

Article

Beaming Bodies: A Neo-Lockean Account of Material Persistence

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Abstract: Conventional wisdom holds that human bodies do not and cannot persist through beaming: scanning and destruction of the body, followed by transmission of the scan information and replication of the body in another location. I argue that given the minimal time travel assumption that information can be sent into the past, it is logically possible for (duplicates of) human bodies to exist in object loops. If so, then conventional wisdom is wrong, and bodies can persist through beaming. The lesson generalizes to all composite material objects that can persist through intrinsic change.

Keywords: beaming; teleportation; time travel; object persistence; survival; personal identity; psychological continuity; bodily continuity; causal loops; object loops

1. Introduction

The teleporter scans you, as deeply as is physically possible. At the instant the scan is complete, you lose consciousness as the machine vaporizes you. Later, somewhere else, a single replica is produced exactly from the scan information. When the replica awakes, it *quasi*-remembers more or less everything that happened to you up until the scan¹ [1]. The scan information is never again used to produce a replica. Call this total process *beaming*.

Philosophers divide into two camps over beaming. According to Derek Parfit, those who approve of beaming are *Lockeans*, appealing to “psychological continuity,” and those who object to beaming are *Animalists*, appealing instead to “biological continuity” [2]. Parfit’s terminology is unfortunate. One of the Animalists is Peter van Inwagen, and his well-known account of biological continuity counts it as “Lockean” continuity [3]. I shall override Parfit and use the name *neo-Lockean* to refer to those who approve of beaming and reserve *Lockean* for those who accept van Inwagen’s “Lockean” continuity as the criterion for the survival of animals and other organisms. If the neo-Lockeans are right, then a teleporter looks like a time machine—a *tempoter*, you might say—since the journey involves a discrepancy between personal time and external time. This will prove important.

Parfit assumes materialism, as shall I. Then, Lockeans and neo-Lockeans disagree about the persistence conditions of material objects that are human persons. The source of this disagreement is usually taken to be—as Parfit takes it to be—a disagreement about whether or not a human person is identical to a human animal. But I think this is a mistake. There is a deeper disagreement, and it will play merry hell with the ubiquitous intuition that no human animal survives beaming.

2. Distinguishing the Two Approaches

David Lewis outlines neo-Lockeanism:

What matters in [personal] survival is mental continuity and connectedness ... My present experiences, thoughts, beliefs, desires, and traits of character should have appropriate future successors. My total present mental state should be but one momentary stage in a continuing succession of mental states. These successive states should be interconnected in two ways. First, by bonds of similarity. Change should be gradual rather than sudden, and (at least in some respects) there should not be too much change overall. Second, by bonds of lawful causal



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dependence. Such change as there is should conform, for the most part, to lawful regularities concerning the succession of mental states—regularities, moreover, that are exemplified in everyday cases of survival. And this should be so not by accident (and also not, for instance, because some demon has set out to create a succession of mental states patterned to counterfeit our ordinary mental life) but rather because each succeeding mental state causally depends for its character on the states immediately before it [4]. (p. 17)

Neo-Lockean continuity is a matter of *qualitative similarity based upon causal dependence*, and all neo-Lockeans hold that such neo-Lockean continuity is necessary for persistence. All Lockeans, on the other hand, hold that Lockean continuity is a necessary condition for persistence. According to van Inwagen, Lockean continuity is “a sort” of “spatio-temporal and causal continuity” [3]. (p. 149) The “sort” in question includes “material” continuity, consisting of chains of material connectedness, where material connectedness is an overlap of parts. And as van Inwagen points out, material continuity may hold when direct material connectedness does not. We can now understand the difference in attitudes to beaming. Beaming preserves neo-Lockean continuity and seems to break Lockean continuity in two ways: by breaking both spatio-temporal and material continuity. Say you are vaporized in Princeton, and your replica is assembled-and-wakes-up in Oxford a day later. Then, there is a large spatio-temporal gap, and although it’s possible for your replica to have some of the same atoms that were in your body at scanning, it would be absurd for a Lockean to pin any hopes for survival on this possibility; and it would, in any case, fail to satisfy a *strong* material connectedness condition that the Lockean is bound to employ.

3. Monumental Error?

We need not restrict these criteria to animals and other organisms. Suppose we use the beaming machine to scan the Washington Monument—which I shall rigidly designate *WM*—as deeply as is physically possible. At the instant the scan is complete, the machine vaporizes *WM*. Later, but in the same relative location on the Mall, a single replica is produced exactly from the scan information. The scan information is never again used to produce a replica. Carl Ginet—making a deliberate analogy with human persons—asks some questions about this kind of example (*italics original*):

But is it incoherent to suppose a type of *material* thing whose constitutive matter could completely change from one time to another in a nonpiecemeal fashion? Could I not introduce such a type of material thing by definition? I might stipulate that a *monewment* is a material object performing the same sort of function as a monument (commemorating something) and such that monewment *x* at t_2 is the same monewment as monewment *y* at t_1 , if the matter constituting *y* at t_1 were subsequently destroyed all at once and thereafter new matter of pretty much the same sort and shape were put in the same place in order to restore the commemorating in the same fashion of whatever it was that monewment *y* at t_1 commemorated² [5]. (p. 220)

In replying to Ginet, Alvin Plantinga writes (*italics original*):

This is a fascinating suggestion. The idea seems to be that there are *monewments* in addition to monuments; perhaps for every monument there is a monewment, so in addition to the Washington Monument there is the Washington Monewment. Unlike the former, the latter would exist even if we completely destroyed the Washington Monument—provided that [replication occurred] [However,] I don’t believe there are any such things as monewments...; nor do I think we can create them by definition³ [6]. (pp. 369-370)

We can imagine the Lockean trying out an analogous complaint about neo-Lockeans:

The idea seems to be that there are material objects—call them *monewmen*—in addition to material *men*; perhaps for every man there is a monewman, so in addi-

tion to Al Plantinga there is AlnewPlantinga. Unlike the former, the latter would exist even if we completely destroyed Al Plantinga—provided that replication occurred. However, I don't believe there are any such things as monewmen ...; nor do I think we can create them by definition.

Here we must separate three complaints. First is that—as Plantinga seems to be claiming—*monewments* should not be in our ontology whether or not anyone engages in the relevant replicating activity. (Nor, presumably, can *monewmen* exist). That dismissal is contentious, however, since many of us endorse the principle of unrestricted mereological composition, with no creation by definition needed. (Lewis is a prime example.) Moreover, amongst those who deny the principle of unrestricted mereological composition, some also deny the existence of monuments as Plantinga understands them (van Inwagen is a prime example).

Second, Plantinga at least suggests that to believe in monewments one must believe in monuments *as well*; such that were relevant replication never to occur, there would be two entirely coincident objects. Perhaps the idea is the one we see in puzzles of coincidence such as statue/lump cases: since monewments, but not monuments, can survive replication, they have different modal properties and must be distinguished [7]. But no such puzzle need arise for the neo-Lockean mereologist, who can claim that monuments *are* monewments, and men *are* monewmen: in each case, there is just one thing, and *it* can survive destruction and replication. If the principle of unrestricted mereological composition is true, then there must be proper temporal parts of objects, with or without Lockean or neo-Lockean continuity. Hence, in the case where replication actually takes place, the neo-Lockean can insist that what Plantinga means by “monument” is not a monument at all but rather a proper temporal part of a monument; *mutatis mutandis* for a beamed man.

The third complaint is the real one. Plantinga does not think that neo-Lockean continuity is ever sufficient for survival of a material object like a monument, or a man. To believe that monuments are monewments is to believe that qualitative similarity based upon causal dependence—call this the *Lewis-relation*, or *L-relation* for short—can be sufficient for monument survival.

4. Parfit the Middleman

Parfit would classify himself as a neo-Lockean, since he believes that men survive beaming. But he does not think men *persist* through beaming. Persistence requires numerical identity, and Parfit notoriously does not think personal survival requires persistence. Commenting on his own view, Parfit writes:

On this view, my Replica would not be me, since he would not have my brain. That, I claimed, would not matter, since being destroyed and Replicated [i.e., beamed] would be as good as ordinary survival [2]. (p. 7)

Parfit thinks his Replica would not have his brain, because he thinks *his* brain would cease to exist through beaming, given that the only candidate for Parfit's brain is Replica's brain, and Replica's brain is not spatio-temporally or materially continuous with Parfit's brain. Parfit has a Lockean view of brain persistence. So it seems likely that Parfit would agree with Plantinga on monuments, too.

But let's ask a different question: does Parfit's brain *survive* beaming? Parfit used a different, fission case to argue for his view of personal survival, and the beaming case can be varied to provide a nice clean example⁴ [1]. Suppose that Parfit has two identical Replicas produced from his scan information, at the same time at different locations. Parfit would argue that the two Replicas are different people, so they cannot both be identical to Parfit. And it is unprincipled to suppose that one is Parfit and not the other; therefore, neither is. That is, Parfit does not persist through a fission case of beaming. Parfit then can repeat his well-known argument that the fission is much more like ordinary survival than it is like ordinary death. He can reach this general conclusion without any Lockean claims about persistence.

Return to the case of the Washington Monument. Suppose we compare three cases: ordinary survival of WM; ordinary permanent destruction of WM; and destruction followed by L-relation-preserving replication. WM does not care about itself, of course, but WM matters *to us*. When I contemplate the three cases from our perspective on what matters, it seems plausible that replication is much more like the case of ordinary survival than it is like permanent destruction (cf. Section 8 below). Hence it is plausible that Parfit should think that *what matters* in the survival of WM is not Lockean continuity, but rather the L-relation.

Now, return to the case of Parfit's brain and compare ordinary brain survival, its ordinary permanent destruction, and destruction followed by L-relation-preserving replication. I find it plausible that *from Parfit's point of view*, brain replication is much more like the case of ordinary brain survival than it is like its permanent destruction. Hence it is plausible by Parfit's own lights that what matters in the survival of Parfit's brain is not Lockean continuity, but rather the L-relation. This produces a startling result. Parfit can say that his brain and body—the Parfit animal—survive beaming. Hence he can occupy a middle position. Other neo-Lockeans say that Parfit the person survives beaming by persisting, even though the Parfit animal does not survive beaming (since it does not persist). Lockean animalists agree that the Parfit animal does not survive beaming, since it does not persist, and conclude that Parfit does not survive beaming, since he does not persist. Parfit the middleman can say instead that neither Parfit the person nor the Parfit animal persists through beaming, even though they both survive.

I shall argue for a fourth, more radical position: Parfit and the Parfit animal both survive beaming since Parfit, his body, and his brain all persist through it. Moreover, this view is neo-Lockean about composite material objects in general: what matters in their persistence is the L-relation.

5. Undermining Lockeanism: The Negative Argument

Until fairly recently, I thought that it was just obvious that Lockean continuity was essential to the persistence of ordinary material objects other than persons. And I'm confident that everyone else thinks it's just obvious, because I have searched the literature in vain for an explicit argument. Why is there none? One possibility is that the claim is self-evident and requires no argument at all. Another is that there was never a reason (until perhaps now) to doubt it. A third is that there is at least some implicit argument.

Let's consider the third possibility. One implicit argument might be an argument from authority: Locke himself. In Chapter 27, Book II of the *Essay*, Locke tells us that there are lots of different criteria for persistence, each suited to the kind of thing under scrutiny. In considering material objects, he divides them into two: things that cannot undergo intrinsic change, such as corpuscles and "masses of matter", and things that can, such as organisms and watches.

But that's about all Locke tells us before he moves on to the persistence of persons. He tells us organisms can change their parts, but he doesn't remark on to what extent their parts must remain the same. And though some might interpret Locke's *Origin Principle*—"that one thing cannot have two beginnings of existence"—as requiring spatio-temporal continuity, it has other plausible interpretations⁵. So it's not obvious that Locke is a Lockean. I reject any implicit argument from Locke's authority.

A more promising implicit argument is that causal continuity requires spatio-temporal continuity. I submit that the standard way of thinking about causation involves spatio-temporal continuity. This is what makes Cartesian interactionism so puzzling: how can something which is not in space at all cause an event which is in space? Perhaps Cartesianism can be saved by appealing to the special metaphysical status of the immaterial, but when it comes to the purely material, we think that, to put it a bit roughly, the cause of an event must be next to it or next to next to it, and so on. If the cause is next to the effect in space-time, call it a *proximal* cause. Then *distal* causation consists in chains of proximal

causation. If material causation is either proximal or distal, then the causal condition on persistence presupposes spatio-temporal continuity.

This argument does not get us all the way to Lockean continuity, however. All that follows is that causal continuity requires *some* spatio-temporal continuity. Consider beaming again. The neo-Lockean has a causal continuity condition on personal survival that they think is satisfied in beaming. But not by magic. There is a spatio-temporally continuous chain of causation from the thoughts in the scanned subject to the thoughts in the replica, mediated by, e.g., an electromagnetic signal. So, this implicit argument fails.

Since I think the Lockean account of material objects is not self-evident (else I would not argue against it), I'm inclined to explain the lack of argument for it by the fact that no one noticed that it needed argument. This surprises me a little when I consider the material continuity condition in light of Locke's assumption that there are *corpuscles* (or, as van Inwagen calls them, *Democritean atoms*). Corpuscles are material objects that can be proper spatial parts of composite material objects but that do not themselves have proper spatial parts that are material objects. They are (spatially, at least) simple. Not everyone believes in corpuscles. Descartes did not, believing instead that matter is infinitely divisible, or *gunky*. Suppose Descartes is correct. The Lockean holds that material continuity is necessary for the persistence of a composite material object. So it must, from one moment to the next, have enough of the same proper spatial parts for material connectedness. But those parts are themselves composite objects, so for them to be the same, they must have enough of the same proper spatial parts, and so on. And so on. If matter is gunky, the buck of material continuity has nowhere to stop, and (ignoring spatio-temporal continuity for the nonce), Lockean material continuity is then indistinguishable from neo-Lockean material continuity. Hence, for Descartes, at least one plank of neo-Lockeanism was not self-evidently false.

The Lockean can insist that matter is, after all, not gunky, and I'm strongly inclined to agree. The problem is that the Lockean must insist further that material continuity is incompatible with gunk, so a commitment to it is a commitment to Democritean atomism. Neo-Lockeans like me can claim some greater generality here, and we have as yet no independent reason to think I am wrong.

6. Using Time Travel to Undermine Lockeanism: The Positive Argument

To make the positive argument as interesting as possible, assume with Locke and van Inwagen that there are corpuscles. Next, assume *minimal time travel*: the proposition that reverse causation is logically possible; equivalently, that it is logically possible for information to time travel to the past⁶. Given minimal time travel, it is logically possible for a beaming replica to appear in the external past of the scanned subject. If neo-Lockeans are right, this is time travel to the past.

Minimal time travel entails the logical possibility of a case I call *Loop Alice*. Loop Alice undergoes a procedure very like beaming—call it *beaming**—exactly once. Her entire existence is a causal loop since the first time the world sees her is when she appears, the result of a replication, in 2050. Alice ages more or less normally for ten years, and in 2060—the last time the world sees her—she is scanned-and-vaporized. The scan information undergoes compression and a *rejuvenation* algorithm—of the sort customers would desire in order to not just look ten years younger but to actually have roughly the physical body of a person ten years younger—and is sent into the past. The information is there decompressed and used to produce an approximate replica, and the process (coincidentally) exactly undoes all the changes of the previous decade of her life.

I originally devised the case of Loop Alice to show that a person could exist as a causal loop with no reversal or suspension of entropy [9]. But focus instead on the fact that there is a composite material object—a functioning organism—that is in a loop; call it *Alibody*. My claim is a simple one: Alibody survives the beaming*. The argument for this is by analogy. Call the replicated body in 2050 *A1* and the scanned body in 2060 *A2*. The relation *A2* bears to *A1* is analogous to that between your body now (*Y2*) and your body ten years ago (*Y1*). In the case of your ordinary survival over the past decade, we say the relation is identity,

that $Y2 = Y1$. So, by analogy, $A2 = A1$. But identity is symmetric, so $A1 = A2$. $A1$ is $A2$'s immediate successor, produced by beaming*, so $A2$ *persists* through beaming*.

7. Objection: Constitution vs. Evidence

A possible objection to my claim is as follows.

In the case of Alibody, although it is true that $A1$ and $A2$ are the same object, it is what happens from 2050 to 2060 that secures this fact. Notice that $A1$ is spatio-temporally and materially continuous with $A2$, and these relations are also symmetric. So in a sense, spatio-temporal and material continuity of corpuscles are not lost through the beaming* process. But in another sense, what could be more obvious, but that beaming* interrupts spatio-temporal and corpuscular material continuity? Therefore, the identity of $A1$ and $A2$ is, after all, *constituted* by spatio-temporal or corpuscular material continuity from 2050 to 2060, and *not* by what happens in the beaming*. Therefore, the case of Loop Alice does not generalize to the case of non-looping beaming, such as the beaming of Parfit.

This objection makes a very interesting point. And it will not do to cheat my way out of it, say, by pointing out that corpuscular material continuity need not be interrupted in *Loop Alice*. (It's *possible* for there to have been corpuscular material connectedness between $A2$ and $A1$, in which case, thanks to coincidence, $A1$ would have been composed in part of earlier temporal parts of parts that compose $A2$ [9]). For one thing, the same trick cannot be turned for spatio-temporal continuity. For another thing, we could just stipulate that corpuscular material connectedness is, in the relevant sense, interrupted in *Loop Alice*. And third, it seems even more tendentious that an *uninterrupted* case would generalize to cases of interruption.

Focus instead on the fact of interruption. If the current objection succeeds, then we need to explain in what sense bodily continuity is interrupted. Mere spatio-temporal or corpuscular material continuity cannot explain this since each is, as we just noted, a symmetric relation, and so is not lost through beaming*. The interruption seems instead to be a break in *connectedness*. For ease of exposition, assume the temporal parts view. Define successive temporal parts—given temporal atomism—as *having no other temporal parts between them in personal time*. Then spatio-temporal connectedness plausibly is spatio-temporal contiguity between successive temporal parts.

In *Loop Alice*, as relativized personal time advances from $A1$ in 2050 to $A2$ in 2060, there is spatio-temporal connectedness all the way. But as relativized personal time advances from $A2$ in 2060 to $A1$ in 2050, spatio-temporal connectedness is interrupted. Let us say that $A2$ is *backward S-connected*; since it is spatio-temporally connected to the temporal part it succeeds, but it is not *forward S-connected*. And let us say that $A1$ is *forward S-continuous* with $A2$, since there is an uninterrupted chain of forward S-connectedness from $A1$ to $A2$. But $A1$ is not *backward S-continuous* with $A2$ ⁷.

Turning to material continuity, we have stipulated that corpuscular material connectedness is interrupted as relativized personal time advances from $A2$ to $A1$. Let us say that $A2$ is *backward M-connected*; since it is (where corpuscles are concerned) materially connected to the temporal part it succeeds, but it is not *forward M-connected*. Let us say that $A1$ is *forward M-continuous* with $A2$, since there is an uninterrupted chain of forward M-connectedness from $A1$ to $A2$. But $A1$ is not M-continuous with $A2$.

We can now restate the objection:

In the case of Alibody, although it is true that $A1$ and $A2$ are the same object, it is what happens from 2050 to 2060 that secures this fact. The identity between $A1$ and $A2$ is constituted by the relation of *forward* spatio-temporal or *forward* corpuscular material continuity from $A1$ to $A2$, and *not* by what happens in the beaming*. Therefore, the case of Alibody does not generalize to the case of non-looping beaming, such as the beaming of Parfit.

And now we can see why the objection is bound to fail. For it postulates that bodily identity is constituted by a relation that is not symmetric. Lewis encounters the same difficulty with the constitution of personal identity by the R-relation, which is usually introduced as directional. He solves it by defining converse “forward” and “backward” R-relations—each non-symmetric—which he can then “merge into a symmetrical relation” (*italics original*):

That is the R-relation I have in mind: S_1 and S_2 are R-related *simpliciter* if and only if S_1 is R-related either forward or backward to S_2 [4]. (p. 24)

If we wish to make sense of bodily identity in ordinary non-looping cases, we cannot settle for a non-symmetric relation. But if we merge the forward and backward S-continuity or M-continuity relations, we arrive back at the symmetric relations of spatio-temporal and corpuscular material continuity, and the objection has gone—like Alibody itself—in a loop. I therefore assert that the identity between A1 and A2 is constituted by what happens from 2060 to 2050, as well as by what happens from 2050 to 2060. The correct diagnosis of Loop Alice is as follows: the fact of bodily identity from 2050 to 2060 is conclusive *evidence* that bodily identity is constituted by what happens from 2060 to 2050. To refuse to recognize this is to fail to treat Alibody as an object that is a loop.

It might help to consider the following analogy⁸. Imagine a length of hemp rope that is laid out on the ground in a straight line. Take the two ends and put them together tightly so that the rope traces out a circle. This does not form a genuine rope loop; it only looks like it. The objection of this section might suggest that this rope is analogous to Loop Alice. But the analogy fails. A better analogy is if the hemp rope has a strong enough steel core, with the two ends joined not by overlapping hemp threads but by overlapping steel threads. If one attends only to hemp connectedness, it will seem like rope continuity is lost. But the real lesson is not to attend only to hemp connectedness.

There is an important methodological point to make here⁹. Locke imagined the case of the prince and the cobbler to employ intuitions about where a person goes when their bodily and psychological continuity are teased apart; where we have two sets of evidence pulling in different directions. But there are two very different ways of conceiving of the case. The one we see over and over again in comedic movies involves spatio-temporally continuous bodies P and C ; at time t_1 , something happens such that each body starts behaving very differently. Initial confusion is followed by intimate moments with friends or loved ones, who—in concurrence with Locke—slowly become convinced that two persons have swapped bodies. But imagine a skeptic asking *how* this alleged swap occurred, especially in a case where the bodies have been continuously observed. The skeptic might reasonably believe that the whole affair depends upon coincidence, in effect denying psychological continuity between P before t_1 and C after t_1 (or vice versa). In a second conception of the case, imagine instead continuous evidence of psychological continuity. Suppose that the prince and his significant other start a deep and meaningful conversation in total darkness that, from the SO’s point of view, is an all-nighter. Hours later, the light dawns, and to the SO’s surprise, their interlocuter now looks completely different (exactly like the cobbler, in fact). Suppose that the same sort of thing was experienced by the cobbler’s SO. Even if each SO could, in hindsight, agree on a time t_2 when (say) each vocal pitch changed, a skeptic might well ask *how* the two bodies allegedly switched places at t_2 . Again, astounding coincidence might be the preferred explanation, in effect denying bodily continuity across the spatio-temporal gap.

Loop Alice avoids these epistemological problems by supplying the causal genesis of each event. Divide the story into two sets of events. First, the events from the “printing” of A1 in 2050 to the scanning of A2 in 2060, which I claim are analogous to events in ordinary human survival. Second, the beaming*. By all means, deny that A2 persists through beaming*; but then I say consistency demands that you deny that A1 persists until 2060, and bid goodbye to the Lockean account of ordinary survival. To use the anonymous referee’s example—call it *Butterpillar*—if we stipulate that a caterpillar is not numerically identical with any later butterfly, then scanning the right butterfly to produce a beaming*

loop is possible but would not establish persistence. That's true, but *Butterpillar* is like the rope example except with *two* ropes arranged in a circle so as to look like a single loop. The L-relation is twice broken. In *Loop Alice*, it is the fact of Alice's persistence from 2050 to 2060 that establishes the persistence through beaming*. In *Butterpillar*, the (stipulated) fact of non-persistence through ordinary metamorphosis establishes the *non*-persistence through beaming*. This is consistent with the neo-Lockean account; recall that, as Lewis puts it, "(at least in some respects) there should not be too much change overall."

Epistemological problems remain, of course. But they do not undermine the neo-Lockean account any more than they do in Locke's P and C case. (Wherein the skeptic doubts that the L-relation obtains, not that it is insufficient.) Similarly, Lewis describes the case of *Fred-cum-Sam*, which to a neo-Lockean would look like non-looping time travel, but where, in fact, the exact resemblance between the last stage of future Sam and the first stage of past Fred is pure coincidence [10] (p. 148). To the extent that we don't know how exactly Fred came to be we have reason to doubt that the L-relation obtains. But if it is known that Fred was a beaming replica, where Sam was scanned in the future and the information sent back in time, then the neo-Lockean has the sort of evidence they need. In the case of non-looping beaming*, on the other hand, we would have a replica that is much less exact. In the absence of information about the causal genesis, we would have even less reason than with beaming to believe in persistence because coincidence would be much easier to swallow as an explanation of slight resemblance. But the entire point of *Loop Alice* is to demonstrate that the bonds of resemblance are much looser than neo-Lockeans have typically thought; to demonstrate that the L-relation obtains in a much broader set of possible cases. That includes cases with or without reverse causation: of sudden aging or de-aging, of changing sex or gender, or transitioning even to a temporary duplicate of a member of a different race or species.

8. Generalizing

It is absurd to hold that a material object can persist through beaming* and not beaming. After all, in beaming, there is an even greater similarity between the scanned object and the replica. So I conclude that Loop Alice can persist through beaming. Loop Alice is a person, but she may not be a *human* person or have a *human* body. Nevertheless, she is at each stage of her existence a *duplicate* of a possible stage of a human person with a human body. I cannot think of any reason why a duplicate of my body right now could persist through beaming but my body could not. Material objects are better behaved than that. So, I conclude that I can persist through beaming. As could Parfit.

We can generalize further. I have previously argued that thanks to time travel, a watch could exist in an object loop without reversal or suspension of entropy [9]. Beaming* provides a second way for this to occur since a watch rejuvenation algorithm could coincidentally undo all the changes that occurred as the watch underwent aging. And the same goes for (a duplicate of) WM. Such a monument could be built from a scan received from the future, taken of the older monument, with the scan information run through a monument rejuvenation algorithm. Again, coincidence is required, but coincidence is not logically impossible.

If composite material objects, in general, can persist through beaming* and beaming, then the persistence conditions of material objects do not include spatio-temporal or corpuscular material continuity. I conclude that Neo-Lockeanism—the preservation of the L-relation—is the correct account for all composite objects that undergo intrinsic change. Of course, it would follow that ordinary material objects are subject to all the science fiction weirdness that persons suffer on the neo-Lockean account (see, e.g., Parfit 2012). If you do not welcome that result, let me close with a sweetener employing the recognition that a monument is a monewment.

In 2015, elements of the medieval-minded Islamic State destroyed the temple of Bel in Palmyra, Syria, in particular the Monumental Arch. Maamoun Abdul Karim, the head of the Syrian Department of Antiquities and Museums, described the destruction as a

catastrophe. But the world responded with the Million Image Database Project run by the Institute for Digital Archaeology. According to their website:

The Institute for Digital Archaeology (IDA) is a joint venture between Harvard University, the University of Oxford and Dubai's Museum of the Future that promotes the development and use of digital imaging and 3D printing techniques in archaeology, epigraphy, art history and museum conservation. . . . through its pioneering use of large-scale 3D printing technology, the IDA carries out meticulous and culturally sensitive restorations of objects and architecture destroyed by conflict or natural disaster [11].

In 2016, the IDA produced a replica of the arch, which they hope to eventually donate to Syria. In an interview with *Newsweek*, the IDA's founder, Roger Michel, said (bold emphasis added):

If ISIS is successful in wiping the slate clean and blotting out from the landscape these objects and architecture, it won't be long until people forget that they ever existed. **We can't recover the original Palmyra**, but thanks to the work of IDA, the ancient sites there will still be accessible by the public in some form. And in some cases, the project will even allow for certain sites to be rebuilt. . . . Concrete was one of the most widely used materials in the classical period, so we'd be using essentially the same materials that these structures were built from originally [12].

Perhaps the original Monumental Arch has not been recovered by the IDA's efforts, but if what matters to the persistence of objects like the Arch is the L-relation, then such recovery is possible in principle. And that's nice to know.

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Notes

- ¹ Quasi-memory is like memory in being factive, but (perhaps unlike memory) does not presuppose identity; hence it is available for use in a non-circular analysis of personal identity.
- ² Beaming is a tighter condition than the one Ginet in fact employs, since his seems to allow the possibility of fission cases. I prefer to rule that complication out for now.
- ³ Van Inwagen [3] (pp. 6–12) tells us he agrees with Plantinga's response, but he seems mostly to be agreeing that such objects cannot be stipulated into existence.
- ⁴ Parfit's argument is developed more fully in [8].
- ⁵ There are at least two other ways to interpret Locke's Origin Principle. First, it might be trivial, and so permit spatio-temporally gappy objects. (Since the reappearance of an object would not thereby be a beginning.) Second, it might be substantive, but permit gappy objects, on account of not addressing spatial-temporal gaps at all (saying instead that an object e.g. cannot have two different spatial origins at the same time).
- ⁶ I do not distinguish logical and metaphysical possibility. If you do, feel free to recast the argument in terms of metaphysical possibility.
- ⁷ In choosing these names I was inspired by Lewis [4].
- ⁸ The rope analogy was suggested by Oliver Pooley (personal communication), but he may not agree with my extension of it.
- ⁹ Thanks are due to an anonymous referee whose comments motivated the rest of this section.

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