Future Contingents and the Logic of Temporal Omniscience

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At least since Aristotle's famous 'sea-battle' passages in *On Interpretation 9*, some substantial minority of philosophers has been attracted to what we might call the doctrine of the *open future*. Open future views (of the sort in question) maintain that future contingent statements—roughly, statements saying of causally undetermined events that they will happen—are never true. Some such views have it that future contingents are neither true nor false; others maintain that they are instead simply false.¹ Both views, however, face a problem: *prima facie,* they seem inconsistent with what John MacFarlane has called the *determinacy intuition*—the intuition, roughly, that if something *has* happened, then (looking backwards) it *was* the case that it *would* happen (MacFarlane 2014: Ch. 9). According to MacFarlane, the *indeterminacy* intuition has it that, looking backwards, they were. This tension forms, in large part, what might be called *the problem of future contingents*.

Some philosophers respond to this tension by saying that one or the other such intuitions must simply be denied. The dominant trend in semantic theorizing about future contingents, however, seeks maintain *both*. Theorists in this tradition — paradigmatically, Thomason (1970) and MacFarlane himself (2003, 2014) — have argued that the apparent tension between the "open future" and the "determinacy intuition" is in fact merely apparent.² In short, such philosophers seek to maintain *both* of the following two theses:

Open future: Future contingents are not true.

Retro-closure: From the fact that something *is* true, it follows that it *was* the case that it *would* be true.

¹ For the former sort of view, see, e.g., Thomason (1970) and MacFarlane (2003). For the latter "all false" approach, see Hartshorne (1965), and Prior's "Peircean" semantics in his (1967: 128-135); for a different version of this approach, see Todd (2016a), and for criticism, see Schoubye and Rabern (forthcoming). ² For a sample of others authors in this tradition, see Belnap and Green (1994), Belnap, et.al (2001), Brogaard (2008), Markosian (2013), Strobach (2014), and Santorio and Cariani (2017). Certain interpretations of Aristotle also fall within this tradition (cf. Thomason 1970: 281). Of course, these authors do not all pursue this reconciliation strategy in precisely the same way.

In this paper, we contend that the conjunction of these two theses, while formally consistent, nevertheless is faced with a substantial, unnoticed cost. Our argument, in short, is that such a conjunction makes questionable predictions about what we'll call *the logic of temporal omniscience*.

It is well-known that reflection on the problem of future contingents has in many ways been inspired by importantly parallel issues regarding divine omniscience, indeterminism, and time. Arthur Prior, whose work figures centrally in these debates, was explicitly motivated by the problem of divine foreknowledge and human freedom, drew inspiration from ancient and medieval discussions of this problem, and formulated various positions regarding future contingents (e.g., "Ockhamism", after William of Ockham) with an explicit eye towards how they might resolve it.3 The current paper is, in a sense, a continuation of this Priorean project one he most rigorously pursues in his 1962 paper, "The Formalities of Omniscience". Our contention is this. Once we take up this perspective, and ask what accepting both the open future and retro-closure predicts about *divine omniscience*, we'll see that there is something deeply counterintuitive about such views. In the context of divine omniscience – that is, in the context of a perfect knower - such a conjunction would predict-short of changing the past-that a perfect knower would correctly regard his or her former self as having been ignorant of a truth. And it is not clear that this is the correct result. Notably, however, the considerations we adduce below needn't be viewed through the lens of philosophy of religion. When we theorize about a perfect knower, we are theorizing about what an agent ought, and ought not, to believe. Thus, if there isn't an acceptable view of ideally rational belief given the assumptions of the open future and retro-closure, this casts doubt on the conjunction of those assumptions.

Our aim in what follows is to more fully unpack this problem for any view that wishes to maintain *both* the open future *and* retro-closure. The plan of the paper is as follows. First, we briefly explain the theoretical and formal underpinnings of the "open future" and "retro-closure" theses, and explain how various prominent views in the literature have attempted to maintain both. We call the resulting view *open-closure*. We then consider, in turn, two different models of a perfect knower suggested by open-closure, and contend that neither such model is attractive. On the first model, the perfect knower is taken to be *omni-accurate* in a strict sense, and we maintain a tight formal equivalence between future contingency and divine anticipation. Since this is, we think, a deeply attractive picture of a perfect knower, the bulk of our paper is devoted to showing that the open-closurist cannot plausibly accept it – and this is the primary cost for the open-closurist we aim to bring out. Open-closure seems to predict, by itself, that there is no

³ Cf. Hasle (2012), Uckelman (2012), and Øhrstrøm (2016).

omni-accurate being, and this is objectionable. However, we go on to consider a different conception of a perfect knower that forgoes strict omni-accuracy, and we contend that, even here, the open-closurist's position is faced with substantial costs.

The Open Future and Retro-closure

The open futurist contends that future contingent statements are not true. Underlying their view is a familiar *model* of the future. Roughly, that model is this: *indeterminism plus no privileged branch*. In the context of causal indeterminism, we have various "branches" representing causally possible ways things might go from here, consistently with the past and the laws. The open futurist contends not only that there *are* these branches, but that no one branch is "metaphysically privileged" as regards the others. Future contingents, however, could only be true if one particular branch *was* so privileged. Future contingents are therefore not true.

But now consider *retro-closure*. Here we introduce the standard tense-logical operators, P ("was") and F ("will"). In this notation, the retro-closure principle amounts to the thesis that every instance of the following schema is true:

$\phi \rightarrow PF\phi$

In order to motivate retro-closure, theorists often point to standard things we say in various conversational contexts. In particular, if someone makes a prediction, and that prediction in fact comes to pass, we may say something like, "You were right!" And this practice seems to presuppose the validity of the retro-closure principle. For instance, in support of retro-closure, MacFarlane writes: "It seems clear that tomorrow we will know more about which of the various possible future contingencies facing us at present were realized. For example, if it is sunny, we'll look back and say, "Yesterday it was the case that Berkeley would be sunny now."" (2014: 212)

Now, again, some theorists see a tension between open-future and retro-closure, and accordingly adopt one in preference to the other.⁴ But many seek to maintain *both*. Call the

⁴ In particular, given causal indeterminism, we have three models of the future to consider:

⁻ *Indeterminism plus a privileged branch.* Here we deny the open future, but we secure retro-closure. This position is often called "Ockhamism."

⁻ Indeterminism plus no privileged branch without retro-closure. Here we affirm the open future, but deny retro-closure. (Hartshorne 1965, Prior 1962 and 1976)

⁻ Indeterminism plus no privileged branch with retro-closure. Here we maintain both.

conjunction of these two views *open-closure*. Roughly, open-closurists agree with the following thought: looking forwards, there is no privileged branch. Accordingly, looking forwards, future contingents are not true. However, looking *backwards*, there is, now, a privileged way things *went* to get us to here; accordingly, when we "go back" to a point in the tree (as commanded by the **P** operator) to evaluate a formula such as **F** ϕ , we *do* at that point have, in some sense, a privileged branch of evaluation, viz., the one we took to get us to back to that point. In short, when we have a simple formula **F** ϕ , and no privileged branch, and ϕ on some but not all branches, the semantic clauses (for one reason or another) do not deliver a truth. However, when **F** is embedded under **P**, the semantic theory (in one way or another) tells you: return from whence you came, and check whether ϕ .⁵ Accordingly, ϕ will imply **PF** ϕ , in accordance with the intuitions supporting retro-closure, and yet we still maintain the doctrine of the open future. Problem solved – or so it seems.

The logic of temporal omniscience

The initial argument of this paper depends on a crucial idea: the "logic" of future contingency should, in some sense, match the logic of divine omniscience. The important connection between these topics is sometimes noted in the literature on future contingents. For instance, Per Hasle and Peter Øhrstrøm write the following:

The medieval discussion regarding the logic of divine foreknowledge is, from a formal point of view, very close to the classical discussion concerning future contingency. If we add the assumption that necessarily, something is true if and only if it is known to God, then it is easy to see how the discussion regarding the logic of divine foreknowledge is, from a formal point of view, essentially the same discussion as the classical discussion concerning future contingency. This was clearly realised by the medieval logicians. (2015)

However, even if this result was realized by such logicians, its import has *not*, we intend to show, been adequately appreciated by contemporary theorists working on these topics.

Of course, much more could be said about the metaphysical and semantic frameworks implicit in the first two models, but we set these issues aside.

⁵ The views that adopt the so-called "supervaluational" method (Thomason 1970; MacFarlane 2014) validate retro-closure, since for them truth at a context is defined as satisfaction by all the worlds that overlap – share a past and have the same laws – at the context. Since if ϕ is true at c, then every world that overlaps at c has a past that has a future that features ϕ , it follows that **PF** ϕ is also true at c.

The formal equivalence suggested by Øhrstrøm and Hasle might be developed in different ways. In what follows, we develop it primarily by means of an equivalence between ϕ and *God believes* ϕ – and, in turn, an equivalence between $F\phi$ and *God anticipates* ϕ , and $P\phi$ and *God remembers* ϕ .⁶ More particularly, first we assume the following:

Omni-accuracy: ϕ if and only if God believes ϕ (abbreviate: $\phi \leftrightarrow \text{Bel } \phi$)

And by extension:

 $F\phi$ if and only if God believes $F\phi$.

Further, we assume that for God to believe that something will happen just is for God to anticipate it. Thus:

 $F\phi$ iff God anticipates ϕ .

For example: if the Sun will engulf the Earth, then God anticipates that the Sun will engulf the Earth, and if God anticipates that the Sun will engulf the Earth, then the Sun will engulf the Earth. The same points can be made as regards the past:

Pφ iff God believes **P**φ.

And by an equivalence of God's past-directed beliefs and his remembrances, we have:

 $\mathbf{P}\phi$ iff God remembers ϕ .

⁶ The conception of God we are working with in this paper is one in which God exists *in time*, not "outside of time". (Cf. Prior 1962: 116.) Within the philosophy of religion, there are two conceptions of "divine eternity": one on which God is *sempiternal* (exists at all times) and one on which God is atemporally eternal (exists outside of time). Here we assume sempiternalism; God's omniscience is *temporal* omniscience. For a classic discussion of these issues, see Stump and Kretzmann (1981); see further Pike (1970) and Leftow (1991).

For example: if there was a giant meteor impact 3.5 billion years ago, then God remembers the meteor impact, and if God remembers that there was a meteor impact 3.5 billion years ago, then there was a meteor impact 3.5 billion years ago.⁷

Letting 'Ant' and 'Rem' be divine anticipation and remembrance operators, respectively, we have the following principles:

 $P\phi \Leftrightarrow \operatorname{Rem} \phi$ $F\phi \Leftrightarrow \operatorname{Ant} \phi$

Given the validity of these principles we can substitute and preserve truth.⁸ For example, it follows that:

$FP\phi \Leftrightarrow Ant(Rem \phi)$

And thus given a principle of tense-logic such as $[\phi \rightarrow FP\phi]$, we have:

 $\phi \rightarrow Ant(Rem \phi)$

More naturally: if ϕ , then God anticipates remembering that ϕ . For example: if a sea-battle is ongoing, then God anticipates remembering the sea-battle. Intuitively, this is, and would be, precisely the logic of temporal omniscience. The principle captures a natural thought: anything that happens will always be remembered by God.

Now, we could, of course, detain ourselves for some time developing the parallels between various principles in tense-logic with their "theological" counterparts; we believe that these parallels deserve a more thorough treatment than that which we propose to give them in this paper. (On this approach, we transform the logic of the tenses into the logic of divine anticipations and remembrances.⁹) Instead, we cut to the chase, and consider the theological

⁷ Strictly speaking, we are talking about what God *seems* to remember – or God's *apparent* memories. "Remembering that..." is arguably factive, so one can't remember an event that didn't take place. But for God any *apparent* (or "quasi") memory is also accurate.

⁸ To be clear, just as with the retro-closure principle, the claim here is not merely that these biconditionals are true; it is that the schemata are valid in the sense that they hold for any sentence ϕ and for all worlds and all times. This strong equivalence vindicates the substitution.

⁹ Note, for instance, how we might naturally enrich the approach with standard Priorean metric tense operators, where **P**n ϕ stands for "Was *n* units of time ago that ϕ ", and "**F**n ϕ " stands for "Will be *n* units of time hence that ϕ ". For instance:

counterpart of the *retro-closure* principle (which is, intuitively, the temporal mirror of the principle just considered), viz.:

$\phi \rightarrow \text{Rem}(\text{Ant }\phi)$

More naturally: if ϕ , then God remembers anticipating that ϕ . For example: if there is a sea-battle (ongoing), then God remembers anticipating that sea-battle. Here we have, then, a principle with direct and obvious implications for the traditional picture of divine foreknowledge – and a principle whose implications have been debated for millennia. From the fact that something has happened, does it follow that God has always anticipated it? This is, of course, the traditional, orthodox position on divine foreknowledge, and this implication would certainly be accepted by contemporary proponents of such orthodoxy (e.g., Plantinga 1986) – and it certainly would have been accepted by Ockham. Indeed, the principle arguably encapsulates precisely the spirit of Ockham – and other defenders of the traditional picture of divine foreknowledge. When Augustine complains (in *On Free Choice of the Will*) that it would be absurd to deny that God has foreknowledge, precisely his complaint is that it would be absurd to deny that there are things that happen which God hasn't always known (viz., anticipated) would happen.

Such a principle, of course, has its defenders, and its attractions (both theological and otherwise). But such a principle seems plainly to be in tension with the doctrine of the open future. For recall *that* thesis (unpacked slightly more):

If $\mathbf{P}n\phi$, then God remembers that n units of time ago that ϕ , and if God remembers that n units of time ago that ϕ , then $\mathbf{P}n\phi$.

If $\mathbf{F}n\phi$, then God anticipates that in n units of time that ϕ , and if God anticipates that in n units of time that ϕ , then $\mathbf{F}n\phi$.

And consider the tense-logical formula:

 $FnFv\phi \rightarrow Fn+v\phi$ (If it will be in n units of time hence that it will be in v units of time hence that ϕ , then it will be in n + v units of time that ϕ .)

The principle seems intuitive, as does its "theological" counterpart:

AntnAntv $\phi \rightarrow$ Antn+v ϕ (If God anticipates that in n units of time that God will [then] anticipate in v units of time that ϕ , then God anticipates that in n + v units of time that ϕ .)

For instance, if today God anticipates that tomorrow he'll anticipate a sea-battle the next day, then today God anticipates a sea-battle in two days.

Open Future: For some ϕ , it is not true that $\mathbf{F}\phi$, and not true that $\mathbf{F}\neg\phi$.

And, crucially, given our equivalencies, we have:

Open Mind: For some ϕ , it is not true that **Ant** ϕ , and it is not true that **Ant** $\neg \phi$.

Which is to say: the future is open, even to an omniscient being. On this view, it may not be true, for example, that God anticipates a sea-battle. However, retro-closure seems to imply that, if a sea-battle comes to pass, then God should *remember* anticipating a sea-battle. The tension might be brought out my means of the following dialogue:

Us: God, do you anticipate a sea-battle tomorrow?

God: It is not true that I do.

Us: Do you anticipate there not being a sea-battle tomorrow?

God: It is not true that I do.

Us: So you're saying that the future is open.

God: Precisely.

[... Time passes, and a sea-battle rages]

Us: God, did you anticipate there being a sea-battle?

God: Yes, of course I did.

But here God is simply lying – or God has changed the past. If we assume that neither is possible, then the implication is that the open future is inconsistent with retro-closure. Intuitively, the open future licenses God's initially maintaining that it is not true that he has the anticipation. But retro-closure licenses God's maintaining that he had it all along. It seems that something has to give.

Consider, then, the following argument:

1. $\mathbf{F}\phi \leftrightarrow \mathbf{Ant} \phi$ (assumption: omni-accuracy)2. $\mathbf{P}\phi \leftrightarrow \mathbf{Rem} \phi$ (assumption: omni-accuracy)3. $\phi \rightarrow \mathbf{PF}\phi$ (assumption: retro-closure)4. $\phi \rightarrow \mathbf{Rem}(\mathbf{Ant} \phi)$ (1,2,3, substitution of equivalents)

According to (4), everything has been anticipated by God. But this clashes with the intuition that when God faces the open future—and sees that things could go so that ϕ or so that $\neg \phi$ —it is not true that God anticipates that ϕ and it is not true that God anticipates that $\neg \phi$. The clash between these two claims is precisely the tension that arose in the dialogue above. Thus there is a challenge for the open-closurist: they must explain how it is that God could have the set of seemingly impossible attitudes exemplified in the dialogue above, or they must deny omniaccuracy (or its trivial consequences in terms of anticipation and remembrance). The former seems like a tough row to hoe. Thus, what our argument plausibly shows is that the intuitive "formal equivalence" between the logic of future contingents and the logic of divine omniscience must be denied by open-closurists. And this is, we think, a significant theoretical cost of such an approach.

Indeterminacy in the divine mind?

But perhaps we are going too quickly. Recall the thought that drove the tension in the dialogue above. Intuitively, it seems unacceptable that God should first admit that it is not true that he has the given anticipation, but then later (correctly!) maintain that he had it all along; *prima facie*, this seems like an unacceptable form of changing the past. Perhaps, however, some may say that, once we appreciate the kind of *indeterminacy* of God's mind implied by their view, this sort of "change" becomes more palatable. Consider the familiar view that future contingents are *neither true nor false* – they possess an indeterminate truth value. Such theorists may contend that if (a future contingent such as) 'F¢' is indeterminate, then 'Bel F¢' should *likewise* be indeterminate—it is *not true*, but nor is it *false*.¹⁰ On this approach, if God seems to "deny" that he

¹⁰ This option is related to issues explored in Hawthorne (2005), "Vagueness and the mind of God". Hawthorne's project is deeply similar to our own. For Hawthorne, we ask what certain theories about *vagueness* predict about divine omniscience, thereby testing those theories; in our case, we ask what a given theory about future contingency predicts about divine omniscience. More generally, Williams (2014)

anticipates a sea-battle, he should be understood as simply denying that it is true, but not as affirming that it is false, that he anticipates a sea-battle.

According to this strategy, then, it is indeterminate whether God anticipates a sea-battle, and indeterminate whether God anticipates the lack of a sea battle. ¹¹ On perhaps the most natural development of this approach, one and the same state of God's mind counts as the anticipation of one or the other, but it is metaphysically indeterminate which. (If someone complains that this is mysterious, one replies that *so is omniscience.*) But the coming to pass of a sea battle *resolves the indeterminacy*, and retro-actively constitutes the (prior) state of God's mind as having been the anticipation of a sea battle. Prior to the sea battle, no one (not even God!) can tell whether the relevant mental state is the anticipation of a sea battle transpires, God's mental state *had been* (all along) the anticipation of a sea battle. Thus, in an important sense, what we do *now* determines which mental state God had been in – the belief-state that we would battle, or instead the belief-state that we would not battle.

Now, such a picture is, of course, mysterious—but the important point is that the openclosurist (who believes that future contingents are *indeterminate*) may say that it is *less* mysterious than a picture on which it is simply *false* that God anticipates future contingents, but *also* that anything that happens had always been anticipated by God. On *that* picture, we get a much stronger form of "change in the past" than a view on which God's mind is somehow indeterminate. The former view requires a change from God determinately *not* anticipating something to having (all along) anticipated it, whereas the view under consideration requires only a change from it being *indeterminate whether* God anticipates something to God's having anticipated it. And perhaps one might say that there are resources available for understanding this latter sort of change that are not available in understanding the former. (After all, the supervaluationist already makes analogous claims about future contingents.)

Perhaps. Still, there are problems with such an approach. Here we consider two in particular. First, note that *everyone* agrees with the following thought: ϕ does not imply *it was causally determined that it was going to be that* ϕ ($\mathbf{P} \Box \mathbf{F} \phi$). (We return to this point below.) In an indeterministic setting, plainly, the mere happening of an indeterministic event at *t* cannot imply that this event had in fact previously been determined to occur at *t*. This is the uncontroversially

explores, sometimes *via* consideration of a God-like agent, which theories of rational belief are best paired with certain accounts of indeterminacy.

¹¹ One might find independent support for this stance on God's mind in Caie (2012). Caie argues that if ϕ is indeterminate, then a rational agent ought to be such that it is indeterminate whether he or she believes that ϕ . Thus, it would follow that when God, a perfectly rational agent, faces the open future, it is indeterminate what beliefs God has about the future.

bad sort of "changing the past" that no mere semantic theory of future contingents can countenance.¹² Thus: ϕ does not imply $\mathbf{P} \Box \mathbf{F} \phi$. But now note what God seems to be telling us on this approach. God is telling us that, right now, looking forwards, since it isn't true that $\Box \mathbf{F} \phi$ (in other words, since we have some branches that feature ϕ , and others that do not) it is also not true that he anticipates ϕ . Now, such a posture seems *prima facie* reasonable. But now combine this contention with what God is telling us about *yesterday*. God maintains that *yesterday*, although then it wasn't *determined* that it was going to be that ϕ – and why is it that though you pulled this trick off yesterday, you cannot pull it off *today*? Consider, in this light, the following dialogue:

Us: Do you anticipate a sea-battle tomorrow?

God: It is not true that I do, nor true that I don't.

[...time passes, and a sea battle rages]

Us: Did you anticipate the sea-battle?

God: Yes, sure I did. [PAnto]

Us: But yesterday it wasn't then determined that there would be a sea battle today, right?

God: Right. $[\mathbf{P}\neg \Box \mathbf{F}\phi]$

¹² There is a related issue concerning the coherence of backward time travel in an open future framework. Say that at t an Obama doppelgänger (call him Obama*) seemingly pops out of nowhere claiming to be Obama and claiming to have time-traveled from the future. While perhaps Lewis is right that certain models of time travel are coherent, it isn't clear that Lewisian time travel is coherent in a branching world. Is Obama* identical to Obama? That seems to depend on whether or not Obama eventually gets into a time machine. But then at t it is metaphysically indeterminate whether Obama* is identical to Obama. And worse, once the future has unfolded and, say, Obama does in fact time travel backwards at some later time t, it will no longer have been indeterminate at t whether Obama* was identical to Obama—the identity determinately held all along. Thus, unless Obama is destined to time travel, for him to time travel given the open future would require unacceptable changes in the past. See Slater (2005) for discussion of these issues.

Us: So yesterday you anticipated the sea-battle, even though it wasn't determined that there would be a sea-battle?

God: Right. $[\mathbf{P}(\neg \Box \mathbf{F}\phi \land \mathbf{Ant}\phi)]$

Us: So how then did you anticipate the sea-battle?

God: Well, it's like this. Yesterday, I had what can only be described to you, a mere mortal, as the possession of a crystal ball. That's how, yesterday, I was able to know what would be happening today.¹³

Us: So you have crystal ball vision of the future? That is, vision of the distant, undetermined future?

God: Well, yesterday I had a crystal ball vision of today's sea-battle. But, today, it is not true that I have crystal ball vision of which particular events will be happening tomorrow.

Us: What? What happened? Yesterday your crystal ball enabled you to have access to today, but today it isn't true that your crystal ball allows you to have the same kind of access to tomorrow?

God: Sad, but true.

But this asymmetry seems unprincipled. If yesterday God was able to anticipate what would happen today, although these facts were then causally undetermined, then today it shouldn't be *indeterminate* whether (or false that) God has some particular anticipation regarding tomorrow. More generally, if *right now* God says, "Since it isn't determined that there's going to be a seabattle, it isn't true that I anticipate one!", then it seems that God should also be saying, "Since it *wasn't* determined that there was going to be a sea-battle, it wasn't true that I anticipated one!" Otherwise, we get an unprincipled (and unexplained) change in the implied divine methodology

¹³ Cf. Ockham's own famous admission on this score: "It is impossible to express clearly the manner in which God knows future contingents." (Ockham in Adams and Kretzmann 1969: 50)

concerning the "discovery" of future contingents. God cannot credibly maintain that he cannot now do precisely what he maintains that he had previously done.

The second problem arises if we assume that God can *act* on the basis of his beliefs about the future.¹⁴ Consider:

Us: Do you anticipate a sea-battle next year?

God: It is not true that I do, nor true that I don't.

Us: What would be rational for you to do, if you did anticipate a sea-battle next year?

God: I would employ 1000 workers from Tyre to take those stones in the quarry to construct a wall around the city.

Us: And peace?

God: I would employ 1000 workers from Sidon to take those same stones and instead construct a temple in the center of the city.

Us: Are you currently doing either of those things?

One possibility at this stage is for God simply to say *no*: the indeterminacy of his anticipations does not extend to the indeterminacy of his *plans*. Such a position, combined with retro-closure, encounters a severe version of the difficulty to be noted shortly. So instead suppose God says:

God: It is not true that I am, nor true that I am not.

Such a posture is, of course, difficult to comprehend. God maintains that it is neither true nor false that he is employing 1000 workers from Tyre to build a wall using some given stones, and also neither true nor false that he is employing 1000 different workers to use those same stones

¹⁴ Note: there are well-known difficulties associated with the idea of God acting on the basis of such beliefs. But these difficulties arise only on *Ockhamist* assumptions about those beliefs (viz., that they are both infallible and *comprehensive*). (See, for instance, Hasker 1989, Hunt 1993, and Robinson 2004.) The openness of the future, however, removes these difficulties, since these beliefs will not be comprehensive – and so it would seem *ad hoc* to deny that God could act on the basis of his beliefs about the future.

instead to build a temple. Needless to say, this is puzzling. (For instance: what does the city look like right now?) But this is not all. For on either such approach, we get a problem like the following:

[... a year passes, and a sea-battle rages]

Us: Did you anticipate a sea-battle a year ago?

God: Yes, sure I did.

Us: Then why didn't you employ those 1000 workers from Tyre to construct a wall around the city? The rampaging army will be here soon!

Needless to say, such a question seems reasonable. How does God respond, according to the open-closurist? Does God say:

God: What? Behold: there indeed have been workers from Tyre building such a wall with those stones over the past year; haven't you noticed the influx of Tyronians? Fear not: the wall is in good stead (and this is why there is no temple in the center of the city). After all: I anticipated this sea-battle.

Us [dumbstruck]: Oh my God, look at the wall!

But surely this is unacceptable. For suppose that, instead of the commander declaring war, that commander had instead commanded peace. Then God would have instead had to say:

God: What? Behold: there indeed have been 1000 Sidonians in the city using those stones to build a temple in the center of the city (that is, after all, why there is no wall around the city). Worry not: the temple is in good stead. After all: I anticipated precisely this peace.

And it is fundamentally unclear how one and the same set of circumstances could resolve itself into the correctness of *both* of these speeches: if we get war, then God will be able to make the first speech, and if we get peace, God will be able to make the second. This seems unacceptable

- if not simply impossible. Needless to say, these dialogues raise a great many questions, not all of which we propose to address. We simply note the following: it is unclear how they could have adequate answers.

In sum, it would seem that any version of open-closure that *also* maintains omni-accuracy will have to make sense of the following pattern of divine response:

Us: Do you anticipate ϕ ?

God: It is not true that I do.

[...time passes, and ϕ comes to pass]

Us: Did you anticipate ϕ ?

God: Yes.

And it is unclear how we might make sense of this pattern. It is worth searching for a different approach.

Interlude: Anticipation and Belief: the hard facts

At this stage, we wish to pause to consider an important assumption on which the arguments of this paper rely. This assumption is that whether someone believes that something will happen is a "temporally non-relational" affair, in the following sense: whether that person counts as believing that the relevant event will happen is not (even in part) determined by whether that event will happen. In other words, "belief" and "anticipation" would seem to be "current time-slice" affairs: in order to tell whether a person has or lacks a given anticipation at t, one needn't consult what's going on at any other time than t - at the very least, one needn't consult any time in the *future* relative to t. Belief and anticipation are, in this sense, both temporally non-relational as regards the future. (Hereon, we simply say "temporally intrinsic".) In this respect, they differ importantly from *correct belief*. For whether one counts as *correctly believing* that an event will take place is, at least in part, a matter of whether in fact it will take place.

What is the point here? The point is that since *anticipation* is temporally intrinsic, *God's anticipations* – if indeed they are anticipations – are temporally intrinsic. Thus, the assumption of omni-accuracy implies the following result: a temporally intrinsic affair (**Ant** ϕ) is equivalent to a temporally-*relational* affair (**F** ϕ). (Plainly, whether **F** ϕ counts as true is, at least in part, a matter of whether it will come to be that ϕ .) And it is precisely the assumption of this equivalence that allows us to bring out the relevant costs for the open-closurist. Once we "connect" **F** ϕ to a temporally *intrinsic* fact at a time (**Ant** ϕ), then we are in better position to see the intuitive costs associated with open-closure. For instance, it is precisely because we intuitively judge that **Ant** ϕ is temporally intrinsic that we have such a difficult time accepting God's position in the given dialogue. If God says that it is not now true that he has a given anticipation – and whether one counts as having an anticipation at a time is solely determined by facts at that time – then it seems that subsequent events are simply *irrelevant* as concerns whether he had it; in particular, subsequent events cannot, in themselves, bring it about that he did. Hence the unacceptability of God's saying, *now*, "Sure I did!"

Here we can make a useful comparison with the case just considered: just as, in an indeterministic setting, ϕ cannot imply $\mathbf{P} \Box \mathbf{F} \phi$, without an unacceptable form of changing the past, so it is that in an "Open Mind" setting, ϕ cannot imply **PAnt** ϕ , without a similarly unacceptable form of changing the past. However, it seems that what one says about **Ant** ϕ , one should similarly say about **F** ϕ . After all, at least initially, the assumption of their equivalence seems perfectly harmless, and perfectly natural. (We return to this theme below.) If one's setting, ϕ should not imply **PF** ϕ . And so we deny retro-closure.

At this stage, however, we must bring out a crucial set of issues that some readers may have already felt belong at center stage: the distinction, in contemporary debates about foreknowledge and free will, between so-called "hard" and "soft" facts about the past. Here it is critical to appreciate the following point: in Nelson Pike's 1965 version of the argument for the incompatibility of foreknowledge and freedom (which gave rise to the soft/hard distinction), the focus is on God's *beliefs*, not God's *correct beliefs*. In particular, the focus is on the assumption that, in the past, God had a certain *belief* about a particular future action – and the contention is that, since the past is unpreventable, and *God believes* ϕ entails ϕ , any such action inherits precisely the same unpreventability that attaches to the fact that God once believed that ϕ .¹⁵ And the reason the focus has been on God's *beliefs* is simple: according to Pike, and others, *belief is a temporally-intrinsic affair* – or a so-called (by Pike) "hard fact" at the time at which it is held, whereas "correct belief" is not.

But now the worry. In developing different strategies of reply to Pike's argument, various philosophers, writing under the guise of "Ockhamism", sought to argue that, on careful inspection, God's beliefs should be counted as "soft facts", not hard facts. For instance, Alvin Plantinga, in "On Ockham's Way Out," laid down the following constraint on hard and soft facts: no soft fact can be logically equivalent to a hard fact.¹⁶ Thus, since $F\phi$ is logically equivalent to *God believes that* $F\phi$, and since the former is "soft", so is the latter. Consequently, it would seem that there is important philosophical precedent for simply denying the operative assumption underlying our argumentative strategy, viz., that **Ant** ϕ is temporally intrinsic ("hard"), and *also* equivalent to $F\phi$. If it is equivalent to $F\phi$, then it isn't equivalent to $F\phi$. Either way, it would appear that our strategy is in trouble.

But here we must be careful. We admit that it has been substantially controversial whether God's beliefs are "hard facts" or instead "soft facts". But this is, in large part, because it has been substantially controversial *what the hard/soft fact distinction even comes to.* As anyone familiar with the history and the development of the "soft/hard" distinction will readily admit, this terminology has sometimes been used in substantially different ways. The issue has not simply concerned the (admittedly substantial) difficulties of analyzing one and the same distinction; the issue has been that some authors simply seem to have in mind a *different* distinction as have others.¹⁷ But we wish simply to sidestep these issues. For we wish to note the following: in this literature, it has *not* been (widely) controversial whether God's beliefs are *temporally intrinsic* in sense specified above. That is, it has not been widely controversial that God does not *count* as believing that something will happen even in part because that thing will happen. More particularly, for the most part, those who have gone under the "Ockhamist" title have *not* wished to say that one and the same state of mind of the person who is God would have counted as one belief, were we to battle, but a different belief, if we were instead not to battle. Rather, they have wished to say that, had we in fact not battled, God never would have

¹⁵ Cf. Prior (1976) in Fischer and Todd (2015: 317). The "transfer of unpreventability" here is the same at issue in the principle now known as "Beta-box" (a modification of van Inwagen's "principle Beta" in his 1983).

¹⁶ Plantinga (1986) in Fischer (1989: 194).

¹⁷ For an account of these complexities, see Todd and Fischer (2015: 13).

been in the given mental state in the first place. In this sense, they agree that the past would have been *intrinsically* different than in fact it was. But this is precisely to admit that God's beliefs are "hard facts" about the past, in the only sense of that term that we wish to employ in this paper.¹⁸

There is, however, one notable exception to this trend. Eddy Zemach and David Widerker once wrote the following:

For all we know, the fact that p may be an environmental necessary condition for the internal state of God, m, to count as the belief that p. It may be that m is God's belief that p only if p is the case, and thus he who is able to bring it about that not-p is able to bring it about that m is not a belief that p. (Zemach and Widerker 1988, in Fischer 1989: 118)

They elaborate:

The fact that *p* does not *cause* God's mental state *m* to mean '*p*'; rather, it is *in virtue of* its being the case that *p*, that God's mental state *m* means '*p*'. Thus, the property *is a belief that p* is a relational property *m* has in virtue of its relation to the fact that *p*. (*ibid*.: 119)

In consequence,

It is not that through our action we can bring about the non-occurrence of an event in the past. Rather, through our action we can deprive a past event from having a certain relational property, a property which accrues to it by virtue of the occurrence of a certain future event over which we have control. Since, as argued above, God's belief that Q is a relation obtaining between a certain mental state of God m and the fact that Q, we can, by exercising our control over the latter, bring it about that the mental state would, or would not, count as a belief that Q. (*ibid.*: 121)

Thus:

¹⁸ For a defense of this characterization of soft and hard facts, see Todd (2013a: 839). Todd therein defends the following characterization of a "soft fact at a time":

⁽IDT-S) A fact F at a time t is soft if and only if F specifies an entity E as having a property P at t, and whether E counts as having P at t is at least in part determined by whether there exists an event or events in the future relative to t.

It is indeed sometimes within our power to determine what God believes. We do not thereby cause any changes in God, nor limit His omniscience, for it is neither change nor limitation in God that some of His states count as beliefs of what we do in virtue of our doing those very things. *(ibid.*: 122)

And here we have a position that maintains precisely what we have just wished to deny. But our complaint against such a picture is the same as John Martin Fischer's. According to Fischer, it is, inter alia, extremely difficult to see how any such picture can plausibly maintain that God indeed has *beliefs*.¹⁹ Pre-theoretically, and obviously, *belief* does not seem to have the sort of structure envisaged by Zemach and Widerker. Certainly we do not count as believing that something will happen even in part in virtue of the fact that it will happen; if this were so, it would plainly follow that no one has ever held an incorrect belief about the future, since one *counts* as believing that something will happen partly in virtue of the fact that it will happen.²⁰ Plausibly, however, it is part of the *constitutive essence* of a given mental state whether it is intrinsic or instead relational; thus, it cannot be intrinsic for some yet extrinsic for others. Said differently, if for one person, a given state *m* counts as what it is at least in part due to its relation to something else, and for someone else, a mental state m^* does not, then m and m^* are not the same kind of mental state. In this light, it is simply a mistake to say that God's beliefs (and anticipations) are extrinsic, whereas ours are intrinsic. On this approach, it is more accurate simply to say that God does not have *beliefs* – and thus to simply *deny* omni-accuracy as we have defined it (ϕ iff **Bel** ϕ). God perhaps has Geliefs, where one Gelieves that something will happen partially in virtue of the fact that it will happen. Perhaps. But here we have simply changed the subject.²¹

In sum, the way to resist the arguments of this paper is not to maintain that since $\mathbf{F}\phi$ is temporally relational, and also equivalent to $\mathbf{Ant}\phi$, $\mathbf{Ant}\phi$ is temporally relational – and accordingly that the given "change" in the relevant dialogue does not imply a "real", intrinsic change in the past, but only a so-called "Cambridge" change. The claim that $\mathbf{Ant}\phi$ is temporally relational is plausibly a non-starter.²² The more promising reply in the area is instead to maintain

unsettled future. And this is cashed out as follows: a statement ϕ is moment-determinate iff at any time t,

¹⁹ See Fischer (1994: 120 – 125).

²⁰ Cf. Todd (2013b).

²¹ If God is indeed in the same mental state (viz., belief) as we are in, how do we characterize the (obviously profound) difference between us and God? Answer: whereas we can (and often are) in the mental state mistakenly, God cannot be in it mistakenly. For more on this theme, see (Todd 2013b).
²² Related to the notion of "hard fact" is the notion of a "moment-determinate" affair (Belnap and Green 1994, MacFarlane 2014). The intuitive idea is that a moment-determinate affair doesn't depend on the

that once it is seen that **Ant** ϕ is plainly intrinsic, the assumption that it is equivalent to **F** ϕ is therefore rendered objectionable. On this approach, again, we simply *deny* the equivalence implied by omni-accuracy, and attempt to explain why it is unproblematic that a semantic theory should, by itself, imply the denial of this equivalence. This is, we believe, the challenge – or certainly one challenge – for the open-closurist.

Omni-accuracy denied?

The conclusion thus far is this: on pain of a changing past, open-closure is inconsistent with omni-accuracy. Consequently, open-closurists plausibly should not accept that a perfect knower would be omni-accurate. Insofar as it seems plausible that a perfect knower *would* be omni-accurate, however, this is a cost for open-closure. But if the open-closurist cannot maintain that a perfect knower would be omni-accurate, what *should* such theorists say about a perfect knower? In other words, if we introduce a perfect knower into the framework of the open-closurist, what, precisely, is the result – if not the given change in the past rejected above?

In order to answer this question, we return to the dialogue – and here we have to imagine God responding differently:

Us: Do you anticipate a sea-battle tomorrow?

God: No.

Us: Why not?

God: Well, for one thing, it isn't even *true* that there will be a sea-battle tomorrow. The future is open.

Us: So there are no truths that escape your gaze?

the truth of ϕ does not vary across worlds with a common past at *t* (see MacFarlane 2014: 214) for a formal definition). It would seem that statements about current beliefs and anticipations are moment-determinate. Belnap and Green plausibly would agree: "Let us note first that wondering, asserting, hoping, betting are each of them moment-determinate affairs: whether a person asserts (wonders, hopes, bets) that A does not depend upon what history has not yet settled." (Belnap and Green 1994: 382) One might try to avoid our argument by insisting that God's beliefs can fail to moment-determinate. However, presumably, since being temporally intrinsic suffices for being moment-determinate, one must then also claim that God's beliefs fail to be temporally intrinsic. And this amounts to the view that we consider in the text.

God: Correct.

Us: And in that sense you are omniscient?

God: Correct.

So far, the open-closurist, in virtue of being an open futurist, agrees. But now we continue:

[.... Time passes, and a sea-battle rages]

Us: God, did you anticipate the sea-battle?

Now, what open-closure predicts, once we deny omni-accuracy, is *not* that God will (correctly) maintain that he *had* anticipated the sea-battle.²³ On the approach we now wish to develop, what open-closure predicts instead is the following:

God: Well... no. I didn't anticipate the sea-battle $[\mathbf{P}\neg\mathbf{Ant}\phi]$.

And here God is certainly being honest. But now, if we endorse retro-closure, we may continue as follows:

Us: But a sea-battle was going to occur! $[\mathbf{PF}\phi]$

God: Granted.

Us: So something was going to happen that you didn't anticipate would happen $[\mathbf{P}(\mathbf{F}\phi \land \neg \mathbf{Ant}\phi)]$.

²³ We might see the responses in the dialogue to come as motivated by a different conception of a perfect knower than the one implied by omni-accuracy. On this new conception, we deny omni-accuracy, but instead accept what we might (rather arbitrarily) call *omni-correctness*: $\Box \phi \Leftrightarrow \text{Bel } \phi$. That is, God believes all and only the *settled* truths (cf. Hawthorne 2005). On this conception, it is *settled that* $F\phi$ just in case it is causally *determined that* it is going to be that ϕ . (The introduction of the \Box -operator might be understood by the supervaluationist as the proper way to talk about "truth" in the object language, and thus the proper way to state that God believes all and only the *truths*.) Such a conception of a perfect knower will imply the responses to come, but we forego verifying this result in what follows.

God: Granted.

Us: But isn't that just to say that you weren't omniscient after all?

God:

And this does not seem to present an attractive picture of a perfect knower. The first (and most obvious) problem is that God seems to be admitting former ignorance – and it can seem deeply implausible, in itself, that this would ever be required of a perfect knower. However, there is an additional problem here. Once more, it has to do with the kind of *change* implied by the truth of open-closure. Admittedly, the change is not as radical as the kind of change discussed above.²⁴ But it is this that we focus on in what follows.

First, consider the principle which we may call God is ignorant:

God is ignorant: $\phi \land \neg Bel \phi$

Although open-closurists (on this approach) deny omni-accuracy, they need not thereby accept that any instance of *God is ignorant* is true. For instance, you will not be able to confront God with anything like the following: *There will be a sea battle and you don't believe that there will be a sea battle.* God may admit to not believing that there will be a sea-battle, but in that case, he will, of course, deny that it is true that there will be a sea-battle. So God rightly denies any instance of *God is ignorant.*²⁵

The trouble comes once we note that the current approach predicts that though God is not ignorant, nevertheless God *was* ignorant:

²⁴ Roughly speaking, this is a change in the *soft* facts about the past. But isn't it widely accepted that changes in the soft facts about the past are perfectly admissible? No – or, better, that depends. What has been widely accepted is that we can act in ways that would *require* such changes. But there is an enormous (and crucial) difference between the following two theses: (1) we can, but never do, act in ways that would require Cambridge-changes in the past, and (2) we can, and often do, Cambridge-change the past. (Cf. Todd and Fischer 2015: 13). And it is (2) that is at issue in the following. Compare: (3) we can, but never do, act in ways that would require that the facts about the future would be different, and (4) we can, and often do, change the facts about the future. Whereas (3) is widely accepted, the only theorist ever to accept (4) was Peter Geach – a more or less unknown position he developed in Geach (1977: Ch. 3). For more recent developments of this "mutable futurist" approach, see Todd (2011; 2016b)

²⁵ Of course, God will grant the following: $[(F\phi \land \neg Ant\phi) \lor (F \neg \phi \land \neg Ant \neg \phi)]$. But this is not to admit that there is a truth of which God is now ignorant. God plainly believes that this disjunction is true. Of course, God does not believe either of its disjuncts – but then, according to the theory in question, neither such disjunct is true.

God was ignorant: $\mathbf{P}(\phi \land \neg \mathbf{Bel}\phi)$

After all, as we saw in the dialogue, we get an instance of *God was ignorant*: $[\mathbf{P}(\mathbf{F}\phi \land \neg \mathbf{Ant}\phi)]$. (Recall that $\neg \mathbf{Ant}\phi$ is just other words for $\neg \mathbf{BelF}\phi$.) On open-closure, then, we get the result that though God is never ignorant, God often had been ignorant. And though the result that God had been ignorant is *prima facie* objectionable, the asymmetry concerning God's current versus past ignorance seems to be additionally objectionable.

Here it is useful to contrast the picture presented by the open-closurist with the picture already endorsed by certain so-called "open theists" – in particular, by open theists such as Swinburne, Hasker, and van Inwagen.²⁶ Whereas there are crucial similarities between the approach adopted by such theorists and the (currently suggested) approach of the open-closurist, there are also crucial differences. In a word, such theists already accept the result at issue in the dialogue [$P(F\phi \land \neg Ant\phi)$]. In that sense, they accept the thesis that (we call) *God was ignorant*. According to this version of open theism, that is, certain events were going to happen which God had not anticipated would happen – and the central argument these philosophers make at this stage is that it was *impossible*, even for a perfect knower, to anticipate these events, even though it was true that they were going to happen.

The crucial difference between such views and the view of the open-closurist, however, is that they simply accept that *God is ignorant*. More particularly, on their view, we have the following:

Us: Do you anticipate a sea-battle tomorrow?

God: No.

Us: Why not?

God: Well, for all I know, it is *true* that there will be a sea-battle tomorrow – it is just that, supposing that this is true, it is a truth I am not in position to know.

Us: So there are truths that escape your gaze?

²⁶ Swinburne (2016: 175 – 199), Hasker (1989), van Inwagen (2008).

God: Correct.

Us: And in that sense you are ignorant?

God: Correct.

On this view, then, we *deny* the Open Future, but we *accept* Open Mind. Now, such a position may or may not be adequate, and its costs have been well-documented already.²⁷ The important point, for our purposes, is that, in virtue of the denial of the Open Future, such a God can be *consistent*. If we ask God after the fact whether he had been ignorant, he will of course admit that he was. But God simply *starts* by saying that he is currently ignorant, and so it is hardly a mystery that God should likewise admit that he *had been* ignorant.

But the picture envisaged by the open-closurist must be different. God does not start by admitting ignorance. Indeed, God *denies* current ignorance, precisely in virtue of maintaining that the future is open. However, looking backwards, God is forced to admit that he *had been* ignorant, precisely in virtue of granting retro-closure. And now we can bring out the following cost for the open-closurist. It is simply not clear that, given the openness of the future, God should have to admit former ignorance. If we *grant* to God that he is not currently ignorant, then it seems that God will be perfectly well-positioned to respond to any charge that he *had* been ignorant. More particularly, there seems to a robust intuition that if we start by granting the Open Future, then God will be able to make the following reply to anyone attempting to saddle him with past ignorance:

Us: But a sea-battle was going to occur! $[\mathbf{PF}\phi]$ And so something was going to happen that you didn't anticipate would happen! $[\mathbf{P}(\mathbf{F}\phi \land \neg \mathbf{Ant}\phi)]$ And so: you were ignorant. $[\mathbf{P}(\phi \land \neg \mathbf{Bel}\phi)]$

God: Well, wait. Recall: previously you had *granted* to me that I wasn't ignorant. These were the words out of your mouth: "You aren't ignorant." Weren't they?

²⁷ On this approach, we have what has been called an Ockhamistic tense-logic (for a defense of which see Rosenkranz 2012), but we do not employ it for purposes that would have pleased Ockham. Instead, though there is a "thin red line" marking a privileged branch, its location is inaccessible even to God. For a critical discussion of this version of open theism, see Todd (2014). We set aside the seemingly remarkable opposite view – attributed to Peter Auriol (ca. 1280–1322) – that though Open Future is true, Open Mind is not (Schabel 2000, Knuuttila 2011).

Us: Yes.

God: But now you're trying to tell me that I was ignorant?

Us: Yes.

And this seems odd. If it is, how must God respond? Arguably as follows:

God: Well, I deny the charge. Just because a sea-battle *did* occur, this doesn't imply that it was *going to* occur. And so just because I didn't anticipate this sea-battle, this doesn't imply that I had been ignorant.

And here what we have is God simply denying retro-closure. Now, our point here is not that God's denial of retro-closure, *in itself*, is unproblematic, or otherwise plausible. Our point instead is that, *in the context of this dialogue*, God has a point. In the context of an admission that the future is open, God may plausibly maintain the following: just because the sea-battle occurred, this doesn't imply that it was *going to* occur. And so what we have, in effect, is a way of motivating the following thought: if you grant the open future, you should deny retro-closure. Otherwise, God would lack the point he evidently does seem to have.

On reflection, however, perhaps it is simply unsurprising that open-closure should have the kind of implication at issue – namely, that though no instance of *God is ignorant* is ever true, some instances of *God was ignorant* indeed are true. Look at it this way. According to openclosure, we might say the following: there are no truths about what the future will always have been. *That* is the openness of the future, according to the open-closurist. It is unsettled what *will have been going to happen*. There is no fact about whether we will end up in a branch in a which a sea-battle had been going to occur (**PF** ϕ), or instead in which sea battle had been going to *not* occur (**PF** $\neg \phi$). But such an approach would seem plainly to predict the following about a perfect knower. God is not *currently* ignorant, but God will *have been* ignorant – it is just unsettled *how*. Indeed, it is because it is unsettled (there is no fact about) *how* God will have been ignorant that it is currently true that God *is not* ignorant. God is not ignorant today, but tomorrow God will have been ignorant the day prior. If this seems strange, then so is open-closure.

Conclusion

We can summarize our results as follows. Needless to say, our argument in this paper is not that since a perfect knower actually exists, and since the open-closurist must say implausible things about that perfect knower, open-closure is implausible. Of course, our results do point to the following: theists – that is, those who *do* believer that there exists a perfect knower – plausibly should not be open-closurists. And that is certainly an interesting, important result in itself. Our point instead is more nearly the following. Plausibly, just as it is not for the semanticist to *say* whether the future is causally open, it is likewise not for the semanticist to *say* whether there exists a perfect knower.²⁸ It is only for the semanticist to say (or to help to say) what that perfect knower would be like, were that knower to exist. And confronted with this task, it has turned out that the open-closurist cannot discharge it in a satisfactory manner. They cannot plausibly maintain the classical view that God would be omni-accurate; here we encounter the specter of a radically changing past. Their more promising position abandons omni-accuracy, but here we nevertheless encounter the result that a perfect knower is never ignorant, but often had been ignorant. And this seems to be objectionable.

In this light, perhaps open futurists should once more rekindle their interest in a recently much-neglected project – the project, not of explaining how they might credibly *accept* retroclosure, but how they might credibly deny it. Such a position was, of course, favored by Prior himself.²⁹ But neither Prior nor anyone else has yet, we think, adequately explained how it should be denied. And here we lay down the following prediction: any persons pursuing the project of denying retro-closure will find the task arduous and their position unenviable. They will worry that their position is *ad hoc*. And they will worry that their position is motivated solely by the preservation of something many of us hold dear – namely, the openness of the future. As regards our very prediction, then, they will find it extraordinarily difficult to deny us the following: we were right.

²⁸ Cf. MacFarlane (2003: 323) and MacFarlane (2014: 201-204): "A proper account of the semantics of future contingents can vindicate ordinary thought and talk about the future in a way that is compatible with branching [...] we assume neither that physical law is deterministic nor that it is not. That is a question for physics. Semantics, conceived as a theory of linguistic meaning, should not presuppose any particular answer to this question. The project is not to give a semantics for future-directed talk that assumes indeterminism, but rather to give one that does not assume determinism." ²⁹ Prior (1962: 117) and Prior (1976) in Fischer and Todd (2015: 319).

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