

## THE NECESSITY OF TIME TRAVEL (ON PAIN OF INDETERMINACY)

The “growing block” account of time has it that though the past is “closed”, the future is “open”.<sup>1</sup> Many propositions about the future (the so-called future contingents) are now indeterminate; but their indeterminacy will only be temporary. That is, for a variety of propositions P,

$\forall$ (it will sometime be the case that P) &  $\neg$ (it will always be the case that  $\forall$ P).<sup>2</sup>

It is now indeterminate whether Tim will travel to Nepal, say. But it will not always be so: sooner or later, he’ll either go or die never having been.

One natural question about the open future concerns the extent (and grounds) of its “openness”. Tim’s traveling to Nepal is a future contingent for obvious reasons: among them, the fact that travel to Nepal is possible. Suppose (as many philosophers do) that *time travel* is also possible. Suppose too that Tim has the means close at hand. Shall we class Tim’s travel to the past alongside his travel to Nepal as a future contingent? Prospects look uncertain. For if Tim travels to 1921, there is a straightforward sense in which *he has already been* “even before he goes” (from the perspective of “external time”). What about the period in Tim’s *personal time* prior to his travels? If Tim has already gone to the past, then it seems—contra the open future hypothesis—that Tim cannot *avoid* traveling into the past. His future, in this respect, is determined.

I want to suggest that the possibility of time travel in the context of a growing block account of time yields a dilemma: Either Tim’s future is determined in an odd way or cases of (temporary) ontic indeterminate identity are possible. Determinacy in the past implies a degree of determinism in the future; indeterminism about the future seeps back to the past.

### *1. Travel in the Growing Block*

Some say that only a “block universe” view, according to which past and future are as real as the present, “can accommodate time travel” (Grey 1999: 56). That looks hasty.<sup>3</sup> Grant that travel to a non-existent future makes as much sense as travel to a non-existent location. Why rule out travel to a real past? The familiar paradoxes of ability provide *general* motivation: Travel to a fixed past, unlike

“The Necessity of Time Travel (on Pain of Indeterminacy)” by Matthew H. Slater,  
*The Monist*, vol. 88, no. 3, pp. ###-###. Copyright © 2005, THE MONIST, La Salle, Illinois 61301.

our usual leisurely travel into an open future, would be overly restrictive (at best) or paradoxical (at worst). For keeping time travelers from doing the impossible seems to require their inability to do the perfectly possible. What “logic-bouncers” prevent time travelers from changing the past? What velvet rope of consistency bars them from doing what they seem perfectly able to do?

Many have accepted David Lewis’s (1976) deflationary answer: nothing stops time travelers from committing paradoxical deeds (from, say, killing their grandfathers). Or as Sider (2002: 116) puts it, *no one thing stops them*: they fall victim to circumstance; they fail for “ordinary reasons”. Since Tim *did not* kill his grandfather, he cannot bring it about that he *did*: “Grandfather lived, so to kill him would be to change the past. . . . It is logically impossible that Tim should change the past by killing Grandfather in 1921. So Tim cannot kill Grandfather” (Lewis 1976: 150)—but merely because the notion of *changing* what already *was* is incoherent. There’s just the past; not (as science fiction often depicts) one past and then another. “Not that past moments are special; no more can anyone change the present or the future” (*ibid*: 150). Lewis dissolves the grandfather paradox by suggesting that time traveling Tim is no more constrained in the past than he is in the future. We may *influence* past, present, and future alike.

*Prima facie*, Lewis’s solution foists on us a block universe account of time. Whether that is really so concerns me not. I want to ask instead whether the intuitions Lewis raises in defense of the possibility of time travel can be adapted to the growing block account sketched above.

## 2. A Curious Discovery

As Tim rifles through newspapers from the ’20s (a favorite pastime), a faded photo catches his eye: it seems to be of Tim himself. How could that be? Tim was born in 1966; the photo dates to 1921. The resemblance is striking but imperfect: Tim has more hair and fewer wrinkles. After ruling out obvious explanations, he considers an unlikely alternative. The mystery man was seen stepping out of a sort of cabinet said to have appeared out of nowhere. Perhaps, Tim thinks, the photo is a photo of *me*! Perhaps I was caught stepping out of a *time machine* in 1921. But Tim’s excitement at the prospect of time travel (all he might do) gives way to a vague unease: if that was *me* back in 1921, am I not *fated* to travel through time? He wonders instead about what he *has done*.

What we make of Tim’s story depends on how we spell out certain details. Declaring that his hunch is *correct* (that it was indeed Tim, not some mysterious doppelganger, skulking about in 1921) seems to fate Tim to time travel sometime in the future. And while that does not straightforwardly contradict the open future hypothesis, it may certainly strike us as odd.

Indeed, it strikes me as a bit odd that writers are seldom fazed by the *phenomenal oddity* of a time traveler doing or looking forward to doing what she has (in the external sense) already done. Such oddity is of course worsened in (common) stories of time travelers interacting not just with members of the family, but younger versions of themselves. For in such cases (barring various psychological lapses) such travelers have *first hand knowledge* of what they have done and hence what they *will do*. Keller and Nelson (2001) offer the example of Jennifer, a glum fourteen-year old who receives a pep-talk from her older time-traveling self:

As a result of the discussion, the girl begins to play tennis, and goes on to win Wimbledon in 1999. She retires, grows old, and on an evening in 2054 she answers the door to a nutty professor [who sells her a time machine], plays with the knobs . . . and disappears. (2001: 336)

The suggestion in this story (as in many) is that the time traveler simply and comfortably “falls into the role”. Variations on this motivation are no doubt possible (perhaps Jennifer thinks that *failing* to deliver the pep-talk she received would “undo” all her success, perhaps she genuinely *wants* to deliver the pep-talk) but the pressing question concerns the freedom of the time traveler to avoid the time travel.

Back to Tim. If the 1921 photograph depicts *him*, then Tim *must* travel through time—open future or not.<sup>4</sup> Suppose that this fatalistic thought propels Tim into abject despair: *he doesn't want to play the role he evidently played*, so he decides to end it all. He buys a rifle; he rents a room; and there he lurks, rifle loaded, sinking deeper, deeper into his depression. . . . Tim can kill himself. He has what it takes. But history records that he *has* traveled and thus *will* travel through time, and thus *won't* kill himself (before time traveling). Hence before his journey takes place, he must fail in his suicide—and for ordinary reasons. No matter what Tim does to avoid the time-traveling cabinet (or indeed *any* conveyance to the past), he must fail to avoid it. If Tim influenced the past, he cannot *avoid* influencing the past. Perhaps his failure to avoid his fate is mysterious, or perhaps his attempts to avoid it themselves result in its realization: After his rifle jams, after Bigfoot breaks a would-be-fatal fall, after countless non-fatal slips on banana peels interfere with otherwise foolproof suicide attempts, Tim tries to suffocate himself in a mysterious cabinet and . . . ZAP! 1921.

Fatalism is mysterious—more so if the future is genuinely open. What resources have open futurists to make sense of it? We must first of all be clear about what needs explanation. The openness of the future, remember, requires only *some* future indeterminacies. *So time travel is not one—so what?* While there may be no fact about whether Tim will travel to Nepal, whether he will travel into the past is now decided. It is his fate one way or another.

We are prepared to accept some instances of fatalism. Mortal beings are fated to die. Their mortality, presumably, inheres in their biology. But what explains Tim's time traveling fate? Nothing about Tim himself. Unlike his mortal fate, nothing about Tim's *metaphysics* credibly explains his time traveling fate. Nothing *causally* explains it. Not to say that we couldn't tell a neat causal *story* connecting events in 1921 to Tim's later travels. Perhaps Tim's curious discovery sets him down the road to constructing a time machine. Such a story would be a sham in this context: we want to know why Tim *cannot avoid* time travel, try as he might to avoid it (whether or not he stumbled upon the photograph). Causally explaining why so and so *is* the case differs from causally explaining why so and so *has* to be the case, why all branches in the open future feature Tim departing for the past.

In reducing the number of "future branches" to one, the block universe account makes a *sort of* fatalism easier to swallow. For there is a story to tell (ironic or not, whether or not we can now tell it) about what leads to Tim's time traveling: if it is a fact that Tim will travel to 1921, then there are facts about the circumstances of travel and how those circumstances came about. But don't say that because Tim *will* time travel that he *can't do otherwise*. According to Lewis, fatalists mistakenly appeal to facts "we count as irrelevant in saying what someone can do" (1976: 151). If, among the many facts about the world is the fact that Tim will travel back in time, then sure enough he will; claiming that (because of this fact) he *can't avoid doing so*, however, mixes things up: "it is an irrelevant fact about the future masquerading as a relevant fact about the past, and so should be left out of account in saying what, in any ordinary sense, I can do" (151). All told, there is nothing very mysterious about the shape such a block universe takes. The question '*why is the story of the universe (as told from beginning to end) consistent?*' doesn't demand a substantive answer.

Proponents of the growing block account have fewer resources for making sense of *any* brand of fatalism, even the commonplace mortal fatalism. The seeds of my destruction are sown into my genes, we might say—but does anything guarantee that those seeds might be "dug up"? A non-mysterious fatalism, for the open futurist, must involve essentialism. My fate depends not on my intrinsic properties—for they may change—but on my *essential* intrinsic properties. Am I essentially biological? I'm not sure. Simply counting among my essential properties *the fate to die* solves little. Not to say that in denying my *essential* mortality I deny that my eventual death is *likely*, or even in *some* sense a "sure thing" (there are several reasons to not bet on my immortality). Saying that it is *fated* however, smacks of hyperbole. How much more, then, does Tim's fate to time travel? For not even essentialism affords a naturalistic explanation of his fate.

### 3. Future Indeterminacy, Past Indeterminacy

According to “open future fatalism”, the future may branch—though *all* branches have Tim traveling back through time. Strange, yes; impossible, no. Perhaps it is just a brute fact about the future that has *no* explanation. Open futurists unwilling to bite this bullet may have an alternative. Rather than simply stipulating that the mystery man (call him ‘X’) is Tim, let us consider things from something like Tim’s present perspective. We know that X appeared, as it were, out of thin air in 1921 with certain distinguishing physical and mental characteristics. X claims to have done things that Tim did. But X also describes some memories that Tim now lacks: falling in with a mysterious temporal cartel, gaining access to a time machine, and so forth. In short, X *seems* to be Tim as he *might be* some time from now. Let us stipulate that these exhaust the relevant facts.<sup>5</sup>

If the future *is* open, then it might happen that, for whatever reason (odd or otherwise), Tim *does* travel back to 1921, having fallen in with a mysterious temporal cartel, having gained access to a time machine, and so forth. Suppose it happens in 2021 just like X describes. And suppose that Tim, at the moment he vanishes, has exactly the same mental states (or whatever is required for agent-identity) as X has at the moment he appears. We might incline on this basis to say that X would be Tim.

Or it might happen that Tim, emboldened by *apparently* cheating his time-traveling “fate”, *decisively* cheats it when he dies in a tragically botched cryogenics procedure attempting to cheat death. Suppose for good measure that no temporal cartel ever forms and no one ever realizes the possibility of time travel. Just what happened in 1921 is a very good question about which we might want to remain silent:<sup>6</sup> did someone really appear *ex nihilo*, out of thin air? Strange, yes; impossible, no. Whatever else we claim about X, I would incline to say that X would not be Tim.

Open futurists claim that things might go either way. If backwards time travel is possible (for Tim), then there is now simply no fact about whether Tim will sometime in the future be somehow conveyed to 1921. Perhaps this counts as reason for thinking that there is *no fact about whether X is Tim*—and not because of our ignorance, unwillingness, or outright inability to settle shallow semantic issues. X is *really* indeterminately identical with Tim. But don’t despair, definitist critics of ontic vague identity: if Tim is mortal, the indeterminacy is *temporary*, lasting only a century.

Small consolation for the definitists; or little concern, as they may follow Evans (1978) in regarding any sentence of the form ‘ $\forall(a=b)$ ’ (where ‘a’ and ‘b’ are directly referential) as “straightforwardly” contradictory. But, of course, the proof and its variant successors are controversial. Against the general claim that

identity is never *really* vague, indefinitists proffer a variety of problem cases, suggesting that the onus rests on the definitist to explain how (short of admitting ontic vague identity) to make sense of them. Of course whether a case strikes one as a case involving vague identity depends on one's metaphysics. For this purpose, van Inwagen (1990: 241) invents his Cabinet: an “infernal philosophical engine” designed to produce cases of indeterminate identity for whatever theory of personal identity *you* hold. Someone named ‘Alpha’ steps in, someone named ‘Omega’ steps out. In the meantime, you adjust the dials to affect *just enough* change in whatever is relevant to personal identity so as to make it indeterminate whether Alpha is Omega.

Of course, definitists will regard this device as a cheat: anyway, it doesn't show that there could be cases of ontic vague identity. For presumably definitists will abjure an account of personal identity vulnerable to indeterminacy no matter how sensitively one twiddles the Cabinet's dials: there will always be a fact of the matter about whether Alpha is Omega, even if such a fact remains hidden from us. But now consider the time-traveling cabinet: if it really is now indeterminate whether Tim will enter it (and be thusly conveyed to 1921), it is really indeterminate whether Tim is X—and no secret facts are (now) available to settle the matter. Suppose you are an epistemicist about personal identity insofar as you hold that it requires *perfect* mental continuity. Such an account will be impervious to PVI-Cabinet-generated indeterminacy—either you keep all your memories undisturbed or you don't (whether or not anyone knows it).<sup>7</sup> Hard facts underlie hard cases—so far—but there may be *no facts* about what Tim's mental states will be like in the future. Hence there are no facts about whether X is Tim. Only time will tell.

Hard core epistemicists may of course simply deny that there are no facts about what Tim's mental states will be like in the future. No surprise that they will be resistant to the very idea of a future contingent (as characterized here). But many philosophers may harbor a merely *de facto* epistemicism, as a contingent feature of their account, not as a “meta-doctrine” constraining all of their theories. They may cleave to both the perfect memory continuity account and the open future. I want to suggest that they must give up one or the other. Their epistemicism either collapses or agglomerates.

But even if a friend of time travel and the open future takes vague identity in stride, it seems that the characterization of the fixed past has to change. Above I suggested that the fixity of the past implied the permanence of past non-epistemic and non-semantic indeterminacies—that for all propositions P,

if it was sometime the case that VP, then it is henceforth always the case that VP

But the philosopher who happily takes on board all these claims (the open future, the possibility of time travel, and certain accounts of personal identity)

seems bound to admit the possible truth of the antecedent and falsity of the consequent for at least one of these propositions: it *was* the case that  $\forall(\text{Tim} = X)$  but it's not the case that it *will always be* indeterminate whether  $\text{Tim} = X$ . Not all past ontic indeterminacies are permanent, contra the natural stance about time.

#### 4. Conclusions

I have suggested two problems for a natural stance about time and its compatibility with backwards time travel: that it implies either an inexplicable fatalism or ontic vague identity. For either it is determinate whether  $X$  is  $\text{Tim}$  or it isn't. If it is determinate whether  $X$  is  $\text{Tim}$ , then it is determinate whether  $\text{Tim}$  will travel through time to 1921: if he will, he can't avoid it; if he won't, he can't manage it. Whether or not this is absurd, it seems to conflict with intuitions about what an open future would be like (how constrained we would be). Its being indeterminate whether  $X$  is  $\text{Tim}$ , on the other hand, conflicts both with powerful arguments against ontic vague identity and a natural reading of the fixity of the past: the past would not *remain* indeterminate. Of course, the complexity of the dialectical terrain cautions against very secure conclusions: I have no doubt that each view could be (and indeed has been) finessed in such a way as to landscape things differently. And perhaps my conclusions would be welcomed by fatalists or friends of vague identity alike. It at least invites notice that what seems like a natural view about time and the possibility of backwards time travel has rather counterintuitive (and controversial) consequences.<sup>8</sup>

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#### NOTES

1. See Broad (1923) and Tooley (1997) for representatives of something like this view.

2. Where '∇' is a sentential operator meaning 'it is indeterminate whether'. It should be noted that Open Futurists may decline this characterization of their view. Similar cautions apply throughout, for the positions involved do not admit much consensus.

3. What I call the "block universe" view, Grey calls the Parmenidean view. I ignore finer questions about the truth of this equivalence. For a critique of this claim, see Keller and Nelson (2001).

4. Casati and Varzi (2001) note essentially this point when they write on the part of a "Review Committee", denying an application for Time Machine funding on fatalistic grounds: "If in order to travel to the past one has to have been there already and

if one can only do what has already been done, then *à quoi bon l'effort?*" (584). I must also assume here that Tim is not the sort of person who merely has disconnected stages, not due to travel.

5. Put thusly, we might even claim that it is now indeterminate whether time travel has taken place. Then, how did X get to 1921? All we can say is that he appeared. Some will say that if X is to have *traveled* to 1921 from some other time, he must have passed through other times (as I must pass over ocean to reach Australia). Instantaneous travel—my disappearing here and now and arriving there and now+ $\delta$ —is at best not travel (call it teleportation if you like) and at worst death and duplication. But never mind. Teleportation is good enough for me; time teleportation better still. If a dinosaur safari is worth the risk, then it's worth the risk that my metaphysics of personal identity is wrong (at least whoever arrives won't know any different). To simplify, I further stipulate that (for technical reasons beyond the scope of this paper) if time "travel" is possible, it must occur instantaneously. If I was a time-traveling four-dimensional streak, I'd be broken rather than zig-zag.

6. Following van Inwagen's advice about a related case (1990: 188).

7. Such a person (if he valued his life) might attempt to keep awake and lucid, lest he cease to exist. Whether anyone actually entertains such a preposterous account, of course, matters not. One can adopt any other definitist account of identity as desired.

8. Thanks go to Andrea Borghini, Chris Haufe, Giuliano Torrengo, Achille Varzi, and Neil Williams for suggestions that improved this paper.

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