov, Y. 2010. *Persistence & Spacetime*. Oxford: Oxford University Press.

Barker, S. and P. Dowe. 2003. Paradoxes of Multi-location, *Analysis* 63/2: 106–14.

Barker, S. and P. Dowe. 2005. Endurance is Paradoxical, *Analysis* 65/285: 69–74.

Braddon-Mitchell, D. and K. Miller. 2006. The Physics of Extended Simples, *Analysis* 66/3: 222–6.

---

[15] For the sake of completeness, it's worth noting that the perdurantist is also committed to a robust theory of location to avoid certain co-location challenges that arise from cases similar to those discussed here. While the perdurantist can meet those challenges, to do so she requires the same sort of tools the endurantist employs here [Gilmore 2007, 2010; Eagle 2010a, 2010b]. The perdurantist may also be incline to consider shape an extrinsic property.

[16] I thank Toby Handfield, John Bigelow, Dana Goswick, Antony Eagle and the audience from the Metaphysics of Time Workshop at Monash University for feedback on earlier drafts and helpful discussions.

Cameron, R. 2009. Intrinsic and Extrinsic Properties, in *The Routledge Companion to Metaphysics*, eds R. LePoidevin et al. New York: Routledge. 265–75.

Daniels, P. 2012. Back to the Present: Defending Presentist Time Travel, *Disputatio* 4/33: 469–84.

Donnelly, M. 2010. Parthood and Multi-location, in *Oxford Studies in Metaphysics volume 5*, ed. D. W. Zimmerman. Oxford: Oxford University Press: 203-43.

Dorato, M. 2012. Presentism/Eternalism and Endurantism/Perdurantism: Why the Unsubstantiality of the First Debate Implies that of the Second, *Philosophia Naturalis* 49/1: 25–41.

Eagle, A. 2010a. Location and Perdurance, in *Oxford Studies in Metaphysics volume 5*, ed. D. W. Zimmerman. Oxford: Oxford University Press: 53–94.

Eagle, A. 2010b. Duration in Relativistic Spacetime, in *Oxford Studies in Metaphysics volume 5*, ed. D. W. Zimmerman. Oxford: Oxford University Press: 113–17.

Effingham, N. 2010. Mereological Explanation and Time Travel, *Australasian Journal of Philosophy* 88/2: 333–45.

Effingham, N. and J. Robson. 2007. A Mereological Challenge to Endurantism, *Australasian Journal of Philosophy* 85/4: 633–40.

Gilmore, C. 2007. Time Travel, Coinciding Objects, and Persistence, in *Oxford Studies in Metaphysics 3* (Ed. Dean Zimmerman)*. Oxford: Oxford University Press: 177–98.

Gilmore, C. 2010. Coinciding Objects and Duration Properties: Reply to Eagle, in *Oxford Studies in Metaphysics volume 5*, ed. D. W. Zimmerman. Oxford: Oxford University Press: 95–111.

Handfield, T. 2008. Unfinkable Dispositions, *Synthese* 160/2: 297–308.

Keller, S. and M. Nelson. 2001. Presentists Should Believe in Time-Travel, *Australasian Journal of Philosophy* 79/3: 333–45.

Lewis, D. 1986. *On the Plurality of Worlds*. Oxford: Blackwell Publishing.

Lewis, D. 1991. *Parts of Classes*. Oxford: Blackwell Publishing.

Lowe, E.J. 1987a. The Problems of Intrinsic Change: rejoinder to Lewis, *Analysis* 48/2: 152–4.

Lowe, E.J. 1987b. Lewis on Perdurance versus Endurance, *Analysis* 47/3: 72–77.

McCall, S. and E.J. Lowe. 2006. The 3D/4D Controversy: a storm in a teacup, *Nous* 40/3: 570-8.

McCall, S. and E.J. Lowe. 2009. The Definition of Endurance, *Analysis* 69/2: 277–80.

McDaniel, K. 2007. Extended Simples, *Philosophical Studies* 133: 131–41.

Sider, T. 2001. *Four-Dimensionalism: An Ontology of Persistence and Time*. Oxford: Oxford University Press.

Skow, B. 2007. Are Shapes Intrinsic?, *Philosophical Studies* 133: 111–30.

Smith, D. 2009. Mereology Without Weak Supplementation, *Australasian Journal of Philosophy* 87/3: 505–11.