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Travelling in Time: How to Wholly Exist in Two Places at the Same Time

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I Introduction

It is possible to wholly exist at multiple spatial locations at the same time. At least, if time travel is possible and objects endure, then such must be the case. To accommodate this possibility requires the introduction of a spatial analog of either relativising properties to times — relativising properties to spatial locations — or of relativising the manner of instantiation to times — relativising the manner of instantiation to spatial locations. It has been suggested, however, that introducing irreducibly spatially relativised or spatially adverbialised properties presents some difficulties for the endurantist. I will consider an objection according to which embracing such spatially relativised properties could lead us to reject mereology altogether in favour of a metaphysics according to which objects are wholly present at every space-time point at which they exist. I argue that although such a view is coherent, there are some good reasons to reject it. Moreover, I argue that the endurantist can introduce spatially relativised or adverbialised properties without conceding that objects lack spatial parts. Such a strategy has the additional advantage that it allows the endurantist not only to explain time travel, but also to reconcile our competing intuitions about cases of fission.

The possibility of travelling back in time to a period in which one's earlier self or one's ancestors existed, raises a number of well-worn problems (Grey, 1999; Chambers, 1999; Horwich, 1975 and Sider, 2002). In this paper I am concerned with only one of these: how is it that an

object can travel back in time to meet its earlier self, thus existing at two different spatial locations at one and the same time?

Four-dimensionalists have an easy answer to this question. Or at least, the vast majority of four-dimensionalists, who hold that objects persist by perduring — perdurantists — have an easy answer to this question (Sider, 2001; Balashov, 2000; Heller, 1990; Lewis, 1986). Perdurantists[1] hold that persisting objects are four-dimensional space-time worms that are at each time at which they exist, partly present in virtue of having some part — a temporal part — present at that time. Though four-dimensional objects are of course self-identical, no two parts of a four-dimensional whole are strictly identical. So we can explain how I can meet myself in the past, by noting that my younger self and my older self are two different temporal parts of one and the same four-dimensional whole that is me. Thus we can reconcile the intuition that the younger and older selves are both me, with the intuition that they are distinct and have different properties (Lewis, 1976).

Three-dimensionalists or endurantists, however, hold that persisting objects have only three dimensions: they are not extended in time and do not persist by having temporal parts. Rather, three-dimensional objects endure (hence endurantists): they are wholly present whenever they exist (Wiggins, 1968; Baker, 1997; Doepke, 1982; Johnston, 1992). Thus if some enduring object O exists through T, then for every time t and t* in T, O wholly exists at t and t* and is strictly identical to itself at each of these times. For the endurantist, then, my younger self and I are not parts of the persisting object that is me, but rather, my younger self and I are strictly identical. But then the possibility of time travel raises the spectre of the same object wholly existing in two locations at the same time.

In section II, I begin by briefly outlining the manner in which the perdurantist accounts for the possibility of a time travelling self meeting his or her younger self. In section III, I explain how the endurantist will need to make use of spatially relativised properties, and I consider a minor worry that Ted Sider has with this proposal. In section IV, I consider whether the introduction of irreducibly spatially relativised properties paves the way for rejecting the existence of all parts, temporal and spatial alike. I consider a view I call mega-endurantism, according to which not only are objects wholly present at every temporal instant

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1 I distinguish perdurantism from four-dimensionalism on the grounds that four-dimensionalism is the thesis that persisting objects are temporally extended: they have four dimensions. This need not entail that such objects persist by having temporal parts, though this is by far the most usual view.

at which they exist, but are also wholly present at every space-time point at which they exist. This, then, is the view that objects endure across space as well as time. While this view is an interesting one that raises some pertinent questions for the endurantist, ultimately I argue that it has too high a cost. Moreover, as I argue in section V, the introduction of spatially relativised properties does not force the endurantist in general to reject mereology. Though there are perhaps some costs to the idea that an object can be wholly present at multiple spatial locations at the same time, there are, as I argue in section VI, also some benefits. Chief among these is that intuitions regarding cases of fission wherein an object 'splits' into two qualitatively identical objects, can best be explained by holding that the same object can be wholly present at multiple spatial regions. This is important because one major benefit cited to perdurantism is that it allows the reconciliation of what appear to be contradictory intuitions regarding cases of fission, in a way that endurantism is unable. Such need no longer be the case.

But I turn first to consider the perdurantist account of time travel.

II Worldlines and Worms

Let us suppose that an elderly Mary unearths a time machine and travels back to a time in which her younger self exists. Let us focus our attention on one pertinent temporal interval — T — during which elderly time travelling Mary meets the young Mary. Then let 'Mary' refer to the person who is born, grows older, and eventually unearths a time machine and travels back in time. Now let us introduce some terminology that is neutral between a three- four-dimensionalist analysis of time travel. Let us say that a spatio-temporal region is 'person-suitable' just if the distribution of intrinsic properties across that region is suitable for that region being occupied by a person during that time.[2] Then during T there exist two relevant person-suitable regions. One of those regions is occupied by Mary when she is young. Call the occupant of that region YS. The other region is occupied by Mary when she is old and has travelled back in time. Call the occupant of that region TT.

For the perdurantist then, Mary is a four-dimensional space-time worm that 'doubles back' on itself, and Mary persists through time by having distinct temporal parts at each time at which she exists. So for the perdurantist, distinct regions of space-time that are person-suitable,

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2 I thank an anonymous referee for this suggestion.

contain[3] distinct objects: in most cases they contain distinct person-stages.[4] The question then becomes whether any two or more person-stages are stages of the same persisting persons. Usually when those person-stages exist at the same time the answer to that question will be no. In the case of time travel, however, it might be yes.

So for the perdurantist TT and YS are distinct objects: they are distinct person-stages, and they are person-stages of one and the same person — Mary. Since for the perdurantist person-stages just are temporal parts of persons, it follows that TT and YS are temporal parts of Mary. But we need to be a bit careful here. The recent trend has been to define temporal parts such that temporal parts of four-dimensional wholes are objects that overlap every spatial part of the whole at the times at which the temporal parts exist. Thus, for instance, Ted Sider (2001, 60) defines an extended temporal part as follows:

> An extended temporal part of x during T is an object that exists at all and only times in T, is part of x at every time during T and at every moment in T overlaps everything that is part of x at that moment.

Given this conception of a temporal part, in general a person-stage just is an extended temporal part of a person. But on this conception, it is not true that TT and YS are distinct temporal parts of the four-dimensional Mary. Rather, at any instant during T there is just one temporal part that has both TT and YS as proper spatial parts. Clearly though, the perdurantist does not want to say that during T there exists only one person-stage. Thus given the possibility of time travel, we need to be careful how we understand the relation between temporal parts and person-stages.

Indeed, the possibility of time travel suggests that should distinguish between maximal and non-maximal temporal parts. Then we can take Sider's definition as a definition of a maximal temporal part, an object that exists only during some interval T, and which overlaps during T

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3 Throughout this paper I will talk of space-time regions containing or being occupied by objects. Naturally since endurantists hold that persisting objects are three-dimensional, they hold that at each time at which an object exists, that object occupies a distinct region, but is not identical to that region. While all four-dimensionalists hold that persisting objects are space-time worms, some hold that such worms occupy space-time regions, while others hold that a worm just is a particular volume of space-time. I take it that this latter view is the minority one, and hence for parity with the endurantist case, I talk of objects occupying space-time regions.

4 Except in odd cases where we have swamp persons, or in cases where we have only a very short-lived object that looks like a person-stage, but where there is no person for it to be a stage of.

every spatial part of the four-dimensional whole. Hence a non-maximal temporal part is an object that is wholly overlapped by some part of the four-dimensional whole at all times at which the non-maximal part exists. Specifically,

> An extended non-maximal temporal part of x during T is an object that exists at all and only times in T, is part of x at every time during T, and at every moment in T overlaps some part of x at that moment.

So in most cases a person-stage is an extended maximal temporal part of a four-dimensional person. When we have instances of time travel, however, person-stages and maximal temporal parts come apart. For we want to say that TT and YS are each person-stages of Mary. So at any times at which a time traveller and an earlier self both exist, a person-stage will be a particular non-maximal temporal part of the four-dimensional person.[5]

Distinguishing maximal and non-maximal temporal parts in this manner allows us to make sense of some of the oddities inherent in describing cases in which time travellers meet their earlier selves. During T Mary has the apparently contradictory properties of being both young and old. How is this possible? During T there exists a maximal temporal part of Mary that has spatial parts some of which are old and some of which are young. So that object is both young and old in the sense described. There is also a sense in which Mary, qua time traveller, is old and not young, and Mary qua young self is young and not old. This, of course, is the sense in which we talk about Mary's person-stages or non-maximal temporal parts during T. There is some non-maximal part of Mary during T that is young and only young, namely the non-maximal temporal part that overlaps all and only the young spatial parts of Mary during T — YS. YS is straightforwardly young. So too *mutatis mutandis* for Mary's old person-stages during T — TT, which is at all times at which it exists, old.

III Time Travelling Endurantists

Suppose, though, that Mary endures. Then 'Mary' refers to a three-dimensional object that is wholly present at each of the times at which it exists. So what does it mean for Mary to travel back in time? Let us

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5 Of course, while any person-stages of a time traveller who meets her earlier self will, at the times at which they both exist, be non-maximal temporal parts of the whole person, not every non-maximal temporal part will be a person stage.

suppose, as the four-dimensionalist does, that our world is correctly described by the four-dimensional geometry of Minkowski space-time. Then the path through space-time of any persisting object is represented by that object's worldline. For the four-dimensionalist, each point on the worldline represents a three-dimensional slice of space-time that is occupied by an instantaneous temporal part of a four-dimensional object, and the worldline as a whole represents a four-dimensional volume of space-time that is occupied by the entire four-dimensional space-time worm. The endurantist agrees with the four-dimensionalist that any persisting object occupies a four-dimensional volume of space-time. She merely insists that each three-dimensional slice of that volume is occupied by a wholly present three-dimensional object, not an instantaneous temporal part of an object.

So regardless of whether any enduring object ever does or could travel back in time, enduring objects are wholly present at multiple regions in space-time, and have different properties at each of those regions. The difference is that in a case of time travel, the two space-time regions in question that are occupied by the time traveller and the younger self, are, from a certain frame of reference, space-like separated:[6] they exist at the same time. In the case we are considering, the two regions of space-time in question are the two person-suitable regions of space-time, one of which is occupied by TT, and the other by YS. But what are TT and YS according to the endurantist? They are not distinct objects that are person-stages of Mary. Rather, TT and YS are simply Mary under different descriptions. Just as absent a case of time travel we can talk of young Mary and old Mary, or Mary at t_1 and Mary at t_2, talk of TT and YS is really just talk of old Mary and young Mary, or time travelling Mary and non-travelling Mary. And just as Mary at t_1 is identical to Mary at t_2, so too old Mary (TT) is identical to young Mary (YS). But this raises the question of how it can be that Mary has the apparently contradictory properties during T, of being both old and young.

Now of course, the endurantist has no difficulty in holding that an object can at one time instantiate apparently contradictory properties. A coin can be both red and blue at the same time without fear of contradiction: it can be red and blue at one time in virtue of having a blue proper part and a red proper part. But YS and TT are *not* proper spatial parts of Mary: they had better not be unless we want to say that Mary is an odd spatially scattered object with four legs and two noses. Rather, YS is

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6 Where x and y are space-like separated just if there is no causal signal that can pass between x and y.

Mary as is TT. Yet if YS and TT are strictly identical, then we run into the problem of Leibniz' Law: for TT and YS have distinct properties.

But even if Mary had not travelled in time, the properties that she has at one time, are different to the properties that she has at another time: young Mary and old Mary have different properties regardless of whether old Mary travels back to meet young Mary. Endurantists have already faced the problem of how it can be that the very same enduring object O can be wholly red at t_1 and wholly blue at t_2, and yet be wholly present and strictly identical at t_1 and t_2. In general, the solution to this problem involves either relativising properties themselves — the view often known as indexicalism (van Inwagen, 1990) — or relativising the manner of instantiating those properties — the view often known as adverbialism (Haslanger, 1989; Johnston, 1987; Lowe, 1988). Thus O will either have the properties of being red-at-t_1 and blue-at-t_2, or the properties of being red $t_1$ly and blue $t_2$ly. Then there is no contradiction in O being both wholly red and wholly blue, since there is no contradiction in O being both red-at-t_1, and blue-at-t_2, or being both red $t_1$ly and blue $t_2$ly.

Considerations arising from the possibility of time travel suggest that in addition to relativising properties or the manner of instantiation of properties to times, the endurantist will also need to relativise them to spatial regions. Let us suppose that there is some instant, t_1, which occurs in the interval T during which Mary's time travelling self and younger self meet. Suppose that at t_1 TT occupies spatial region S, and YS occupies spatial region S*. Suppose further that at t_1, TT is standing and YS is sitting. Since TT and YS are both Mary, and Mary is wholly present at both S and S*, then at t_1 Mary has the properties of both sitting and standing. How is this possible? For the sake of simplicity I will explicate this idea in terms of a spatial analog of temporal adverbialism, but nothing hangs on this choice. According to the spatial analog of temporal adverbialism, the manner in which some properties are instantiated is relative to a spatial location: properties are instantitated in different spatial locational ways. Hence they are instantiated spatially, or Sly. Then since Mary is wholly present at both S and S*, the endurantist will say that Mary is standing Sly, and sitting S*ly. This is the view that Sider countenances in his (2001, 102-103) and endorses as the best alternative in his (2002, 133).

So just as the strategy of temporally adverbialising properties requires that there be some irreducible notion of instantiating a property in a particular temporal manner, so too the strategy of spatially adverbialising properties requires that there be some irreducible notion of instantiating a property in a particular spatial-locational manner.

A brief aside. Since Mary has both spatially and temporally adverbialised properties, rather than talking of her having the property of stand-

ing Sly $t_1$ly, we could instead talk of her having that property at a space-time region. If we suppose that TT occupies space-time region R, and YS occupies space-time region R*, then we can simplify matters by holding that Mary has the properties of standing Rly, and sitting R*ly. The endurantist could generally adopt this strategy, such that for any space-time region R that is occupied by a wholly present object O, and any property P that O has at R, O has P Rly. Thus regardless of whether Mary travels in time or not, the manner of instantiation of her properties will be relativised to a space-time region. The only difference in the time travel case is that the space-time regions R and R* are, from the perspective of their rest frames, space-like separated, while other pairs of space-time regions that are occupied by wholly present Mary are time-like separated.

Relativising the manner of instantiation of properties to space-time regions is, of course, the same as relativising the manner of instantiation of properties to both times and spatial locations. Frequently though, our pre-relativistic ways of thinking and speaking mean that we prefer to talk of Mary being in two different places at the same time, rather than being in two different space-time regions. Henceforth then, I will mainly talk of spatially adverbialised properties, rather than space-time regionally adverbialised properties (properties instantiated Rly).

So far then, it all sounds quite straightforward for the endurantist. But is it? In the next section we will consider a criticism of this account made by Ted Sider, which I will argue is overblown. Then we will move on to consider a more serious objection, namely that relativising the manner of instantiation of properties to spatial regions could mean the death knell for spatial parts. I consider whether abstaining from a metaphysics of spatial parts would be such a bad thing, and whether endurantists would, at any rate, be led to such a view. First though, can the endurantist tell the difference between a world in which Mary's time travelling self stands and her younger self sits, and a world in which her time travelling self sits, and her younger self stands?

1. Knowing Which of Me Does What

According to Ted Sider (2001, 102-4), one problem with the endurantist's spatial adverbialisation strategy is that it fails to enable us to distinguish between the properties Mary actually has, and the properties she would have had if things had gone differently. We know that in the actual world — call it W — at t_1 Mary has the properties of standing Sly and sitting S*ly in virtue of her time travelling self (TT) standing at S, and her younger self (YS) sitting at S*. But suppose that things had happened a little differently. Consider the counterfactual world W* in which at t_1 TT

occupies spatial location S* and is sitting, and YS occupies spatial location S and is standing. In W* Mary has the properties of sitting S*ly and standing Sly at t_1, the very same properties she has in the actual world, despite the fact that in W it is TT who is sitting and not YS.

Now it is true with respect to the properties of sitting and standing, that at t_1 Mary has those properties in the same way in W as she does in W*. But it is not true that Mary will have all of the same properties in W and W*, and thus not true that the endurantist is unable to distinguish the two situations. For suppose that Mary's younger self has blonde hair at t_1, and her time travelling self has grey hair at t_1. Then in W at t_1 Mary has the properties of having blonde hair S*ly, and grey hair Sly. In W*, however, Mary has the properties of having blonde hair Sly and grey hair S*ly. In the world in which TT and YS's locations are reversed, the manner in which Mary has the properties of having blonde and grey hair are also reversed. So in W, the totality of Mary's $t_1$ly properties is different to the totality of Mary's $t_1$ly properties in W*. Indeed, in W Mary has rather different second-order properties than she does in W*. In W she has the second-order property of having the property of sitting in the same spatially adverbialised manner as she has the property of being blonde: namely she has each of these properties S*ly. In W* she has the second-order property of having the property of sitting in the same spatially adverbialised manner as she has the property of being grey: namely the S*ly manner. And that's because in the actual world, Mary has those properties in virtue of having a younger self wholly present at S*, whereas in the counterfactual world she has those properties in virtue of having a time travelling self wholly present at S*.

So as long as we assume that for any time t at which some enduring object O is wholly present at multiple spatial locations S and S*, there is some property P that O has at S and lacks at S*, then it will always be possible to distinguish the sort of 'role and spatial' reversal cases that Sider is concerned with. Now, in general we would expect this to be the case. For we would expect that even if Mary travels an instant into the past — from t_2 to t_1 — there will be some properties, such as having an extra instant of memory, and being a time traveller, that time travelling Mary will have, that younger self Mary will not, albeit that the two are very qualitatively similar. But suppose that Mary steps into a time machine which not only transports her back to t_1, but does so in a manner such that when she arrives at t_1, she is a qualitative duplicate of her younger self at t_1. Then it seems that it will not be possible to distinguish a case in which TT is standing and YS sitting, and a case where the reverse is true.

Of course, in some cases this would result in the sort of radical psychological discontinuity that would lead us to conclude that Mary simply ceases to exist when the time machine procedure begins, and a

qualitative duplicate of old Mary is caused by some future states, to exist at t_1.[7] But if Mary travels back in time only a short distance, then likely she survives the experience. In such cases then, there will be no intrinsic properties[8] that can be appealed to in order to distinguish our two worlds. Nevertheless, it is still true that at one of the spatial locations S or S* at which Mary is wholly present at t_1, she has the property of being a time traveller, and at the other spatial location she does not have that property. The property of being a time traveller turns out to be the relational property of having certain appropriate causal relations to future events and so forth. So in W at t_1 Mary has the properties of standing Sly and sitting S*ly, the same same properties she has in W*. But in W, Mary has the property of having her time travelling self wholly exist at S, and in W* has the property of having her time travelling self wholly exist at S*. Moreover, since Mary cannot be a time traveller unless at t_1, one of the wholly present persons has the relevant causal connections to the future, it will always be the case that such scenarios can be distinguished, albeit by reference to relations rather than properties.

IV Mereological Abstinence

So far then, we might think that time travel does not present a problem for the endurantist. There is a problem here though. Allowing that there exist such irreducibly spatially adverbialised properties seems to collapse the distinction between extension through space and persistence through time. For perdurantists, objects persist through time in a manner analogous to the way they extend through space: by having parts at both locations and times. It is this that allows the perdurantist to explain how TT and YS are both Mary, and yet how both are distinct. Endurantists though, explicitly deny that objects persist through time in the same way they extend through space. Persisting objects do not have parts at times

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7 In fact, one might even think that it is psychological continuity and not causal continuity that makes one a time traveller, such that I can travel back in time without the present state causing anything in the past, simply by its being the case that in the past someone psychologically continuous with me-at-t appeared, and me-at-t vanishes. The latter need not cause the former for time travel to have occurred. On this view, Mary does not travel in time despite the requisite causation occurring, simply because the person who arrives at t1 is not psychologically continuous with the person who leaves in the present. This, however, is a controversial view on which the endurantist would not wish to rely.

8 Where by 'intrinsic' I mean to include the various relativised properties that are had Sly, or at-S, though in this latter case these are not strictly speaking intrinsics.

the way they have parts at places. Absent the possibility of time travel, the very same wholly present object may exist at multiple temporal locations, but never at multiple spatial locations. Thus the endurantist can happily say that objects endure through time by being wholly present at each temporal location at which they exist, and extend through space by having spatial parts at each spatial location at which they exist.

Ironically though, the possibility of time travel forces the endurantist to hold that objects can be wholly present at multiple spatial locations at the same time. It thus forces the endurantist to introduce the notion of instantiating properties Sly or at-S. Once we have the notion of irreducibly spatially adverbialised properties, however, the question presents itself as to why we should *ever* treat spatial extension and persistence differently. Why not in general think that any object that exists at multiple spatial locations, does so in virtue of being wholly present at each of those locations? For if the notion of instantiating properties Sly is a coherent one, this paves the way for arguing that we should treat local intrinsics in the same manner as we treat temporary intrinsics. Just as we can explain how objects both change over time and exist at multiple temporal locations by appealing to irreducibly temporally adverbialised properties rather than temporal parts, so too we can explain how objects exist at multiple spatial locations and change across space, by appealing to irreducibly spatially adverbialised properties rather than spatial parts (Sider 2001, 105).

Then if we return to our coin which is both red and blue at the same time, instead of holding that the coin has both of these properties in virtue of having a proper red part and a proper blue part, we could instead hold that the coin is blue S_1ly (let us suppose) and red S_2ly. In fact we can develop a view according to which objects are wholly present at every space-time point[9] at which they exist. Call the four-dimensional volume that is occupied by some object O, R. Then in broad strokes, for every space-time point P and P* that exist within R, O is wholly present at P and P*, and O at P is strictly identical to O at P*. We will then explain how the wholly present object O at P, is identical to the wholly present object O at P* despite the fact that these objects appear to have different properties, by noting that the manner of instantiating properties is relativised to space-time points: properties are instantiated Ply (or at-P). On this view then, objects not only endure through time by being strictly identical to themselves at each time at which they exist, they also extend through space by being strictly identical to themselves at each point at

9 Or to whatever one holds the smallest units of space-time to be.

which they exist. Thus objects not only lack temporal parts, they also lack spatial parts. Since this is the view that objects endure through both space and time, call the view *mega-endurantism*.

Let us put aside for a moment the issue of whether or not there is some sort of slippery slope that would, in the context of the possibility of time travel, lead the endurantist to embrace mega-endurantism. Let us first consider a little more closely what mega-endurantism would amount to as a view, and whether the endurantist might have reason to embrace such a view.

1. Exploring Mega-endurantism

Can we really make sense of the idea that objects endure across space as well as time? There is no denying that the idea that everyday objects lack spatial parts seems deeply counterintuitive. Indeed, many of our folk notions about objects are cashed out in terms of mereology. But I think we can make sense of such folk talk without employing mereology. For instance, what of the two folk notions of objects being completely separate and of objects not being completely separate? Understood in terms of mereology the former is the claim that two objects A and B are disjoint, and the latter is the claim that two objects A and B overlap. A and B are disjoint just in case there is no C that is a part of both A and B. A and B overlap just in case there is some C that is a proper part of A and a proper part of B. It is fairly straightforward for the mega-endurantist to understand A and B being completely separate in terms of there being no space-time point P at which both A and B are wholly present. Similarly, she will understand A and B 'overlapping' not in terms of mereological overlap, but rather in terms the existence of some space-time point P at which both A and B are wholly present.

In this latter case of what we might call non-mereological overlap, however, we might have the intuition that there is something odd going on here. Let us suppose that A and B are both wholly present at space-time point P_1. Let us also suppose that A is wholly present at space-time point P_2, and B is wholly present at space-time point P_3. Further, suppose that from A or B's frame of reference, points P_1, P_2 and P_3 are space-like separated. A is strictly identical at P_1 and P_2, while B is strictly identical at P_1 and P_3. Yet A and B wholly exist at P_1, and for all the world they look identical at P_1: after all A and B wholly exist at the same place and time. Yet ostensibly A and B are distinct.

Of course, the idea that distinct objects can be wholly present at the same place and time is not a new one for the endurantist. Consider, for instance, the relation between a lump of clay — call it Clay — and the statue that is made from that clay — call it Statue. Though, we may

suppose, Clay pre and post-exists Statue, there are times at which both exist and are composed of the very same matter. Perdurantists describe such cases as being ones in which one four-dimensional object (Statue) is a proper part of another four-dimensional object (Clay), or to put it another way, as a case in which through a certain interval, Clay and Statue share the same maximal temporal parts.

Endurantists though, see this as a case in which two wholly present objects exist at the same time and place, and at those times are related by the constitution relation — the relation that holds between two wholly present objects that are materially coincident at a time Thomson, 1998; Doepke, 1982; Johnston, 1992; Lowe, 1995; Wiggins, 1968.[10] Suppose that from the frame of reference of Clay/Statue, at t_1 Clay and Statue occupy exactly the same spatial region. Then both endurantist and mega-endurantist alike want to say that at t_1, Clay and Statue are related by constitution. Unlike the endurantist, however, the mega-endurantist cannot define constitution in terms of material coincidence: for the mega-endurantist denies that objects have parts (at least in the mereological sense, though she may cash out in some manner the English sense of 'having a part'). It is tempting, therefore, to say that what it is for Clay and Statue to be related by constitution at t_1, is for Clay to be wholly present at all and only the space-like separated space-time points at which Statue is wholly present. Then Clay and Statue are nevertheless distinct because there are space-time points at which Clay is wholly present and Statue is not: space-time points that are time-like separated from t_1.

There is a reason, however, why most endurantists hold that a necessary feature of constitution is material coincidence rather than, say, spatial coincidence. For the former, but not the latter, rules out cases of spatially coinciding 'penetrable' matter, from counting as instances of constitution. Suppose that fermions *themselves* are inter-penetrable in this way, and that at some time two fermions spatially coincide. What sets the fermion case apart from the Statue and Clay case is that in the former case, a single fermion would[11] have existed in the very same spatial region, even if the other fermion had not existed: one fermion does not depend for its existence, on the existence of the other fermion.

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10 Though many three-dimensionalists build into the constitution relation various additional features (such as it being an asymmetric relation), almost all agree that it is the relation that holds between materially coincident three-dimensional objects at times. The notable exception to this is Baker, 2000, who holds that it is the relation that holds between spatially coincident three-dimensional objects at times.

11 Setting aside any deviant causal chains.

In the Statue and Clay case, however, if you take away the Statue at t_1, then you take away the Clay too. The Statue and the Clay supervene on the same matter, whereas the two fermions do not.

This suggests that the mega-endurantist might define constitution in terms of supervenience. She might say that the Statue and the Clay are related by constitution at t_1 just if at t_1, the Statue and the Clay supervene on the same hunks of matter. Of course, these hunks of matter are not parts of either Statue or Clay. Indeed, whatever size these hunks may be — atoms or larger — it is true of them that they are wholly present at every space-time point at which they exist. Nevertheless, just as we can talk about the Statue and the Clay, we can talk about hunks of matter that the Statue and the Clay supervene upon. If Clay and Statue supervene on the *same* hunks of matter, then it follows that they exist at all and only the space-time points. The reverse, however, is not the case, since inter-penetrable objects might exist at all and only the same space-time points and yet not supervene on the same matter.

Now, given traditional endurantism, at t_1 Clay and Statue have distinct properties despite being materially coincident, for at t_1, let us suppose, Clay has the property of being flat t*ly, while Statue lacks this property since the flattening of Clay at t* marks the cessation of existence of Statue. Similarly for the mega-endurantist, at every space-time point at which Clay and Statue both wholly exist, they each have different properties at that point. For there are some $P_n$ly properties that Clay has in virtue of existing at P_n, which Statue lacks in virtue of not existing at P_n.

Consideration of cases such as Clay and Statue remind us that for the endurantist, it is possible for two objects to be wholly present at a time and place, and yet have different properties in virtue of having properties that are in some manner relativised. Thus we can begin to see how the mega-endurantist will deal with the case in which A and B both wholly exist at P_1. The mega-endurantist will distinguish this case from the Clay and Statue case described above, by noting that it is one in which from the perspective of the frame of reference of A and B, not all of the space-like separated space-time points at t_1 (P_1, P_2 and P_3) are points at which both A and B are wholly present. So A and B do not supervene on the same matter, and they are not related by constitution. Yet we can explain how it is that although A and B both wholly exist at P_1, they are not identical. For A and B have quite different properties at P_1. At P_1, A has some properties P_2ly, and at P_1 B has properties P_3ly. So how do we explain the fact that at P_1, A and B look so remarkably alike?

Well, consider traditional endurantism once more. Consider some enduring object O that is red at t, and blue at t*. O has the properties of being red tly and blue t*ly. Moreover, since O is wholly present at both t and t*, and is strictly identical at each of these times, it must have each

of these properties at both t and t*. The sense in which O is identical at t and t* then, is the sense in which at both of these times, it has the properties of being red tly and blue t*ly. The sense in which O changes over time, however, is the sense in which there is all the difference in the world between being red tly at t, and being red tly at t*.

In the case of the Statue and the Clay, the apparent identity of the two at t_1 is explained by the fact that Clay and Statue share all of the same $t_1$ly properties at t_1 — they share the same intrinsic properties. The properties that Clay and Statue do not share at t_1, such as being flat t*ly, are properties that are had in a manner that is temporally relativised to a time other than t_1. The same is true for point relativised properties. Having the property of being red Ply at P is different indeed from having the property of being red Ply at P_1. What makes A and B appear identical at P_1, is that they share all of the same P_1ly properties: it is other point relativised properties that they do not have in common. What makes A and B distinct at P_1 are point relativised properties that supervene on points other than P_1. This, of course, is the oddity of mega-endurantism: that an object is wholly present at a point and yet at that point it has what we would ordinarily think of as intrinsic properties, yet these are properties that depend on at which *other* space-time points that object wholly exists: the truth makers for these intrinsic properties are extrinsic to the point at which the properties exist. Thus if the only point that one has epistemic access to is P_1, then the only properties that one can know about are the intrinsic properties of P_1, and hence the P_1ly properties of whichever objects might be wholly present at P_1.

One virtue of this account is that it stands up rather better to the theory of special relativity than does ordinary endurantism. Special relativity tells us that there is no absolute simultaneity. This means that from the perspective of different frames of reference, different collections of parts of one and the same enduring object will be space-like separated. Thus it seems that enduring objects will be relativistic: relative to one frame of reference R, enduring object O will be composed of the members of one set of particulars, and relative to another frame of reference R*, O will be composed of the members of a different set of particulars. So relative to different frames of reference, O might have rather different properties (Balashov, 1999; Hales and Johnson 2003). For many four-dimensionalists, the oddity of such relativism is reason enough to reject endurantism (Hales and Johnson 2003). The mega-endurantist though, has a response to this problem. If O is wholly present at every space-time point at which it exists, then there is no sense in which O is composed of different sets of particulars relative to different frames of reference. Rather, it is a straightforward relativistically invariant fact at which space-time points O exists, and which properties O instantiates at each

of those points. All that varies with one's frame of reference, are which of these space-time points are simultaneous.

What though, is the mega-endurantist to make of ordinary sentences such as 'Mary has two arms and one nose', given that there are no arms or noses that are spatial parts of Mary? Here matters are a little more tricky. For noses, arms, and indeed, most properties, are not properties of point-sized objects. So how can Mary instantiate such properties at a point? This question raises a further one. Throughout, I have talked of Mary having properties at a point, and hence having properties Ply. But what are these Ply properties and upon what do they supervene? As I see it, the mega-endurantist has basically the same options available to her when talking about point-sized property instances, as does anyone else. The mega-endurantist can hold that space-time points themselves have properties, and thus that what it is for some mega-enduring object O to have a property Ply, is for point P to have that property, and for O to exist at P. Alternatively, the mega-endurantist might think that space-time points have no properties, but rather, that there exist at those points, (or at least, at the points at which some object exists) tiny concreta that are the bearers of point-sized properties. Or, along similar lines, she might think that it is not concreta that have point-sized properties, but rather, that what exist at points are abstract particulars — point-sized property instances, and that particulars are ultimately bundles of such instances. In all of these cases, the mega-endurantist will hold that the Ply properties of a mega-enduring object supervene on *whatever* it is at P, that is the bearer of point-sized properties. If it is space-time points that are the bearers of these properties, then Ply properties of mega-enduring objects supervene on the properties of space-time points. If it is tiny concreta that are the bearers of these properties, then Ply properties supervene on the propeties of these concreta at points. If point-sized properties are abstract particulars, then Ply properties supervene on these property instances at points. From the point of view of the mega-endurantist, what is important is that mega-enduring objects wholly exist at points, but are not identical to those points, or the concreta or abstract particulars that exist at those points. For the sake of simplicity, in what follows I will often talk as though it is space-time points that are the bearers of properties, but nothing hangs on this particular characterisation.

What, then, will the mega-endurantist say about Mary's various properties? Well of course, person-properties are not properties that can be instantiated at a point either. But there are certain properties that Mary has at a point, such as the property G (let us suppose) at P_1 which Mary has P_1ly at each point at which she exists. There are also various relations that hold between the space-time points at which Mary exists. Then what it is for Mary to be a person is for there to exist a particular distribution of properties and relations across the points at which she wholly exists.

So too Mary's having a nose supervenes on the intrinsic properties of, and relations between, certain space-time points. But it is true of Mary at *every* point at which she exists, that she exists at all and only the points at which she does exist, and that those points are related to one another in the way that they are. For it is true of Mary at P_2, that she is G P_1ly, and it is true of her at P_2 that a certain relation holds between her wholly existing at P_1 and at P_3. So it is true of Mary at every point at which she exists, that she has a nose, although the having on that nose supervenes on her existing at multiple points.

Finally then, consideration of cases such as these also reveals how the mega-endurantist can make sense of the idea of unrestricted composition, that is, the idea that any arbitrary arrangement of particulars composes some particular. Usually we find this understood as mereological universalism, the thesis that for any arbitrary set S of concrete particulars, there exists a fusion of the members of that set. Clearly the mega-endurantist cannot embrace a mereological conception of unrestricted composition. That does not mean, however, that she must reject the core idea of unrestricted composition. Rather, the mega-endurantist would need to hold that there is some sort of non-mereological universalism such that for any arbitrary set S of space-time points, there is some mega-enduring object O that wholly exists at each of those space-time points and at no others.

Prima facie then, the mega-endurantist's non-mereological universalism has a surprising amount in common with the perdurantist's mereological universalism.[12] For the latter holds that for any arbitrary set S of space-time points, there is some four-dimensional object O that exists at each and only those points in virtue of having some part that exists at each point. The non-mereological universalism of the mega-endurantist also holds that for any arbitrary set S of space-time points, there is some object O that exists at each and only those space-time points, but in contrast holds that O is wholly present at each of those points rather than being merely partly present. So while the perdurantist gets to uphold the intuition that objects have spatial parts, she does so at the expense of saying that objects are never wholly present whenever they exist. The mega-endurantist has just the opposite problem: she gets to say that objects are indeed wholly present at every time at which they exist, but must concede that strictly speaking they do not have spatial parts: they are not only wholly present at every 'now' they are also wholly present at every 'here.'

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12 Indeed, we might imagine that these two theories are really equivalent. I leave it to the reader to consider this option. For more on this issue see my (2004).

Depending on which of these intuitions is the stronger, one might have reason to prefer one of these views over the other. One might also prefer perdurantism on the grounds that it allows one to hold that objects have properties *simpliciter*, (by having parts with those properties) rather than holding, as does the mega-endurantist, that objects have peculiar spatially adverbialised properties, most of which are epistemically inaccessible from looking at a wholly present object at a point. Notice though, that for the spatial adverbialist, it is the manner of instantiating properties, rather than the properties themselves that are relativised, and thus technically properties can be instantiated *simpliciter*, albeit in different spatial and temporal ways. (One advantage of spatial adverbialisation over spatial relativisation). Moreover, the perdurantist too has to say that whole objects have properties which are, at times, epistemically inaccessible. The whole four-dimensional object tenselessly has property P in virtue of having some temporal part with that property, but if the temporal part that has that property is not the current temporal part, then the P property is currently epistemically inaccessible.[13]

Finally though, we might prefer perdurantism to either endurantism or mega-endurantism, on the grounds that it preserves a certain symmetry with space-time. Let us say that an account of objects and their persistence mirrors an account of space-time and its regions, just if the relation that holds between regions and sub-regions of space-time, is the same relation that holds between the objects that occupy those regions and sub-regions of space-time. Then both perdurantist and endurantist agree that there is what we might call synchronic mirroring: mirroring at a time. Both agree that the relation that holds between a region R that exists at t, and the sub-regions of R at t, is the part/whole relation. So too they agree that the relation that holds between the object O that occupies R at t, and the objects that occupy each of the sub-regions of R at t, is the part/whole relation: the objects that occupy the sub-regions of R at t are spatial parts of O at t. The perdurantist also holds that there is what we might call diachronic mirroring. She holds that the relation that holds between a four-dimensional volume R, and the sub-regions of R is the part/whole relation, while the relation that holds between the four-dimensional object O that occupies R and the objects that occupy the sub-regions of R, is also the part/whole relation: in the latter case the occupiers of the sub-regions are the temporal parts of O. For the endurantist, however, this is where the mirroring stops: while the four-di-

13 Indeed, the endurantist too must concede that there exist such epistemically inaccessible properties at times, namely all of the tly properties that at had at times other than t. Thus at t_1, it is epistemically inaccessible that the ball is red $t_2$ly.

mensional volume that is occupied by some enduring object has sub-regions that are parts of that region, these regions are not occupied by parts of the enduring object, but rather, by the wholly present enduring object itself.

Though perdurantists find this puzzling, for endurantists it is precisely because there is a disanalogy between spatial extension and temporal extension that this is so. For the mega-endurantist though, there is *no* sense in which the relation between spatio-temporal regions and their sub-regions, mirrors any relation between the objects that occupy those regions and sub-regions. Unlike the endurantist, however, who has some story (plausible or not) as to why there should be mirroring on some occasions (synchronically) and not on others (diachronically), *prima facie* at least, the mega-endurantist seems to lack any such story. (She certainly cannot say that the relations between space-time regions and sub-regions, mirrors the relations between the objects that occupy those regions and sub-regions in virtue of space-time regions being wholly present at space-time regions, whatever that might mean). So this would seem to mandate some explanation for why there should be such a complete failure of mirroring.

None of this shows that mega-endurantism is an untenable view. Thus it does not show that if introducing irreducibly spatially adverbialised properties creates a slippery slope that leads to mega-endurantism, then this would amount to showing that four-dimensionalism is the only viable metaphysics of persistence. Nevertheless, one suspects that many endurantists would be unhappy to embrace such a view. But is there any reason to suspect that the slippery slope in question is so very slippery?

V Re-instating parts

Why should we think that the possibility of time travel could or would lead the endurantist to reject mereology outright? Presumably the idea is that once we introduce the notion of irreducibly spatially adverbialised properties, there is no principled reason to relativise the manner of instantiation of those properties to spatial regions rather than to space-time points. Since local intrinsics can be explained without appeal to mereology, there is no need to posit the existence of any spatial parts. This leaves us with two possible theories, one of which eliminates talk of spatial parts altogether and embraces a metaphysics of being wholly present at space-time points, and the other which combines mereology with a metaphysics of being wholly present at spatial regions. Given that positing spatial parts is unnecessary, however, we should opt for the former, more simple theory. Thus we should adopt mega-endurantism.

This argument is not wholly convincing. Consider the following. There are those who consider it at least logically possible that there exist

spatially extended mereological simples (Parsons, 2000; Sider, 2002). This leaves it open that such extended simples might, for instance, be differently coloured at different spatial locations. We can imagine a simple O_1 that is half red and half yellow. Clearly we cannot explain the local intrinsics of O_1 in terms of its having parts with certain properties. An obvious suggestion then, is to introduce the idea that in some cases, properties, or the manner of instantiation of those properties, are relativised to spatial locations. Thus, all too familiarly, we can say that extended simple O_1 is red at location S, and yellow at location S*: it is red Sly and yellow S*ly.

But, the argument might then proceed, if we need to introduce spatially adverbialised properties to explain the local intrinsics of spatially extended mereological simples, then why not use such a strategy to explain local intrinsics in general? If such simples are possible, why not in effect maintain that all spatially extended objects are such simples: objects that are wholly present at every point at which they exist? After all, this latter theory is simpler than one in which there exist spatially extended objects, some of which are mereologically simple and have local properties that are spatially adverbialised, and others which are mereologically composite and have local properties that are properties of spatial parts.

So if the mere spectre of spatially adverbialised properties is sufficient to threaten the metaphysics of mereology, then it is not only endurantists who should be worried. But of course, while it is plausible that all things being equal we should prefer the simpler theory, none of this goes any way to showing that all things are equal. The best endurantist theory is likely one that reconciles the possibility of time travel with the intuition that enduring objects are composed of spatial parts at times — this is, after all, a core endurantist intuition. This means that the endurantist needs to distinguish between relativising properties to spatial regions, and relativising them to space-time points. This is a perfectly principled distinction. Of course, it presupposes that spatially extended enduring objects are composed of spatial parts at a time. This is why such objects are wholly present within a particular spatial region, not at each space-time point within that region. But no one said that endurantists must create an account that is consistent with the possibility of time travel, without appealing to various endurantist intuitions as constraints on that theory.

The endurantist needs to hold that for every frame of reference R and region S all of whose space-time points are simultaneous relative to R, if there exists some enduring object O that is wholly present in S, then O occupies all and only S such that at every space-time point P within S, O exists at P in virtue of having some spatial part at P. Thus no spatially extended object is ever wholly present at any sub-region of the spatial region S that it occupies at a time relative to a frame of reference. Rather,

the contents of each of these sub-regions represent some proper part of O at a time.

So consider Mary. Suppose at t_1 Mary occupies spatial region Sm_1. Then at t_1, each object that occupies some proper sub-region of Sm_1 is a proper part of Mary. Presumably we also want to say that Mary has some other proper parts, such as a left arm and a right leg. At t_1, let us say that Mary's left arm occupies sub-region Sa_1 of Sm_1. If Mary's arm is itself an enduring object, then at t_1 it is wholly present within Sa_1, and has a proper spatial part at each sub-region within Sa_1. So we have a sort of ontological hierarchy, such that Mary has some proper spatial parts that are themselves wholly present within a spatial region, and which themselves have spatial parts, and so forth down the line. This means that just as Mary endures through time, so too do each of her parts. Just as Mary, wholly present at t_1 in region Sm_1, is strictly identical with Mary at t_2 in region Sm_2, so too Mary's arm at t_1 in region Sa_1, is strictly identical with Mary's arm at t_2 in region Sa_2.

Now let us suppose that Mary travels back in time to t_1 where she meets her younger self. At t_1 let us suppose that Mary's time travelling self occupies spatial region S_1, and her younger self occupies region S_1*. Then Mary is wholly present at S_1, and wholly present at S_1*, and is strictly identical at each of those locations. Thus if she is standing at S_1 and sitting at S_1*, she has the properties of standing S_1ly and sitting S_1*ly. And just as Mary is identical at each of those locations, so too are those of her parts that have endured.[14] Some sub-region of S_1 contains the wholly present time-traveller's arm, which is a proper spatial part of the time traveller. And that arm is strictly identical to some proper part of Mary's younger self, namely the younger self's arm which occupies some sub-region of S_1*, and is wholly present within that sub-region. So just as one and the same person, Mary, is wholly present at multiple spatial regions, so too one and the same arm is wholly present at multiple spatial regions.

VI Fission Explained

Fission is a process whereby a single individual splits into two qualitatively identical individuals, each causally related in the same manner to the original individual. Such cases are particularly puzzling because it seems that two strong intuitions we have about such situations are inconsistent. On the one hand, it seems that individuals who undergo

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14 Of course, not all of her parts might have endured: she might have had an arm replaced with a mechanical arm.

fission survive the experience. Suppose Bob undergoes Star Trek type transportation and the transporter malfunctions creating two qualitatively identical persons, B_1 and B_2 at the destination end of transportation. If the transporter had not malfunctioned then Bob would have survived transportation, and surely the fact that two qualitatively identical individuals resulted from the process does not make it any less plausible to hold that Bob survived. On the other hand, although B_1 and B_2, are qualitatively identical, they are not numerically identical: they exist at two distinct spatial locations. So they cannot both be Bob. Yet there is no principled reason to identify one but not the other of the resultant persons with Bob. So, it has been argued, we must conclude that assuming that survival matters, it is not in virtue of the identity relation (Parfit, 1984).

The advantage of perdurantism is that it can accommodate both intuitions about survival, whilst retaining the idea that it is indeed the identity relation that determines when survival occurs. According to the perdurantist, prior to fission the post-fission individuals (in this case B_1 and B_2) share a maximal temporal part. That is, their four-dimensional space-time worms completely overlap prior to fission. After fission the worms 'fork', and B_1 and B_2 no longer share any temporal parts. So prior to fission, the name 'Bob' failed to refer uniquely, but rather, was ambiguous between referring to either B_1 or B_2. The sense in which Bob survives fission then, is the sense in which both B_1 and B_2 exist prior to fission, and both exist after fission (Lewis, 1983).

It has been suggested by Robinson (1985) that the endurantist can say something very similar. She can say that prior to fission, there existed two wholly present persons B_1 and B_2. But rather than it being the case that B_1 and B_2 shared a temporal part prior to fission, she will instead say that they were related by constitution prior to fission. What explains why it appears that only a single individual exists prior to fission, is that the relation of sharing a temporal part at a time, or of being related by constitution at a time, can appear very like the identity relation.

The problem with this endurantist account is that since enduring objects are wholly present whenever they exist, there must be some fact of the matter prior to any fission event, as to whether there exist multiple persons related by constitution. If fission does take place, then we know that prior to fission, there existed multiple coincident objects — this is what the analysis relies on. But if fission does not take place, do there still exist such coincident objects? Intuitively we want to say that there do not. To do so we might appeal to future facts about whether fission occurs or not. And we might liken the appeal to such facts as analogous to, for instance, the case of the Statue and the Clay. What makes it the case that the Statue and the Clay are distinct despite being coincident at certain times, is that at other times they are not coincident. Thus their

distinctness is grounded in times other than the time of coincidence, just as, we might say, the distinctness of B_1 and B_2 is grounded in their manner of existence at times after fission occurs. But this is not satisfactory.

For Statue and Clay are not distinct purely in virtue of coinciding only temporarily: rather, they are distinct in virtue of having, at every time at which they exist, distinct modal properties. This is what leads the endurantist to hold that objects (such as Statue and Clay) can be distinct yet coincide at *all* times. But in the case of fission the objects in question do not have different modal properties. Of course, the endurantist could hold that it is future facts (about fission) that determine how many objects exist and coincide at a time. This is not an unreasonable thing for the perdurantist to think: since perduring objects only partly exist at a time, to know how many (persisting) objects exist at any one time necessarily involves knowing facts about other times. But for the endurantist, appeal to future facts appears more dubious. If whether fission occurs at some future time determines how many *wholly present* objects exist in the present, then it seems that the endurantist is appealing to something a lot like backwards causation. Yet if we do not want to say that a future fission event retrospectively causes it to be the case that B_1 and B_2 exist prior to fission, then it must be that B_1 and B_2 would have existed even if fission had not taken place, it is just that they would have been related by constitution at *all* times at which they both exist. So Robinson's account ought be committed to the claim that if fission in persons is possible, then for every name of a person 'P' there are materially coincident objects P_1 and P_2 of which it is indeterminate to which object 'P' refers. In some cases P_1 and P_2 coincide only temporarily — when fission occurs — and in other cases they coincide permanently — when fission does not occur. Moreover, since fission events need not produce only two post-fission objects, but could produce a vast number, it follows that for every object O of which it is possible that multiple future fission occurs, there exist a vast number of coincident objects $O_1...O_n$ to which 'O' ambiguously refers. Plausibly though, this vast ontological profligacy is not one to which many endurantists will want to commit themselves.

Considerations arising from the possibility of time travel, however, reveal another potential solution to the problem of fission. In setting up the problem I blithely noted that B_1 and B_2 could not both be identical with Bob, since they exist at distinct spatial locations. But if time travel is possible, then the endurantist has to deny this apparent truism. This leaves her free to reconcile the various competing intuitions about cases of fission by holding that B_1 and B_2 really are both Bob: they are strictly identical. After fission, Bob simply wholly exists at multiple spatial regions. This preserves both the intuition that Bob survives fission, and that there is no principled way of declaring one of the resultant persons

to be Bob, and the other not. This latter is true because they are, as intuition tells us, both Bob. Fission just is that peculiar process that causes a single individual to be multiply spatially located. Post-fission then, all of Bob's properties will be relativised to spatial regions. Bob can be both a bachelor and married, can have children and be childless, by having each of these contradictory properties in a different spatially relativised or adverbialised manner.

In fact we can see what appears to be the oddity of spatial adverbialism, as one way of making sense of the sort of ordinary folk talk we might expect given such a situation. Suppose that post-fission, both B_1 and B_2 marry. Then we can imagine each wife talking of what 'her' Bob does. One wife might say to the other, 'my Bob never picks his socks up off the floor, what about yours?'. The perdurantist can make sense of such talk by holding that B_1 and B_2 are distinct persons, but that since prior to fission they shared the same temporal parts and thus the name 'Bob' was ambiguous between the two, it makes sense for each wife to talk of 'her' Bob. The endurantist can also make sense of such talk. We can view language such as this in terms of one and the same man — Bob — being wholly present at two distinct locations. Then the use of 'my' and 'your' is a way of relativising properties — a way of referring to wholly present Bob at different places.

Thus once the endurantist avails herself of the resources of the spatial relativisation or adverbialisation of properties, she too is able to reconcile all of our intuitions about fission without sacrificing the claim that it is identity that counts in survival.

VII Conclusion

So the possibility of time travel need not faze the endurantist. Indeed, consideration of such a possibility opens the door for a new way of making sense of cases of fission. It turns out that objects can be wholly present at multiple spatial regions at the same time, and why should this be surprising, after all, objects can be wholly present at multiple temporal locations at the same spatial location.

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