

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. This doctrine maintains that future contingent statements—roughly, statements saying of causally undetermined events that they will happen—are not true.¹ But, *prima facie*, such views seem inconsistent with the following intuition: if something *has* happened, then (looking backwards) it *was* the case that it *would* happen. How can it be that, looking forwards, it isn’t true that there will be a sea-battle, while also being true that, looking backwards, it was the case that there would be a sea-battle? This tension forms, in large part, what might be called *the problem of future contingents*.

Some theorists respond to this tension by insisting that one of the intuitions here must simply be denied. For example, so-called *Peircians* give up the backward-looking intuition, while so-called *Ockamists* give up the forward-looking intuition (see Prior 1967: 113-135). But a dominant trend in temporal logic and semantic theorizing about future contingents seeks to validate *both* intuitions. Theorists in this tradition—including some interpretations of Aristotle, but paradigmatically, Thomason (1970), as well as more recent developments in Belnap, et.al (2001) and MacFarlane (2003, 2014)—have argued that the apparent tension between the intuitions is in fact merely apparent.² In short, such philosophers seek to maintain *both* of the following two theses:

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¹ Some such views have it that future contingents are neither true nor false; others maintain that they are instead simply false. 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 Todd (forthcoming), and for criticism, see Schoubye and Rabern (2017) and Wawer (2018).

² For a sample of others authors in this tradition, see Belnap and Green (1994), Brogaard (2008), Markosian (2013), Strobach (2014), and the discussion in Dummett (1973: 391-400). Certain

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.³

It is well-known that reflection on the problem of future contingents has in many ways been inspired by importantly parallel issues regarding divine foreknowledge and indeterminism. Arthur Prior, whose work figures centrally in these debates, was explicitly motivated by the problems of 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.⁴ 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”.

The combination of Open-future and Retro-closure, though rigorously investigated in temporal logic, has been underexplored in connection with foreknowledge, omniscience, and related issues. Our contention is this: Once we take up this perspective, and ask what accepting both Open-future and Retro-closure predicts about *omniscience*, we’ll see that the view harbours some substantial unnoticed costs. We will argue that a temporal semantics that adopts this conjunction, in fact, rules out the existence of an omniscient being (under certain plausible assumptions)—or, at least, requires that any indeterministic universe lacked an omniscient being at some point in its past. Not only does this prove far too much, we will also argue that the resulting picture, in itself, seems incoherent. Notably, although we will use God as our proxy for certain epistemic ideals, the considerations we adduce here needn’t be viewed through the lens of philosophy of religion. When we theorize about an ideal knower, we are theorizing about what an agent ought to believe. Thus, if the conjunction of Open-future and Retro-closure leads to an unacceptable view of ideally rational belief, this casts doubt on that conjunction.⁵

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.

³ Note that ‘would’, as used here, is not indicating a counterfactual situation. This use of ‘would’ is the simple past tense of ‘will’. For example, if on Monday John says “There will be a sea-battle tomorrow”, then on Tuesday we may report John’s utterance with “John said there would be a sea-battle today”. To avoid potentially distracting connections to *counterfactuals* and the “subjunctive mood”, however, one could give an alternative gloss on the Retro-closure principle – such as, “From the fact that something *is* true, it follows that it *was* the case that it was *going to be* true,” or, more simply, “Anything that happens was going to happen”.

⁴ Cf. Hasle (2012), Uckelman (2012), and Øhrstrøm (2019).

⁵ In this way, our project here is deeply similar to Hawthorne’s (2005), “Vagueness and the mind of God”. Hawthorne asks 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

Our aim in what follows is to more fully unpack the problems raised by omniscience for views that maintain *both* Open-future *and* Retro-closure.

1. Open-closurism

We will first briefly explain the theoretical and formal underpinnings of the Open-future and Retro-closure theses, and explain how one might maintain both. We call the resulting view *Open-closurism*.⁶

Open-closurism accepts the doctrine of the open future: that future contingent statements are not true. Underlying the 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 a given moment, consistently with the past and the laws. Importantly, no one branch is “metaphysically privileged” with regard to the others. Future contingents, however, could only be true if one particular branch *was* so privileged. Future contingents are therefore not true.

Yet, Open-closurism also accepts the Retro-closure principle: anything that does in fact happen always would happen. 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.⁷ 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”.

(MacFarlane 2014: 212)

divine omniscience. More generally, our project overlaps with themes in Williams (2014), who explores, sometimes *via* consideration of a God-like agent, which theories of rational belief are best paired with certain accounts of indeterminacy.

⁶ Open-closurism is reminiscent of certain interpretations of Aristotle’s view on future contingents. Of course, the interpretation of Aristotle on future-tensed statements is complex and controversial (see, e.g., Gaskin 1995), so we will not claim that Aristotle was himself an Open-closurist. Thomason, the *locus classicus* of the Open-closurist view, insists that his picture is in line with Aristotelian themes: “It may also be that the theory presented here in fact coincides with the views of previous philosophers on truth and future tenses. Here, Aristotle is the man who comes first to mind; his “sea-battle” passage is, at first glance anyway, in very good accord with the modelling of the future tense propounded here” (Thomason 1970: 281). Cf. Dummett (1973: 393-394).

⁷ Thomason insists that the principle is common sense: “arguments such as ‘there is space travel; therefore it was the case that space travel would come about’ strike us as valid on logical grounds.” (Thomason 1970: 268)

In terms of the tense-logical operators, **P** (“one day ago”) and **F** (“one day hence”), the Retro-closure principle amounts to the thesis that every instance of the following schema is true: $[\phi \rightarrow \mathbf{PF}\phi]$.⁸

Now, again, some theorists see a tension between Open-future and Retro-closure, and accordingly adopt one in preference to the other. But Open-closurism maintains *both* by putting forward the following picture. Looking forwards, there is no privileged branch. Accordingly, looking forwards, future contingents, such as “There will be a sea-battle tomorrow” and “There will not be a sea-battle tomorrow”, which (letting *B* stand for “there is a sea-battle”) might symbolised as **FB** and **F¬B** respectively, are not true. However, looking *backwards*, e.g. from the perspective of a current sea-battle, there is, now, a way things *went* to get us to here; accordingly, in a statement such as “It was the case yesterday that there would be a sea-battle today” (symbolised as **PFB**) when the past tense operator takes us “back” to a point in the “temporal tree” to evaluate the future tensed statement **FB**, 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 , with ϕ on some but not all branches, then given that there is no privileged branch, the semantic clauses do not deliver a truth. However, when **F** is embedded under **P**, the semantic theory (in some sense) tells you: go back – but then return from whence you came, and check whether ϕ . And thus, the picture validates Retro-closure.

That’s, at least, a helpful metaphorical gloss on the view. The way Open-closurism has actually been implemented model-theoretically is by adopting the *supervaluational* method (Thomason 1970).⁹ The overall strategy can be divided into two parts. First, the operators **F** and **P** are treated as purely temporal operators – this is in accord with Ockhamism but opposed to Peircianism, where the latter assumes that **F** quantifies over possible worlds in addition to future times. So, the first part of the strategy says that for any world history *b* and any time *t* on that history, the satisfaction of **F** ϕ and **P** ϕ by *b* at *t* (for any sentence ϕ) are defined as follows:

- **F** ϕ is satisfied by a history *b* at time *t* iff ϕ occurs at *t* + 1 on *b*
- **P** ϕ is satisfied by a history *b* at time *t* iff ϕ occurs at *t* - 1 on *b*

⁸ If we adopt Prior’s metric tense operators (1957: 11-12), **P_n** ϕ stands for “It was *n* units of time ago that ϕ ”, and “**F_n** ϕ ” stands for “It will be *n* units of time hence that ϕ ”. Note that throughout we will simplify things by using the metric tense operators “one day hence” and “one day ago”, and we will abuse notation slightly by using **F** and **P** (instead of **F₁** and **P₁**) for these respectively.

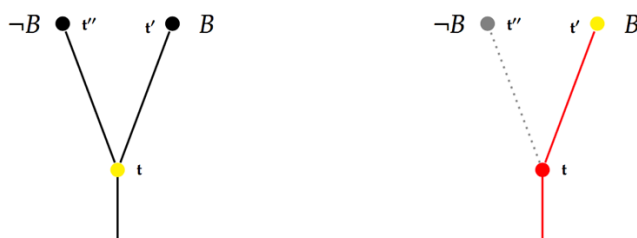
⁹ For early developments of supervaluational semantics in application to other cases where truth-value gaps might arise, see Mehlberg (1958: 256-259) and van Fraassen (1966).

These clauses specify how the temporal operators “shift” forward and backwards on a given possible history of the world.

Saying this much only specifies when a sentence is *satisfied by a world history at a time*, but it doesn’t yet specify when a sentence is *true* at a given moment. Specifying this is the key supervenient aspect of the Open-closurist approach. Consider all the possible total world histories. Since the view holds that the future is open—indeterminism with no privileged history—a moment might take place on many overlapping world histories, where overlapping histories share a past and laws up to that point, but diverge thereafter. In contrast to the Ockhamist, who insists that a sentence is true just in case it is satisfied by the *privileged* history, the Open-closurist holds that since no history in the overlap is privileged, a sentence is true just in case it is satisfied by *all* the overlapping histories.¹⁰

Truth: ψ is *true* at a time t iff ψ is satisfied by all histories h that overlap at t , and
 ψ is *false* at a time t iff ψ is unsatisfied by all histories h that overlap at t , and
 ψ is *indeterminate* otherwise.

This model supports both Open-future and Retro-closure. Consider this picture:



Both \mathbf{FB} and $\mathbf{F}\neg B$ are not true at t , since some future histories from that time feature a sea-battle and some don’t. (Consult left figure.) But from the perspective of a future time t' at which there is a sea-battle, since B is true, \mathbf{PFB} must also be true: If B is true at t' , then every history that overlaps at t' has a past that has a future that features B , so it follows that \mathbf{PFB} is also true at t' . (Consult the right figure.) In general, ϕ will imply $\mathbf{PF}\phi$, in accordance with the intuitions supporting Retro-closure, and yet we still maintain Open-future. This is the elegant Open-closurist package, which promises a resolution to the Aristotelian puzzles surrounding future contingents.

¹⁰ Notice that in this sense the supervenient method is reminiscent of Tarski’s (1935) landmark definition of “truth” in terms of satisfaction by all assignments of values to variables. Tarski restricts the definition of truth to closed formulas, but a nearby definition goes as follows: For any formula ϕ , ϕ is true iff ϕ is satisfied by all sequences, and ϕ is false iff ϕ is unsatisfied by all sequences. On this definition an open formula such as $(Gx \vee \neg Gx)$ is true, even though neither disjunct is.

Such is the formal model of future contingency underlying Open-closurism. To foreshadow what is to come, it is worth observing what sorts of (informal) “dialogues” concerning anticipation and retrospective assessment this model predicts to be perfectly coherent. Suppose Jones believes that there will be a sea-battle tomorrow. Now consider the following dialogue (Dialogue-1):

A: Does Jones correctly believe that there will be a sea-battle tomorrow?

B: It is not true that he does.

A: Does Jones *incorrectly* believe that there will be a sea-battle tomorrow?

B: It is not true that he does.

A: So, the future is open?

B: Precisely. It is indeterminate whether Jones’ belief is correct.

[... *a day passes, and a sea-battle rages*]

A: Did Jones correctly believe yesterday that there would be a sea-battle today?

B: Yes, of course he did. He believed that there would be a sea-battle today – and there is a sea-battle today.

The position of the Open-closurist is that B’s pattern of response is perfectly coherent, and furthermore, could be perfectly accurate. And now note what seems to be the consequence of the accuracy of B’s position: the past would seem to have undergone a sort of *change*. Crucially, however, it has undergone merely what we might call an *extrinsic* change – or a so-called “Cambridge change”. More particularly, in the dialogue, we have “moved” (over time) from the untruth of “Jones’ belief is correct” to the later truth of “Jones’ belief was correct.” Thus: at a certain point in time, it is not true that Jones’ belief has a certain property (the property of being correct). Later, however, Jones’ belief did have that property at that time.

At this stage, however, it is important to note that the proponent of Open-closure will insist that this sort of “change in the past” is not the sort of *radical* “change in the past” which clearly seems impossible. For instance, suppose that, on a given day, “Jones is in Los Angeles” is

untrue, but then, on the next day, “Jones was in Los Angeles yesterday” is true – or, in another preview of what’s to come, consider the move from the initial untruth today of “Jones believes that ϕ ” to the later truth of “Jones believed that ϕ yesterday.” Intuitively, *these* sorts of “changes” would require *intrinsic* changes in the past – and these sorts of changes, the Open-closurist can insist, are the ones that are impossible. (More about these issues shortly.)

However, the change at issue in the dialogue above is *not* a change of this kind. For consider: whether a given belief counts as being *correct* or *incorrect* would plainly seem to be a *relational* property of that belief; whether a belief is correct or incorrect is constituted, roughly, by how that belief is *related* to the world. Thus, in the dialogue above, when a sea-battle comes to pass, this brings it about that Jones’ prior belief was correct (when he held it). However, had a sea-battle *failed* to come to pass (which was objectively possible), this would have brought it about that Jones’ prior belief was *incorrect* (when he held it). However, it is crucial to observe that in *both* scenarios, “the past” – in the ordinary sense of “the past” – is exactly the same: the difference is solely that, in one scenario, a past belief comes to have had a certain relational property, and in the other scenario, that belief comes to have had a *different* (incompatible) relational property. The past, however, remains *intrinsically* just the same in both scenarios.

As we will see, these differences – between *intrinsic* and *extrinsic* changes in the past – play a crucial role in our arguments to come.¹¹

2. The logic of temporal omniscience

Our contention is that Open-closurism predicts certain problematic consequences regarding the logic of divine omniscience. The important connections between the logics of tense and divine

¹¹ As we note below (in fn. 18), the changes required by the Open-closurist are changes in what have been called the *soft* facts about the past. (For an introduction to this distinction, see the essays in Fischer 1989, and Todd and Fischer’s more recent survey in their 2015.) 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 whereas the truth of (1) is widely accepted (in the literature on fatalism and free will), it is the truth of (2) that is at issue for the Open-closurist. 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 his 1977: Ch. 3. (For more recent developments of this “mutable futurist” approach, see Todd (2011; 2016b).) In short, we do not mean to precipitously concede to the Open-closurist that the requisite Cambridge-changes in the past are perfectly acceptable; we mean only to concede, for the moment, that they are *less* unacceptable than the parallel *intrinsic* changes.

omniscience are often noted in the literature on future contingents. For example, the following passage from Peter Øhrstrøm and Per Hasle provides a nice point of departure:

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. (Øhrstrøm and Hasle 2015)

The formal equivalence suggested by Øhrstrøm and Hasle could be developed in different ways, but in what follows, we develop it primarily in terms of constraints on the *beliefs* of an omniscient being: *God believes all and only what is the case*. This slogan, however, could be cashed out in at least two competing ways. The first way to capture the slogan is in terms of an intuitive principle we will call *Omni-accuracy*.

Omni-accuracy: ϕ if and only if God believes ϕ

We will argue that this principle combined with Open-closurism quickly leads to some undesirable results.

While some Open-closurists may happily accept *Omni-accuracy* and insist that the consequences we draw out are not so undesirable, some will presumably insist on an alternative rendering of the intuitive slogan. In the context of supervaluationism, the Open-closurist will want some means of distinguishing “It is *true* that ϕ ” from “ ϕ ”. That is, letting **T** be an object language operator expressing “truth”, the Open-closurist rejects the following equivalence: ϕ iff **T** ϕ .¹² This opens up space for a second, and non-equivalent, principle connecting God’s beliefs to what is the case, namely *Omni-correctness*.

Omni-correctness: **T** ϕ if and only if God believes ϕ

¹² There are choices here as to how to define the truth predicate, and we are not insisting that this is the only kind of truth predicate available to the supervaluationist. We are only assuming that the supervaluationist will want to make the relevant distinction somehow, and we are providing them with **T** as the way to make that distinction: **T** ϕ is satisfied by a history b at time t iff ϕ is satisfied by every history b' overlapping at t . Note that Thomason (1970: 278) instead introduces a “transparent” truth predicate: **T** ϕ is satisfied by a history b at time t iff ϕ is satisfied by b at t . See also MacFarlane (2014: 93).

These, then, are the two options characterizing (a necessary condition on) divine omniscience that we will explore in connection with Open-closurism.¹³

For ease of exposition, we will often talk in terms of *God's anticipations* and *God's recollections*.¹⁴ We assume that for God to believe that something will happen tomorrow just is for God to anticipate it. And for God to believe that something happened yesterday just is for God to remember it. So, letting '**Bel**', '**Ant**', and '**Rem**' be divine belief, anticipation, and remembrance operators, respectively, we will often employ the locutions on the right-hand-side of the following equivalencies:

- **Bel F** $\phi \leftrightarrow$ **Ant** ϕ
- **Bel P** $\phi \leftrightarrow$ **Rem** ϕ

With these abbreviations we can also contrast Omni-accuracy and Omni-correctness as follows.¹⁵

Option 1. Omni-accuracy:

$$\phi \leftrightarrow \mathbf{Bel} \phi$$

$$\mathbf{F}\phi \leftrightarrow \mathbf{Ant} \phi$$

$$\mathbf{P}\phi \leftrightarrow \mathbf{Rem} \phi$$

Option 2. Omni-correctness:

$$\mathbf{T}\phi \leftrightarrow \mathbf{Bel} \phi$$

$$\mathbf{TF}\phi \leftrightarrow \mathbf{Ant} \phi$$

$$\mathbf{TP}\phi \leftrightarrow \mathbf{Rem} \phi$$

Given the validity of one set of these principles one can substitute equivalents and preserve truth. For example, according to option 1, it follows that:

$$\mathbf{FP}\phi \leftrightarrow \mathbf{Ant}(\mathbf{Rem} \phi)$$

And thus combined with a principle of tense-logic such as $[\phi \rightarrow \mathbf{FP}\phi]$, we have:

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

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. 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

¹³ Note that 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).

¹⁴ 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.

¹⁵ 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.

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.) But we now have enough on the table to assess the two options, given the assumptions of both Open-future *and* Retro-closure.

3. The costs of Omni-accuracy

To cut to the chase, consider what is, according to option 1, the theological counterpart of the Retro-closure principle $[\phi \rightarrow \mathbf{PF}\phi]$, viz.:

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

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 yesterday. More simply: if there is a sea-battle today, then yesterday God anticipated a sea-battle today. Now, here we have 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 maintain 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. The tension might be brought out by means of the following dialogue (Dialogue-2):

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

God: It is not true that I do.

Us: Do you anticipate peace tomorrow?

God: It is not true that I do.

Us: So, the future is open?

God: Precisely.

[... *a day passes, and a sea-battle rages*]

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

God: Yes, of course I did.

But surely this is unacceptable. How can this make sense, unless God has fundamentally changed the past? According to the Omni-accuracy principle, the open future licenses God's initial claim that it is not true that he has the anticipation. When God faces the open future—and sees that things could go so that B or so that $\neg B$ —it is not true that \mathbf{FB} , so it is not true that God anticipates that B . But likewise, Retro-closure licenses God's maintaining that he had the anticipation all along: Retro-closure plus Omni-accuracy yields that *everything has been anticipated by God*. There is thus a challenge for the Open-closurist who accepts Omni-accuracy: they must explain how it is that God could have the set of seemingly impossible attitudes exemplified in Dialogue-2.

But let's slow down. Recall the issues at the end of Section 1: Open-closurism requires the coherence of *extrinsic* or “mere Cambridge” changes in the past. As we saw, it requires a “move” (over time) from the untruth of “Jones' belief is correct” to the later truth of “Jones' belief was correct.” But we distinguished *that* sort of “change in the past” with a different sort of change in the past: an *intrinsic* change in the past – the sort of change in the past that more clearly seems objectionable. And now the problem: the sort of change in the past involved in Dialogue-2 would seem to imply an *intrinsic* change in the past; we have moved from the initial untruth of “God believes that ϕ ” to the later truth of “God believed that ϕ ”. We do not profess to know the operations of the divine mind. But we do claim that if this move represents those operations, those operations imply an intrinsic change in the past.

We can thus represent our argument against the conjunction of Open-closurism and Omni-accuracy slightly more carefully as follows:

1. If Open-closurism and Omni-accuracy, then God's combination of attitudes in Dialogue-2 are possible.
2. The attitudes exemplified in Dialogue-2 necessarily imply an intrinsic change in the past.
3. Intrinsic changes in the past are impossible. So,
4. It is not the case that: Open-closurism and Omni-accuracy.

We have brought out how Open-closurism together with Omni-accuracy predicts the pattern of response in Dialogue-2, and we have thereby defended (1). In this paper, we simply assume the truth of (3).¹⁶ That leaves (2). Might the Open-closurist insist that, on closer inspection, the “move” at issue in Dialogue-2 implies no more of an intrinsic change in the past than the “move” at issue in Dialogue-1?

Recall: the Open-closurist under consideration accepts the view that it is not true that there will be a sea-battle tomorrow, and it is not true that there will be peace tomorrow – but they *also* accept that it is not false that there will be a sea-battle tomorrow, and not false that there will be peace tomorrow. Whether there will be a battle tomorrow is strictly *indeterminate*: $\neg\mathbf{TFB}$ and $\neg\mathbf{T}\neg\mathbf{FB}$. Thus, crucially, given Omni-accuracy, they must also accept:

Unsettled Mind: For some ϕ , $\neg\mathbf{T}(\mathbf{Ant}\ \phi)$, and $\neg\mathbf{T}(\neg\mathbf{Ant}\ \phi)$.

That is, given that it is indeterminate whether there will be a sea-battle, it is also indeterminate whether God anticipates a sea-battle.¹⁷ But if it is indeterminate whether God anticipates a sea-battle, then perhaps we can say the following: God's mind is either in a state of sea-battle-anticipation or it's in a state of non-anticipation, but it is metaphysically indeterminate which. And if we can say *that*, then perhaps we can also say that the coming to pass of a sea-battle retroactively 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 determinately whether the relevant mental state is the anticipation of a sea-battle (because it is *not* determinately such an anticipation). But once the 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* partially constitutes which mental state God had been in – the belief-state that we would battle, or instead the belief-state that we would not

¹⁶ We think this assumption is dialectically reasonable, and we certainly are not aware of any place our interlocutors in this essay (e.g. Thomason or MacFarlane) have denied it.

¹⁷ 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.

battle. Thus, the changes at issue concerning God's mental state would be mere *extrinsic* changes on analogy with the sorts of changes already acknowledged to be required for the Open-closurist's treatment of future contingents. And if this is so, premise (2) is false.

This, then, is the picture that the proponent of Open-closurism and Omni-accuracy must defend. Such a picture is, of course, mysterious – but we think it's even worse than that. Consider the nature of the “indeterminacy” of God's belief-states that this approach must posit. God's beliefs concerning future contingents are indeterminate in the sense that *what belief state* God is in constitutively depends on what eventuates in the future – that is, constitutively depends on whether or not a sea-battle eventuates. However, very plausibly, whether God currently counts as believing that there will be a sea-battle tomorrow doesn't await the unfolding of time. Nevertheless, this is what the view under consideration must be insisting: *Whether God counts as having a certain present anticipation constitutively depends on what the future has not yet settled.*¹⁸ This

¹⁸ Readers familiar with the literature on divine foreknowledge (especially in the wake of Pike 1965) and the associated “hard/soft fact” distinction may recognize this position; essentially this position has been defended by Zemach and Widerker (1988):

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:

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 (1994: 120 – 125). According to Fischer, it is, *inter alia*, extremely difficult to see how any such picture can plausibly maintain that God indeed has *beliefs*. A full discussion of this position must lay outside the scope of the present paper. Briefly, however, our main contention is that, on this view, God does not genuinely have *beliefs* in the first place; God may have *geliefs* (where whether one *believes* that something will happen is partly a matter of whether it will happen), but not *beliefs*. Thus, the adoption of this radical position on God's mind is *not* a

sort of indeterminacy, which we will call “future history indeterminacy”, can be defined as follows:

Definition. ϕ is *future history indeterminate* at t iff there are some possible histories overlapping at t according to which ϕ and some possible histories overlapping at t according to which $\neg\phi$. (And ϕ is *future history determinate* otherwise.)¹⁹

Intuitively, however, whether someone counts as believing that an event will happen is not indeterminate, in this sense. That is, *belief* and *anticipation* would seem to be future-history determinate affairs: whether a person has or lacks a given belief at t does not depend, in this sense, on what happens in the future relative to t .²⁰ Notice that, in this respect, *belief* differs importantly from *correct belief*. As we brought out in Dialogue-1, whether one counts as *correctly believing* that an event will take place is, at least in part, a matter of (is constitutively dependent on) whether in fact it will take place. Contrary to the current suggestion, however, whether one counts as *believing* that an event will take place is *not* constitutively dependent on whether it will take place. And so this way of denying premise (2) seems untenable.

An Open-closurist may be tempted at this point to just dig in, and accept the radical idea that God’s anticipations are constitutively dependent on the future, in the same way that *correct belief* is constitutively dependent on the future. But it is not enough just to accept the consequence that some *anticipations work in mysterious ways*. The indeterminacy in God’s mind will tend to bleed out. God’s beliefs may co-vary with other affairs that one would be hard pressed to accept as future-history indeterminate affairs. Consider, for example, God’s *actions*. Current actions or utterances would seem to be good examples of future-history determinate affairs, and

way of vindicating the pattern of response in Dialogue-2 (wherein God has genuine *beliefs* about the future) – and thus the adoption of this position is no response to our argument in this paper. Note: because (necessarily) someone believes p iff p , it does not follow, by itself, that whether that person *believes* p constitutively depends, in the noted sense, on whether p .

¹⁹ This notion of a future-history determinate statement is essentially the notion of a “moment-determinate” affair as defined in Belnap and Green (1994: 374) and MacFarlane (2014: 214). The intuitive idea is that a moment-determinate affair doesn’t constitutively depend on the unsettled future.

²⁰ Here we are in agreement with Belnap and Green, who insist that “whether a person asserts (wonders, hopes, bets) [and, we might add, believes] that A does not depend upon what history has not yet settled” (Belnap and Green 1994: 382). Note: here we are plainly discussing the central themes at issue in the so-called “hard”/“soft” fact distinction in debates about foreknowledge and free will. For a defense of this characterization of God’s beliefs (as temporally future-non-relational, “hard” facts at times), see Todd 2013a and Todd 2013b. For more on these issues, see the essays in Fischer 1989, and Todd and Fischer 2015.

God's actions are linked to his beliefs.²¹ Assuming that God can *act* on the basis of his beliefs about the future, the tension that arises can be brought out in the following (Dialogue-3):²²

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

God: It is not true that I do.

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 instead to build a temple. He is doing one or the other, but it is metaphysically indeterminate

²¹ The argument here doesn't rely on God's actions *per se*. This is just an illustration. We just require some future-history determinate witness for the following: *If God anticipates a sea-battle, then some future-history determinate fact obtains that would not obtain if God did not anticipate a sea-battle.*

²² 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: 53 - 64, 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.

which. 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, 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 this characterization? 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. The reason these situations strike us as impossible is that affairs such as an agent's current actions or utterances or the current physical locations of stones are future-history determinate affairs. But if such affairs are linked to God's indeterminate anticipations,

then they would also have to be indeterminate—but they aren't. Needless to say, these dialogues raise a great many questions, not all of which we address. We simply note the following: it is unclear how they could have adequate answers.

4. The costs of Omni-correctness

Open-closurism combined with Omni-accuracy has led to some undesirable results. But as we mentioned at the outset, this is not the only way that one might try to cash out the slogan, *God believes all and only what is the case*. Some Open-closurists will no doubt insist on an alternative rendering of the slogan. *Truth*, they will say, is satisfaction by every overlapping history, and thus the truth predicate should be defined as follows:

- $\mathbf{T}\phi$ is satisfied by a history h at time t iff ϕ is satisfied by every history h' overlapping at t .

Given this understanding the following equivalence must be rejected: ϕ iff $\mathbf{T}\phi$. And those who reject this equivalence will naturally insist on a principle connecting God's beliefs to what is *true* (cf. Dummett 1973: 398):

Omni-correctness: $\mathbf{T}\phi$ if and only if God believes ϕ

If this is the constraint God is working under, then we must imagine God responding very differently in the dialogue (Dialogue-4):

Us: Do you anticipate a sea-battle tomorrow?

God: No.

Us: Why not?

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

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

God: Correct.

Us: And in that sense you are omniscient?

God: Correct.

[... *a day passes, and a sea-battle rages*]

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

Now, what Open-closurism plus Omni-correctness predicts is *not* that God will maintain that he had anticipated the sea-battle. This approach instead predicts the following:

God: Well... no. I didn't anticipate the sea-battle.

And here God is certainly being consistent. But now we continue as follows:

Us: But a sea-battle was going to occur!

[**PFB**]

God: Granted.

Us: So something was going to happen that you didn't anticipate would happen.

[**P(FB \wedge \neg Ant B)**]

God: Granted.

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

God:

Now, as a first approximation, the problem is that we seem to have shown that God was not omniscient. After all, God seems to be admitting former ignorance. If there are events that were indeed always going to happen that God didn't anticipate would happen, then in what sense was God omniscient? Given the principle of Omni-correctness and the Open-closurist model, the following statement is true at the sea-battle: **P(FB \wedge \neg Ant B)**. Thus, some instances of the

schema $\mathbf{P}(\phi \wedge \neg \mathbf{Bel} \phi)$ are true. Normally, one would take a true instance of that schema to be a statement to the effect that *God was ignorant*: Something was the case that God didn't believe was the case!

Now in response to this complaint, one might maintain that God is not and was not genuinely “ignorant”, since one is ignorant only if there is a *truth* about which that one is ignorant. However, according to the view under discussion, there was no *truth* of which God was ignorant. At the time of the sea-battle, there was always going to be a sea-battle, but it wasn't always *true* that there would be a sea-battle. That is, since B is true, then \mathbf{PFB} is also true, but \mathbf{PTFB} isn't. So while it is right that the sea-battle was going to happen and God didn't anticipate it – $\mathbf{P}(\mathbf{FB} \wedge \neg \mathbf{Ant} B)$ – there is nevertheless no *truth* that escaped his gaze, since it wasn't *true* that there would be a sea-battle – $\neg \mathbf{PTFB}$.²³

We think that one can accept this view only at the expense of giving up on the fundamental intuitions that motivate Retro-closure in the first place. Very plausibly, if one is moved by the backward-looking intuition that, given that a sea-battle has occurred, it was always going to occur, it seems that one should likewise be moved by the intuition that given that a sea-battle has occurred, it was always *true* – which is not to say determined! – that it was going to occur. However, by treating *truth* as, in effect, synonymous with *determined*, the view under consideration makes it impossible to express the intuition that, though it was true that the sea-battle would occur, it wasn't *determined* that it would occur. This is, however, an intuition we should be able to express – and this is precisely the intuition that motivates Retro-closure.

²³ Notice that the view also predicts that the following disjunction is true (determinately, super-, true): $(\mathbf{FB} \wedge \neg \mathbf{Ant} B) \vee (\mathbf{F}\neg B \wedge \neg \mathbf{Ant} \neg B)$. That is, either there will be a sea-battle tomorrow and God doesn't anticipate the sea-battle *or* there will be peace tomorrow and God doesn't anticipate peace. Thus, it would seem, something is the case that God doesn't believe is the case. Again, normally, one would take that to be a statement to the effect that *God is ignorant*. But then why call such a being “omniscient”? The response again is this: God is not currently ignorant, since there is no *truth* about what is going to happen that God fails to anticipate, since both $\neg \mathbf{TFB}$ and $\neg \mathbf{TF}\neg B$. Hawthorne (2005) has suggested that supervaluationism applied to *vagueness* has an analogous result for an omniscient being: Either (Frank is bald and God doesn't know it) or (Frank is not bald and God doesn't know that). And he insists that the supervaluationist can perhaps learn to live with this result given that they already tolerate the following: Either (Frank is bald and it is not true that Frank is bald) or (Frank is not bald and it is not true that Frank is not bald). But the case of future contingents adds an important complicating factor, which makes this line of thought less appealing. The indeterminacy involved with the future involves a dynamic aspect that has no analogue with respect to vagueness—in the vagueness case, there is no “waiting around” to see how the indeterminacy gets resolved (so that we can *then* say that it was the former: Frank was, indeed, bald, but God didn't know that). That is, there is no principle that is analogous to the Retro-closure principle. And so whereas we may be able to accept “Either (Frank is bald and God doesn't know that) or (Frank is not bald and God doesn't know that)”, it is substantially more difficult to accept the (backwards looking) discharged disjunct, $\mathbf{P}(\phi \wedge \neg \mathbf{Bel} \phi)$.

Notice that MacFarlane, the archetypical Open-closurist, agrees with this latter intuition, and it is, in fact, what motivates him to sophisticate the supervaluationist picture by adding on a kind of truth *relativism*. Here is a characteristic passage:

According to supervaluationism, then, my utterance was not true. By [the definition of **T** above], the sentence I uttered was neither true nor false at the context in which I uttered it. But surely that is the wrong verdict. I said that it would be sunny today, and look—it is sunny! How could it be, then, that what I said was not true? To see how strange the supervaluationist’s verdict is, suppose that the Director of the Bureau of Quantum Weather Prediction now offers me an irrefutable proof that, at the time of my utterance yesterday, it was still an open possibility that it would not be sunny today. Would such a proof compel me to withdraw my assertion? Hardly. If I had asserted that it was settled that it would be sunny today, I would have to stand corrected. But I did not assert that. I just said that it would be sunny—and it is. My prediction was true, as we can demonstrate simply by looking outside. (MacFarlane 2008: 89-90)

Of course, in this passage, MacFarlane is not suggesting that we give up Open-future. He thinks we need to vindicate both the claim that future contingents are neither true nor false, and the retrospective assessments that some future contingents were true. MacFarlane presents the tension as the following puzzle: *present claims concerning the future can be shown to be untrue by a proof of present unsettledness, but past claims concerning the present cannot be shown to have been untrue by a proof of past unsettledness* (MacFarlane 2008: 90). What the puzzle motivates is a conception of truth that validates both of the following principles (using a generic truth predicate **T**^{*}):

Retro-closure: For all ϕ , $\phi \rightarrow \mathbf{PT}^*\mathbf{F}\phi$

Open-future: For some ϕ , $(\neg\mathbf{T}^*\mathbf{F}\phi \wedge \neg\mathbf{T}^*\mathbf{F}\neg\phi)$

But validating the latter would seem to invalidate the former—the forward-looking intuition seems to require a robust notion of truth which quantifies over histories, whereas the backward-looking intuition seems to require a more-or-less *transparent* notion of truth.²⁴ MacFarlane insists that we should “split the difference” by introducing a definition of truth with “double time references”—the time of utterance and the time of assessment (MacFarlane 2003: 331; cf. Dummett 1973: 394-395).²⁵ Various technicalities can be employed at this point to vindicate both

²⁴ Roughly, a notion of truth is “transparent” just in case it predicts no difference in “ ϕ ” and “It is true that ϕ .”

²⁵ MacFarlane tends to only talk about relativistic truth in the metalanguage, where he says, e.g., “**FB**” is not true at t assessed from t and “**F** \neg **B**” is not true at t assessed from t , but “**FB**” was true at t as assessed from the sea-battle at t' (226). Although MacFarlane employs this talk of relativistic truth in the metalanguage, he doesn’t actually introduce an operator **T**^{*} which corresponds to the metalanguage. In

principles. But this is not our primary concern. Our point, instead, is this: insofar as the Open-closurist view has a notion of truth that vindicates the (updated) Retro-closure principle, they will have to accept the conclusion that *God was genuinely ignorant*. Something was *true* (in the relevant sense) that God didn't believe: $\mathbf{P}(\mathbf{T}^* \mathbf{FB} \wedge \neg \mathbf{Ant} B)$. This is a conclusion MacFarlane must simply accept (on the assumption that MacFarlane does not wish to accept the first option, Omni-accuracy). In other words: MacFarlane is right about the supervaluationist. But we are right about MacFarlane. On his picture, God was ignorant. The question now becomes: is this result defensible? More particularly, is it (1) defensible that a theory of temporal semantics alone could rule out the former existence of an omniscient being in an indeterministic universe? And (2) is it *plausible* that, given the open future, we can nevertheless fairly charge God with having been ignorant – as Open-closurism suggests? It is these questions we take up in the remainder of the paper.

5. Ruling out omniscience?

Given that Open-closurism has the implications for omniscience we have outlined above, it seems that one could argue from Open-closurism and indeterminism to a substantial metaphysical conclusion:

1. Open-closurism is the correct semantic theory of temporal language.
2. The universe is indeterministic.
3. If Open-closurism is correct and the universe is indeterministic, then at some past time the universe lacked an omniscient being.
4. Therefore, at some past time the universe lacked an omniscient being.

Now, as a first approximation, the problem here is that this seems to prove too much. Needless to say, we are not insisting that since there indeed has always been an omniscient being in our indeterministic universe, and since the Open-closurist must deny that this is so, Open-closurism is false. Of course, our results do point to the following: theists – that is, those who *do* believe that there exists and has always existed an omniscient being – plausibly should not be Open-

fact, the only truth predicate MacFarlane introduces in the object language is what he calls *monadic truth* (pp. 93-94). The monadic truth predicate “True” is *transparent* in the sense that the following equivalence holds: True ϕ iff ϕ . But then, in this sense, it is false that future contingents are not True. We will set monadic truth aside. All that really matters here is that MacFarlane somehow wants to vindicate that backward-looking claims that it was true that a sea-battle would occur.

clousurists. And that is certainly an interesting, important result in itself. The point we wish to make is instead the following. 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 the universe contains or ever did contain an omniscient being. Here we are arguably following the advice of MacFarlane himself:

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. (MacFarlane 2014: 202-204)

Nor, we think, should a semantics for future-directed talk make presuppositions about the existence or non-existence of an omniscient being. This is a question for the metaphysician, or perhaps the philosopher of religion, or perhaps even the person in the pew – but at any rate it is not a question for the semanticist *qua* semanticist. In general, one could argue that a semantic theory—a theory concerned with the logic and compositional structure of the language—ought not settle certain substantive non-semantic questions. Although we find it very attractive, we can't hope to offer a defence of this general semantic neutrality principle here.²⁶ But the appeal to neutrality we are making is much narrower in scope: A correct semantic theory for temporal language must be compatible with the existence of an omniscient agent in a (deterministic or indeterministic) universe.

It is worth observing that the main alternative views concerning the semantics for future-contingents don't fail to be neutral in this way. Clearly, the Peircean can maintain the claim that, yesterday, there existed an omniscient God; the Peircean, in virtue of denying Retro-closure, will simply contend that, though yesterday God did not anticipate today's sea-battle, this doesn't

²⁶ The appeal to semantic neutrality is not novel with us. Above we quoted MacFarlane (2014) in connection to the neutrality of temporal semantics on determinism/indeterminism, but others have made similar appeals in other domains. For example, Yalcin (2010) is concerned with the semantics of the language of probability, and maintains neutrality on the metaphysical issues concerning “interpretations of probability”. He says, “We will consider natural language as we find it, without making assumptions about the nature of the domain(s) being described in advance. ... As we will see, one can make considerable progress limning the logic and compositional structure of probability operators in abstraction from substantive metaphysical assumptions.” (917). Likewise, Cariani (2014) defends the thesis that a semantic theory for normative language should be neutral between a range of normative and evaluative theories, and uses this to argue against certain theories of deontic modals that are not neutral in this regard. However, for complications concerning the neutrality constraint, see Cariani and Santorio (2018: 144).

show that yesterday God was ignorant – for, according to the Peircean, yesterday it wasn't *true* that there would be a sea-battle today. Similarly, the Ockhamist can plainly maintain that there exists and did exist an omniscient being (witness, for instance, Ockham). At any rate, if there is no Ockhamist *God* (no being that knows or did know the Ockhamist facts, as it were), this is certainly not the fault of the Ockhamist *semantics*. But the Open-closurist semanticist – in virtue of being such a semanticist – *cannot* maintain the claim (in the relevant context) that, yesterday, there existed an omniscient being. In this, the Open-closurists stand alone – and problematically so.

To flesh out this complaint, it is useful to compare the Open-closurist view with a view that might initially be seen as a partner in crime – that is, with a nearby view that *also* denies that there was an omniscient being, but does so on roughly *metaphysical* rather than semantic grounds. In particular, consider the picture endorsed by certain so-called “open theists” such as Swinburne, Hasker, and van Inwagen.²⁷ Like Open-closurists, such theists accept the thesis that past indeterminism implies that God was ignorant.²⁸ According to this version of open theism, that is, it was true that certain events were going to happen which God had not anticipated would happen. However, 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. *Prima facie*, Open-closurists might make exactly the same appeal: it was true that the events were going to happen – but anticipating them was impossible, even for a perfect knower.

The crucial difference between the given version of open theism and the view of the Open-closurist, however, concerns the proffered *grounds* of this impossibility. For the Open-closurist, it is semantic – whereas for the open theist, it is metaphysical. More particularly, on this open theist view, we have the following (Dialogue-5):

Us: Do you anticipate a sea-battle tomorrow?

God: No.

Us: Why not?

²⁷ Swinburne (2016: 175-199), Hasker (1989), van Inwagen (2008).

²⁸ However, they do not accept this result under this description. Instead, they seek to argue that, since the given truths were impossible to know, God can still be called “omniscient”, despite not knowing them. These philosophers argue that, just as omnipotence requires only an ability to do what is logically possible to do, omniscience only requires knowledge of what is logically possible to know. We disagree: if there are truths that a being doesn't know, that being is not properly called omniscient, *even if* those truths are impossible to know (Kvanvig 1986: 14-25). The better option for these philosophers is simply to deny that God is omniscient, but to maintain that God is as perfect knower as there could be anyhow. However, we set this complicating factor aside.

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?

God: Correct.

Us: And in that sense you are ignorant?

God: Correct.

[*time passes, and a sea-battle rages*]

Us: God, did you anticipate this sea-battle yesterday?

God: As I said yesterday, I didn't believe that there would be a sea-battle today – although now we can see that it was *true* that there would be a sea-battle today.

Us: Well, what's your excuse? I thought you were meant to be omniscient.

God: So some people say; but I am not, and was not. Let me explain. Yesterday it was *true* that there would be a sea-battle today – but this wasn't *determined*. Accordingly, there is nothing that I could have “looked at” yesterday to verify that there would be a sea-battle today. I could have known that there would be a sea-battle today only if I had some mystical insight into the contingent truths about the future – but (contrary to the well-meaning suggestions of my friend Plantinga²⁹) no one has or could have any such mystical insight.

Us: So your excuse for not believing that there would be a sea-battle today was solely the excuse of *non-determination*, and not the excuse of non-truth.

God: Correct.

²⁹ Plantinga (1993).

This view, then, simply *denies* Open-future (some future contingents are just true), but *accepts* that God doesn't anticipate the truths about the contingent future. Now, such a position may or may not be adequate, and its costs have been well-documented already.³⁰ The important point, for our purposes, is the grounds this view offers for the non-existence of an omniscient being. And the point is that those grounds are metaphysical, not semantic. Semantically, such open theists are *Ockhamists* (some future contingents are simply true), and there is no motivation from the Ockhamist semantics, per se, toward the rejection of an omniscient being. For example, on this view, although it is causally possible that there will be sea-battle tomorrow and causally possible that there won't be, according to the Ockhamist there in fact (e.g.) will be a sea battle tomorrow. And if God is omniscient, then God anticipates tomorrow's (non-determined) sea-battle. That's coherent. But these open theists reject omniscience because they insist that no one – not even God – could have access to the facts about the contingent future. So, what is telling these philosophers that there was no omniscient being is (very broadly speaking) their metaphysics of mind. (“No one has or could have any such mystical insight.”) It is not their semantic theory by itself.

6. Revoking omniscience

Our first complaint against Open-closurism (combined with Omni-correctness) is that such a theory, in itself, predicts whether and when an indeterministic universe contained an omniscient being. But even if we take on board these strong commitments, the resulting model of the ideal knower has the following implausible feature: The title of “knower of all the truths” is retrospectively revoked at each passing moment. We now turn to this second complaint.

Recall the position of the open theists discussed above. According to this view, if we ask the ideal knower – God – during the sea-battle whether he had been ignorant of the sea-battle, he will of course admit that he was. But on this view God simply *starts* by admitting that he is ignorant, and so it is hardly a mystery that retrospectively God should likewise admit that he *had been* ignorant.

The model provided by Open-closurism is importantly different on this front. God needn't admit current ignorance. Indeed, God should *deny* current ignorance, precisely in virtue

³⁰ On this approach, we have what has been called an “Ockhamist” 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 the future is open, in the sense that there are no truths concerning the contingent future, God nevertheless has anticipations concerning the contingent future (Schabel 2000, Knuuttila 2011).

of maintaining that the future is open. Looking forward into the future, that is, God has the excuse of non-truth: it isn't true that there will be a sea-battle tomorrow, and *that* is why he doesn't believe there will be a sea-battle tomorrow. Retrospectively, however, God does *not* have the excuse of non-truth. That is, in virtue of granting Retro-closure, when God looks back on the previous day, he is forced to admit that he *had been* ignorant. Given that God is fully aware of this impending revocation of his good epistemic status, it seems that he would be trapped in a perplexing cycle of self-doubt. To draw this out, consider this variant on Dialogue-4:

Us: Do you anticipate a sea-battle tomorrow? Or do you anticipate peace tomorrow?

God: Neither. It isn't true that there will be a sea-battle tomorrow, but nor is it true that there will be peace. The future is open.

Us: But there are no *truths* that escape your gaze? And in that sense, you are omniscient?

God: Correct. I am omniscient.

Us: Yet, either there will be a sea-battle tomorrow or there will be peace tomorrow. Right?

God: Right.

Us: So tomorrow you will either be saying "It was true that a sea battle would occur" or you will be saying "It was true that no sea-battle would occur."

God: That's right.

Us: So, you will be making one of those statements while recognizing that you anticipated neither a battle nor peace.

God: Right.

Us: So tomorrow you will either be admitting "It was true that a sea-battle would occur but I didn't anticipate that" or admitting "It was true that no sea-battle would occur but I didn't anticipate that".

God: Yes, since no truth escapes my gaze, that is what I foresee: I'll be saying "Yesterday some truth escaped my gaze".

Us: So, there is no truth that escapes your gaze, but tomorrow you will admit that some truth *did* in fact escape your gaze.

God: Yes.

Us: So why insist that you are omniscient if your future self will insist that you weren't?

God: [voice inaudible]

God seems to be flouting a sort of reflection principle: you shouldn't believe something if you think your future-self will disagree. The Open-closurist model predicts that at a given time the ideal knower is omniscient (and the ideal knower believes this), while the ideal knower nevertheless foresees that his omniscience will be revoked. This is a mysterious feature of the model. Plausibly, however, if God counts as being omniscient at a time, then it would seem to be a once-and-for-all assessment that God counts as having that feature at that time. But on the model under consideration, whether God counts as being *omniscient at a given time* depends on the temporal perspective. Relative to *today* God is omniscient today, but relative to *tomorrow* God is not omniscient today.

One might be tempted to insist that this is just the mystery of relativism at work. But this reply is inadequate. The sort of relativism at issue is explicitly motivated by (and *only* by) our (alleged) intuitive verdicts about what it is correct to say concerning future contingency and retrospective assessment. And what we have brought out is that relativism (and Open-closurism more generally) does *not* accord with our intuitive assessment of what is correct to say in these domains. We do not find it correct to suppose that, though omniscient today, it could nevertheless be that tomorrow the ideally rational agent will be saying, "Yesterday I had not been omniscient." More to the point, whereas the Open-closurist is right that we *do* find Open-future intuitive, and we *do* find Retro-closure intuitive, we have brought out that we do *not* find the consequences of the *conjunction* of these claims intuitive.

The intuitive incompatibility of Open-future and Retro-closure can be summed up as follows: If there is a robust intuition that if the future is open, then God can – contrary to what God grants in Dialogue-4 – deny past ignorance, then there is a robust intuition that if Open-future is true, then Retro-closure is not. Here, then, we must at last bring out the plausibility of God's simply *denying* Retro-closure, precisely on grounds of the open future. If we *begin* once

more by granting that God is omniscient, despite not believing that there will be a sea battle (and not believing that there will not be a sea battle), our contention is that God's response intuitively should be different:

Us: But it was true that a sea-battle was going to occur! And so something was true that you didn't believe! And so: you were ignorant.

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

Us: Yes.

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

Us: Yes.

And this seems odd. At this point, it seems that God should maintain the following:

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 even though a sea-battle occurred, and I didn't believe that a sea-battle would occur, it doesn't follow that I was not omniscient.

And what we have here is God simply denying Retro-closure. Now, our point is not that the denial of Retro-closure *in itself* is plausible, or unproblematic. Our contention 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 should maintain the following: just because the sea-battle occurred, this doesn't imply that it was true that it would occur. And so what we have, in effect, is a way of motivating the following thought: if you grant Open-future, you should deny Retro-closure. Otherwise, God would lack the point he evidently does seem to have.

Conclusion

The problem of future contingents has traditionally been connected to parallel issues regarding divine foreknowledge, and we have taken up this perspective in order to spell out what a temporal semantics that accepts both Open-future *and* Retro-closure predicts about omniscience.

We've argued that the resulting Open-closurist model has substantial unnoticed costs. The Open-closurist cannot maintain the classical view that God is Omni-accurate without accepting that God's anticipations are implausibly constitutively dependent on the future. But the more promising position for Open-closurist, which abandons Omni-accuracy in favor of Omni-correctness, implausibly predicts, by itself, that there was no formerly omniscient being in an indeterministic universe, and encounters the startling result that God had been ignorant – despite the openness of the future! In light of these results, perhaps Open Futurists should resume the recently much neglected project, not of explaining how they might *save* Retro-closure, but how they might credibly deny it.

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