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# Around the Tree

## Semantic and Metaphysical Issues Concerning Branching and the Open Future

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Fabrice Correia • Andrea Iacona
Editors

# Around the Tree

## Semantic and Metaphysical Issues Concerning Branching and the Open Future

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# Timeless Truth

**Andrea Iacona**

**Abstract** A fairly simple theory of the semantics of tense is obtained by combining three claims: (1) for any time *t*, a present-tense sentence 'p' is either true or false at *t*; (2) for any time *t′* earlier than *t*, the future-tense sentence 'It will be the case that p at *t*' is true at *t′* if 'p' is true at *t*, false otherwise; (3) for any time *t′* later than *t*, the past-tense sentence 'It was the case that p at *t*' is true at *t′* if 'p' is true at *t*, false otherwise. This theory, which has been called the *theory of timeless truth*, is often dismissed on the basis of its alleged incapacity to comply with indeterminism. Here, instead, it will be suggested that there is no reason to be dismissive. Once the theory is properly articulated and some common misunderstandings are dispelled, it turns out clear that there is a coherent sense in which (1)-(3) are compatible with indeterminism.

## Introduction

According to the theory of timeless truth, the truth-value of a sentence at a time is insensitive to variation of temporal perspective. Suppose that the following sentence is true today:

(1) There is a sea battle.

The theory entails that the following sentence was true yesterday:

(2) There will be a sea battle tomorrow.

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Similarly, it entails that the following sentence will be true tomorrow:

(3) There was a sea battle yesterday.

This means that (1) is true today no matter whether we 'look' at it from a temporal perspective that differs from the perspective we have on today. The truth-value of (2) yesterday and the truth-value of (3) tomorrow depend what the truth-value of (1) today depends, namely, the way things are today. (1)–(3) may be regarded as different descriptions of one and the same fact. Since that fact is in no way dependent on time, the same goes for the truth-value of (1)–(3). This is the sense in which truth is said to be timeless.[1]

At least two things must be clear about the claim that truth is timeless. The first is that the claim concerns utterances, that is, sentences at times. To say that 'p' is true at *t* is to say that it is true that p at *t*. If one utters 'p' at *t*, one says that p at *t*; hence, what one says is true if and only if p at *t*. For example, if one utters (1) today, one says that there is a sea battle today; hence, what one says is true if and only if there is a sea battle today. Timeless truth is taken to be a property of things said by uttering sentences, rather than of sentences themselves. So a tensed use of 'is true' is acceptable when truth is ascribed to sentences: one can say that a sentence is or was or will be true. For a tensed ascription of truth to a sentence is equivalent to a tenseless ascription of truth to the corresponding utterance. Thus, '(2) was true yesterday' is equivalent to 'the thing said by uttering (2) yesterday is true'.[2]

The second thing that must be clear is that timelessness is not quite the same thing as eternity. To say that an utterance is timelessly true is to say that its truth is in no way relative to time. The 'is' in 'is true' is like the 'is' in 'Two plus two is equal to four'. So 'is true' is not to be read as 'is true at every time'. Truth at every time, eternal truth, may rightly be ascribed to sentences. For example, the sentence 'Two plus two is equal to four' is eternally true in that, for every time, it is true at that time. But what is said by uttering the sentence at this or that time is simply true. Obviously, this does not mean that it makes no sense at all to say that an utterance is eternally true. The fact is rather that, in saying it, nothing is added to the claim that the utterance is true.

The simplicity of the theory of timeless truth lies in the logical symmetry it postulates between past and future. The thought that underlies the theory is that past and future do not differ in logically relevant ways. This holds in at least three important respects. In the first place, *bivalence* holds, in that every utterance is either true or false. For example, (2) is either true or false today, just as any other day. The same goes for (3).

In the second place, truth complies with the *disquotation principle*. For any sentence 'p', the following schema is true at any time: 'p' is true if and only if p. Consider:

(4) 'There will be a sea battle tomorrow' is true if and only if there will be a sea battle tomorrow

[1] The label 'theory of timeless truth' goes back to McCall (1966), which dismisses the theory.

[2] Here, no assumption is made about the existence of concrete acts of utterance.

The left-hand side of (4), uttered today, states that (2) is true today, so it is true today just in case (2) is true today. Since the right-hand side of (4) is nothing but (2), both sides are true today if (1) is true tomorrow. The same goes for falsity. So the schema applies to (2), just as it applies to (3).

In the third place, past and future are alike as far as *truth-value links* are concerned. Truth-value links are principles that articulate connections of truth-value between different tensed sentences uttered at different times. Consider the truth-value of (1) today and the truth-value of (2) yesterday. There is a straightforward relation between these two truth-values, and this relation is specular to that between the truth-value of (1) today and the truth-value of (3) tomorrow.[3]

## The Aristotelian objection

A foregone objection to the theory of timeless truth comes from a thesis that is very influential in the logic and the philosophy of time. Let a *future-oriented utterance* be an utterance of a future-tense sentence such as (2), that is, a sentence whose truth-value at the time of the utterance depends on the way things are at some later time. The thesis – call it the *necessitation thesis* – goes as follows:

(N) If future-oriented utterances have a truth-value, the future is necessary.

Here, 'truth-value' is understood in the classical sense in which the absence of truth and falsity is not itself a truth-value, and 'necessary' stands for 'historically necessary', that is, 'necessary relative to our past and our present'. Since the theory of timeless truth entails that future-oriented utterances have a truth-value, (N) may be invoked against it: the future is not necessary, so it is not the case that future-oriented utterances have a truth-value.[4]

This objection may be called the Aristotelian objection, as Aristotle was probably the first to suggest that the necessitation thesis may be adopted as a premise of an argument by contraposition to the effect that future-oriented utterances lack truth-value: if (2) is true today, then it is necessary that there will be a sea battle tomorrow, and if it is false today, then it is necessary that no sea battle will take place. In both cases, the consequent must be rejected, so the same goes for the antecedent.[5]

Many logicians and philosophers after Aristotle have pursued the thought that, in order to account for future contingency, future-oriented utterances are to be deemed neither true nor false. One way to articulate this thought is to define a semantics based on a tree model, in which a future-tense sentence 'It will be the case that p at *t*' can be evaluated as true or false at a time *t′* earlier than *t* relative to different possible

[3] Dummett (1996, p. 363), draws attention to truth-value links.

[4] Words such as 'settled' or 'inevitable' are often used as synonymous with 'historically necessary', so they may equally be employed to phrase (N).

[5] Or at least, this is the reasoning that a widely accepted reading of *De interpretatione* 9 attributes to Aristotle.

continuations of the state of affairs obtaining at $t'$. These possible continuations are represented as branches of a tree. So the sentence may be true at $t'$ relative to some branches yet false relative to others.[6]

The rationale for (N) that most of its supporters take for granted is that a future-tense sentence has a given truth-value at a given time only if it has that value at that time in all possible futures. Since there are many possible futures, one may think, the only way in which (2) can have a truth-value today is that in which it has the same value in all of them: how can (2) be true today if in some possible future there is no sea battle? The argument goes as follows:

(5) If future-oriented utterances have a truth-value, the sentences uttered have the same truth-value in all possible futures.
(6) If the sentences uttered have the same truth-value in all possible futures, the future is necessary.

(N) If future-oriented utterances have a truth-value, the future is necessary.

The tree model provides a rigorous way to give substance to (5). Suppose, for $t$ later than $t'$, that 'It will be the case that p at $t$' is true at $t'$ relative to some branches but false at $t'$ relative to others. If truth at $t'$ is understood as truth at $t'$ relative to all branches, the sentence is neither true nor false at $t'$. The motivation for (6) is clear. If there is no difference in the truth-value of the sentences uttered, there is no difference between branches; hence, only one future is possible.[7]

Clearly, those who are sympathetic with this argument are apt to think that what holds for sentences holds for subsentential expressions. Consider the following definite description:

(7) The next president of the USA.

Suppose that (7) is uttered before the next presidential elections as part of a sentence, say

(8) The next president of the USA will visit China very soon.

In this case, the view is that (7) has no reference. For if it had a reference, the result of the next presidential elections would be necessary. The rationale for the conditional is similar to that for (N), that is, having a reference amounts to having the same reference in all possible futures. It is easy to see how the view may be generalized. If 'extension' is understood in the usual way, it may be claimed that what holds for (7) holds for any expression whose extension at the time of utterance depends on the way things are at some later time.

[6] The standard supervaluational account proposed in Thomason (1970) is of this kind. A precursor is Van Fraassen (1966). More recent examples are the account offered in McCall (1976), Belnap et al. (2001) and MacFarlane (2003).

[7] The semantics provided in Thomason (1970) justifies (5) in the way considered. Note that (5) is also justified in a tree-like semantics that does not include a nonrelative definition of truth based on a quantification over branches, such as the semantics offered in Belnap et al. (2001). In that case, (5) holds vacuously, since its antecedent is never satisfied.

The argument for (N), however, is less solid than expected. Its weakness lies in the very notion that seems to make it strong, namely, that having a given truth-value amounts to having that value in all possible futures. According to that notion, 'It will be the case that p at *t*' is true if and only if it is necessary that it will be the case that p at *t*. This is not quite the same thing as to say that 'It will be the case that p at *t*' is equivalent to 'Necessarily, it will be the case that p at *t*'. Only the first equivalence is required, as it is shown by the fact that in tree-like semantics 'It will be the case that p at *t*' and 'Necessarily, it will be the case that p at *t*' can take different values. Yet that equivalence may plausibly be denied.

One way to see the difference between the claim that 'It will be the case that p at *t*' is true and the claim that necessarily it will be the case that p at *t* is to realize that a rational subject may have different attitudes toward them. Suppose that Indy is indeterminist about tomorrow's weather: he believes that it is possible that it rains tomorrow and that it is possible that it doesn't. Indy is planning a day out tomorrow, so he watches a forecast on TV. The forecast says 'Sun tomorrow', and he says 'I hope that's true'. It is plausible that Indy does not hope the negation of what he believes, so he does not hope that necessarily it will be sunny tomorrow. This means that the inference from 'Indy hopes that "It will be sunny tomorrow" is true' to 'Indy hopes that necessarily it will be sunny tomorrow' is not legitimate.[8]

Another way to see the difference between the claim that 'It will be the case that p at *t*' is true and the claim that necessarily it will be the case that p at *t* is to consider retrospective assessments. Suppose that Indy calls Andy after watching the TV forecast, and says 'It will be sunny tomorrow'. If the day after it is sunny, Andy can correctly affirm 'what Indy said was true'. According to Andy's retrospective assessment, 'It will be sunny tomorrow' is true as uttered by Indy the day before. But having this truth-value does not prevent it from being possibly false the day before. Andy may coherently think that what Indy said yesterday was true and it was possible yesterday that today it would rain. Therefore, it seems that the truth of the sentence does not amount to its truth in all possible futures.[9]

Propositional attitude ascriptions and retrospective assessments seem to show, like two faces of the same medal, that there is a difference between saying that 'It will be the case that p at *t*' is true and saying that necessarily it will be the case that p at *t*. Similar considerations hold for subsentential expressions. Suppose that the day before the elections a newspaper publishes an article that contains (8). There is no apparent inconsistency in thinking that (7) refers to Barack Obama, even though it could refer to Mitt Romney. Imagine that Obama wins and that 2 weeks after his inauguration the White House issues a press release saying that he is ready to leave on official visit to China. Then the author of the article may rightfully assert: 'I said he would go!' Since 'he' refers to Obama, this means that the statement made in the

[8] A similar example is discussed in Burgess (1978, pp. 160–161). Further examples involving bets may easily be provided, as in Belnap et al. (2001, p. 160).

[9] MacFarlane (2008, pp. 89–90), recognizes that past unsettledness is consistent with the truth of past claims concerning the present, although the moral he draws is different.

article is reported as a statement about Obama. Nonetheless, the author may firmly believe that the result of the elections was not necessary. Romney could win, so the day before the elections (7) did not refer to Obama in all possible futures.

Future-oriented utterances are occasionally described as utterances that lack *determinacy*: it is said that (2) has no determinate truth-value today, or that (7) has no determinate reference today. The underlying assumption is that having a determinate extension amounts to having the same extension in all possible futures. If this assumption is granted, the point may be stated as follows. It is plausible that (2) has no determinate truth-value today, or that (7) has no determinate reference today. But this does not mean that (2) has no truth-value today, or that (7) has no reference today. Until proved otherwise, an expression may have an extension even though it does not have a determinate extension.[10]

## The necessitation thesis again

The foregoing discussion of the argument for (N) is relevant to the assessment of another version of the necessitation thesis, the version that underpins the relativist semantics proposed by John MacFarlane. That semantics is intended to solve a problem that concerns sentences such as (2). MacFarlane says that we are torn between two intuitions. On the one hand, today we are tempted to say that (2) is neither true nor false, because there are possible futures in which it is true and possible futures in which it is false. This is what he calls 'the indeterminacy intuition'. On the other, tomorrow we will be tempted to say that the assertion does have a definite truth-value: once the sea battle has happened (or not), it seems strange to deny that the assertion was true (or false). This is what he calls 'the determinacy intuition'. MacFarlane claims that the two 'intuitions' are incompatible only on the assumption that utterance truth is nonrelative. For no conflict arises if we drop that assumption and accept that the same utterance can have different truth-values relative to different 'contexts of assessment'. His suggestion is that (2), as uttered today, is neither true nor false as assessed today, but true (or false) as assessed tomorrow. Therefore, his version of the necessitation thesis seems to be the following:

(N′) If future-tense sentences have a truth-value as assessed at the time of utterance, the future is necessary

From (N′) and the premise that the future is not necessary, it follows that future-tense sentences lack truth-value as assessed at the time of utterance.[11]

This line of thought rests on the presumption that truth and determinate truth are the same thing. According to MacFarlane, (2) as assessed today lacks a truth-value because it is true in some but not in all possible futures. However, if truth and

[10] The thought that a sentence may be true without being determinately true is entertained in Von Wright (1984, pp. 8–11), Lewis (1986, p. 208) and Horwich (1987, p. 32).

[11] MacFarlane (2003). Brogaard (2008) agrees with MacFarlane on the problem, although not on the solution.

determinate truth are not the same thing, (2) may be true (or false) without being determinately true (or false). More generally, the following conditional is not guaranteed to hold: if future-tense sentences have a truth-value as assessed at the time of utterance, they have the same value in all possible futures. Therefore, (N′) cannot be inferred from this conditional, and the premise that if future-tense sentences have the same value in all possible futures then the future is necessary. MacFarlane's justification of (N′) is nothing but a variant of the argument for (N), with the same flaw.

Not only the equation of truth with determinate truth is vital to MacFarlane's justification of (N′), it is also vital to the statement of the very problem he wants to solve. Consider the 'indeterminacy intuition'. Leaving aside the issue of whether we have evidence about the lack of truth-value of (2) today that is distinguishable from the mere epistemic fact that today we are not in a position to know whether (2) is true or false, the point is that if we do, the evidence must be that (2) is neither determinately true nor determinately false today. Similarly, the 'determinacy intuition' must be that (2) is determinately true (or determinately false) tomorrow. But if truth and determinate truth do not coincide, it is not obvious that these two 'intuitions' are incompatible. (2) may have the same truth-value today and tomorrow, with the difference that tomorrow, not today, that value is determinate. There is no apparent inconsistency in the claim that (2) has a determinate truth-value only tomorrow.

The Aristotelian objection can so be thwarted. On both versions of the necessitation thesis, the argument for the thesis rests on the assumption that having a truth-value amounts to having the same value in all possible futures. But this assumption may be denied if a distinction is drawn between truth and determinate truth. Therefore, unless the distinction is shown to be illusory, the necessitation thesis may be rejected. The next two sections show that there is a way to substantiate the theory of timeless truth that is consistent with the denial of the necessitation thesis.

## Ockhamism

The core idea is easy to grasp, as it is the first thing that comes to mind. Consider (2) as uttered today. There is an obvious way to explain what is the condition at which (2) is true, that is, (2) is true if and only if there will in fact be a sea battle tomorrow. If we entertain (2) as a hypothesis about tomorrow, our concern – the question we are addressing – is whether there will in fact be a sea battle tomorrow. As 'in fact' indicates, truth is a matter of *actuality*. Just like a present-tense sentence 'p' is true at *t* if and only if it is actually the case that p at *t* and a past-tense sentence 'It was the case that p at *t*' is true after *t* if an only if it is actually the case that p at *t*, a future-tense sentence 'It will be the case that p at *t*' is true before *t* if and only if it is actually the case that p at *t*.

According to William of Ockham, one among the possible futures has a special status, that of being the 'true' future, and the truth-value of (2) today depends on what happens in it. Here, the idea is essentially the same. Let a *history* be a possible

course of events, and let it be agreed that there is a plurality of histories, one for each possible continuation of the present state of affairs. The truth-value of (2) today depends on what happens in one of these histories, the *actual* history. So the view under consideration may rightly be called 'Ockhamism'.[12]

On this view, the distinction between truth and determinate truth is to be understood in terms of the distinction between actuality and necessity. To say that (2) as uttered today is determinately true is to say that in all histories there is a sea battle tomorrow. In other words, truth is truth in the actual history, determinate truth is truth in all histories. So determinate truth entails truth, but is not entailed by it. A sentence may be true without being determinately true, if it is true in the actual history but false in some other history.

Ockhamism provides a clear explanation of the three elements of symmetry that characterize the theory of timeless truth. In the first place, bivalence holds. A future-tense sentence 'It will be the case that p at *t*' is either true or false at any time earlier than *t*. For either the actual history is such that p at *t* or it is not. So there is no difference between future-tense sentences and past-tense sentences as far as truth is concerned. At most, there may be a difference in determinate truth. It is consistent with the view to hold that a future-tense sentence, unlike a past-tense sentence, can be neither determinately true nor determinately false. Yet bivalence concerns truth, not determinate truth.

In the second place, truth conforms to the disquotation principle. The left-hand side of (4) is true today if and only if its right-hand side is true today. For the left-hand side of (4) as uttered today is true if and only if (2) as uttered today is true in the actual history. This is a result that one wouldn't get if truth were identified with determinate truth. For in that case one would get that today there are possible futures in which the right-hand side of (4) is true while its left-hand side is not.[13]

In the third place, the two truth-value links considered obtain. Suppose that (1) is true today. Then (2) was true yesterday. For the truth of (2) yesterday depended on what would happen today in the actual history. The same goes for the converse entailment. The truth-value link between (1) and (3) is similar. Note that if truth were identified with determinate truth, the first truth-value link would be in question. The supposition that (1) is true today would be consistent with the supposition that (2) was neither true nor false yesterday. For the truth of (2) yesterday would depend on all the courses of events that were possible yesterday.[14]

In substance, according to Ockhamism the theory of timeless truth may be regarded as an adequate characterization of truth, as distinct from determinate truth. The fact that truth does not entail determinate truth makes the denial of the neces-

[12] Øhrstrøm (2009, pp. 17–21), explains Ockham's conception. Adams (1986, p. 329, fn. 20), hints at an account of future-tense sentences along these lines.

[13] As it has been emphasized by the advocates of supervaluationism, this leaves room for a different sense in which ''p' is true' is equivalent to 'p'. See Van Fraassen (1966).

[14] MacFarlane (2008) argues that his semantics squares with the first truth-value link. But the issue is controversial, see Moruzzi and Wright (2009, Sect. 5) and Wright (2008, pp. 182–184).

sitation thesis acceptable. The conclusion that the future is necessary can be inferred from the premise that future-oriented utterances are determinately true or determinately false, but it cannot be inferred from the premise that they are true or false. So the theory is consistent with the assumption that the future is not necessary.[15]

More specifically, Ockhamism is consistent with indeterminism on at least one familiar understanding of indeterminism. Let a *state* be a way in which the world can be at a time. That is, saying that a certain state obtains at a given time amounts to saying that things are in a certain way at that time. If $S$ is a state that obtains at a time $t$ and $S'$ is a state that obtains at a later time $t'$, *determination* may be defined as follows:

(D) $S$ determines $S'$ if and only if the obtaining of $S$ at $t$ and the laws of nature entail that $S'$ obtains at $t'$.[16]

Determinism may be understood as the claim that, for any time, the state of the world at that time is determined by its state at some earlier time. Indeterminism may be understood as the negation of that claim. Now suppose that two histories are in the same state at $t$, just as at any earlier time, but that they are in two different states at $t'$, neither of which is determined by their state at $t$. This supposition is compatible with the hypothesis that only one of the two histories is actual, namely, that only one of the two states at $t'$ is actually instantiated.

## Further clarifications

The idea that truth is a matter of actuality naturally fits into a broader picture. Consider (7) as uttered today. There is an obvious way to explain what is the reference of (7), that is, (7) refers to the candidate that will in fact win the elections. Again, 'in fact' indicates actuality. One and only one candidate will actually win the elections, and the intended reference of (7) is precisely that candidate. Thus, a definite description uttered at $t$ can refer to an object that exists at $t'$. More generally, the extension of an expression $e$ uttered at $t$ may involve a relation that ties $e$ to something that belongs to a time later than $t$.[17]

Two issues must be addressed to get a better understanding of this picture. The first is metaphysical. One may ask whether it makes sense to talk of a relation as

[15] As Von Wright (1984, p. 9) suggests, determinate truth may be seen as the combination of two components. One, truth, is atemporal. The other, determinacy, is temporal; hence, it accounts for the temporal character of determinate truth.

[16] Hoefer (2003) is one of the works in which a definition along these lines is adopted to characterize determinism.

[17] Kaplan (1985, p. 397) suggests that we refer to future persons through acts of demonstration that essentially involve definite descriptions. Kaplan's suggestion has been discussed in several works, among which Adams (1986). However, that discussion is to a good extent irrelevant here, in that its focus is whether it is possible to have rigid designation towards the future. To ask whether a singular term about the future has a reference is not the same as to ask whether it is a rigid designator, unless having a reference amounts to having the same reference in all possible futures.

obtaining if one of its terms does not exist now. The answer is that it does make sense. A reasoning that seems to lead to the opposite conclusion is the following: a necessary condition for the existence of a relation is the existence of its terms; therefore, if one of the terms of a relation doesn't exist now, the relation itself doesn't exist now. This reasoning, however, is a *non sequitur*. The necessary condition does not entail that in order for a relation to exist at $t$, its terms must exist at $t$. If it did, then many relations we are familiar with would exist at no time. For example, if $x$ is ancestor of $y$, $x$ and $y$ exist at different times. The fact is that many relations we are familiar with are *transtemporal*, that is, they obtain between entities located a different times. If a relation obtains between an expression $e$ uttered at $t$ and something that exists at $t'$, it is simply one of them.[18]

It is not even clear whether it is meaningful at all to talk of transtemporal relations as existing at times. To ask whether a relation that obtains between an entity located at $t$ and an entity located at $t'$ exists at $t$ is like asking whether a relation that obtains between an entity located in a place $p$ and an entity located in a place $p'$ – such as being to the right of – exists at $p$. This is not to say that there is a clear notion of what it is for a transtemporal relation to exist. Transtemporal relations might exist *simpliciter*, or outside time, or at any time, or for extended periods of time. In any event, all that matters here is that there is no reason to exclude that transtemporal relations can be described without presupposing that their existence is relative to time in the implausible way considered. Therefore, unless one is willing to deny the existence of transtemporal relations, one must agree that no specific metaphysical trouble arises with transtemporality in the case of future-oriented utterances.

The second issue is epistemological. To say that a relation obtains between an expression $e$ uttered at $t$ and something that exists at a later time $t'$ is to say that the second term of the relation, hence, the relation itself is unknowable at $t$. One may then ask whether it makes sense to talk of a relation when one of its terms is unknowable. As in the first case, the answer is that it does make sense. The unknowability of a relation at a time is not a reason to deny that the relation can obtain. When one utters $e$ at $t$, one's use of $e$ is guided by the intention to talk about something that belongs to $t'$. Thus if one utters (7) today, one's use of (7) is guided by the intention to refer to the winner of the next presidential elections. Nothing prevents us from thinking that the utterance, in accordance with that intention, fixes the relation independently of one's state of knowledge at $t$.[19]

A spatial analogy may illustrate. In many action movies, there is a scene in which the good guy and the bad guy are in different rooms of the same house, each of them slowly walking without making noise in order to kill the other without being killed. Imagine that the following circumstance takes place in a situation like this. Al doesn't know Bob, he has never seen him. But he senses that a man is standing behind a

[18] Adams (1986, p. 320), uses the example of causation against the reasoning considered.

[19] Kaplan (1973, p. 500) considers definite descriptions whose reference is not knowable at the time of their utterance and calls them 'blind'.

door in front of him. He points his gun towards the centre of the door, fires off, and hits Bob. Since Al can't see Bob from his position, Al's intention is generically directed toward the man behind the door. It is not an intention to hit a specific man. However, once the gun fires off, the bullet is able to go through the door and hit Bob without further assistance. The semantic relation that ties an expression *e* uttered at *t* to an entity that exists at a later time *t′* has something in common with the ballistic relation between Al and Bob. Consider (7) as uttered today. Since we are not in a position to know who will win the elections, the intention that guides our use of (7) does not involve specific knowledge of its reference. But the utterance, in accordance with that intention, is able to get to the right person independently of this limitation.

It may be observed that there is an important difference between the man behind the door and an entity that can exist in the future, that is, the latter does not exist now. This is right. But note that the analogy is a spatial analogy, so it represents a relation between entities located at different times as a relation between entities located in different places. The two cases are similar in at least one crucial respect. Even if the spatial relation – the trajectory of the bullet – is not visible from the shooting position, it could be described by an external observer, say, a third man with special x-ray glasses who is above the two rooms and is able to see what happens in both. Similarly, even if the temporal relation – the semantic connection between an expression and the relevant entity – is not accessible at the time of the utterance, it could be described from an external point of view, a perspective from which different times can be ordered in a sequence.

As the shooting analogy suggests, a future-oriented utterance has semantic effects that go beyond our control. The extension of an expression *e* uttered at *t* may reach things that are inaccessible at *t*. On the assumption that extension is part of meaning, this is to say that the meaning of *e* is not transparent to one who uses *e* at *t*, that is, using *e* at *t* does not entail being in a position to know at *t* what *e* means. Non-transparency so construed is easy to accept. Independent evidence shows that a speaker can correctly use an expression without knowing its extension. For example, detectives often use the description 'the murderer' without knowing its reference. Therefore, the way in which meaning fails to be transparent is quite trivial and hardly controversial. A less trivial and more controversial form of non-transparency would involve some component of meaning other than extension: sense, intension or linguistic meaning. But no such component is in question here.

## Some arguments against Ockhamism

Even though it is hardly disputable that the theory of timeless truth is indeterministic in the sense outlined in the fourth section, it may be contended that there is some important sense, other than that, in which it is not indeterministic. It is often repeated that indeterminism entails that no history is 'the' actual history. Some advocates of the tree model have suggested that any account of the semantics of tensed discourse

that makes reference to a distinguished history as the actual history is misguided. The distinguished history in question is what Nuel Belnap, Michael Perloff and Ming Xu call the *Thin Red Line*. According to them, even if we are inclined to talk of a unique actual future, this inclination must be resisted.[20]

The considerations in this direction can be divided into two categories. A first claim that has been made about Ockhamism is that the hypothesis that there is such thing as the actual history collides with a metaphysical conception, *branching*, that underlies the tree model. On that conception, two histories can overlap, that is, they can have a temporal part in common. A second claim that has been made is that if the hypothesis is maintained and branching is dropped, genuine indeterminism is lost. In this section, three arguments for the first claim will be examined.

The first argument is intended to show that it doesn't even make sense to talk of the actual history if branching holds. The argument goes as follows. The definite description 'the actual history' has no reference. If it had a reference, it would have the same reference in all branches. But that cannot be the case. Each branch is actual from its own point of view. That is, in each history, 'the actual history' refers to that history.[21]

This argument combines a shared assumption – that in each history, 'the actual history' refers to that history – with an assumption that is welcome among the advocates of the tree model, namely, that a definite description has a reference only if it has the same reference in all possible futures. As it turns out from the second section, however, the second assumption may be rejected if a distinction is drawn between reference and determinate reference. The reference of 'the actual history' is fixed in exactly the same way in which the reference of (7) or any other definite description is fixed: 'the actual history' refers to what in the actual history uniquely satisfies the condition of being an actual history, namely, the actual history itself.[22]

The second argument goes as follows. If a given history is the actual history, there must be something in the world that makes it so. But branching demands that all possibilities are equal. Therefore, it makes little sense to represent a plurality of histories as a tree and mark one of them in red as the actual history:

> What in the structure of our world could determine a single possibility from among all the others to be 'actual'? As far as we know, there is nothing in any science that would help. To the extent that scientific theories require objective possibilities for the future, there is no hint that those theories pick out a Thin Red Line.[23]

[20] This does not mean that the tree model rules out actuality talk. On that model, it is certainly possible to define an actuality operator, as in Belnap et al. (2001, p. 246), or in MacFarlane (2008, pp. 98–101). But such operator leaves no room for the ascription of actuality to a single course of events.

[21] See MacFarlane (2003, p. 326). A slightly different version of the argument – see Belnap and Green (1994, p. 381), Belnap et al. (2001, p. 164) and MacFarlane (2008, p. 85) – invokes the indexical account of actuality proposed in Lewis (1983, pp. 18–20): if 'the actual history' had a reference, then 'our history' would have a reference, but that cannot be the case, given that we are in more than one history.

[22] Van Inwagen (1980, pp. 410–412), calls 'weak theory' the shared assumption and distinguishes it from the indexical account. As to the version of the argument based on that account, note that it might not be granted that we are in more than one history.

[23] Belnap et al. (2001, pp. 162).

This argument rests on a confusion. One thing is to say that a given history is the actual history, quite another thing is to say that something in the world makes it so. Perhaps there is nothing in 'the structure of the world' that determines a single possibility to be actual, yet this does not prevent that possibility from being actual. No matter whether (D) or some other definition is adopted to characterize determination, the distinction between actual and non-actual can be drawn independently of any consideration about determination. Something may be actual without being determined to be actual.[24]

The third argument goes as follows. Imagine a plurality of histories as a tree. If one of the branches is marked in red as the actual history, it is no longer clear how the other branches can represent genuine possibilities. For their non-actuality seems to rule out that they are genuine continuations of the same past:

> But, in our view, allowing any state to already be marked as that which will become actual, or as that state which is (atemporally) actual, reintroduces the linear conception, because it denies that the other states are real alternatives. That is to say, under such a theory the additional alternatives become mere logical possibilities with no ontological claims whatever.[25]

There is something right and something wrong in this argument. Let $h$ and $h'$ be histories that include different futures $f$ and $f'$, and suppose that only $h$ is actual. It is legitimate to ask whether $f'$ can be a genuine continuation of the part of $h$ that precedes $f$, hence whether $h$ and $h'$ can overlap. But a negative answer to this question is not to be confused with the claim that $f'$ is not a a genuine possibility. Certainly, $f'$ is non-actual. But non-actuality does not rule out possibility. It is not actually the case that I'm lying on a beach, but this does not prevent such a state of affairs from being possible. Thus, the case of $h$ and $h'$ shows at most that Ockhamism is at odds with branching, which is not the same thing as to show that it is at odds with indeterminism. If what indeterminism requires is that more than one future is possible, indeterminism may equally be framed in terms of the conception that David Lewis calls *divergence*, the conception on which there is no overlap, even though two histories can have qualitatively identical temporal parts. Non-actual futures may be conceived as parts of histories that are wholly distinct from the actual history.[26]

## Other arguments against Ockhamism

Let us grant, in accordance with the third argument considered in the previous section, that the first claim is true: the hypothesis that there is such thing as the actual future clashes with branching; hence, it can be held only in combination with divergence. According to the second claim, accepting that combination amounts to giving

[24] Rosenkranz (this volume) spells out the confusion in this argument by distinguishing two senses of 'determine', p.

[25] McArthur (1974, pp. 284–285). The same argument appears in MacFarlane (2003, p. 325)

[26] Lewis (1986) spells out the difference between branching and divergence, pp. 206–209, and argues in favour of divergence.

up indeterminism. In this section, three arguments in support of the second claim will be examined, to show that none of them resists scrutiny.[27]

The first goes as follows. In the scenario envisaged by Lewis, for each utterance there is at most one history to which the utterance belongs. In this sense, the future is determinate:

> Given a context of utterance, there is only one possible future history that contains it: the future is in that sense determined. Granted, there are other possible worlds that are qualitative duplicates of the actual world up to the present and diverge thereafter, but these worlds contain different utterances (and utterers), mere 'counterparts' of the actual ones.[28]

This is not a good argument. To begin with, if divergence is understood as the claim that histories do not overlap – independently of what Lewis adds to that claim – divergence does not entail that each utterance belongs to at most one history. Whether such relation obtains depends on how utterances are individuated. More specifically, it depends on whether contexts are defined in terms of objects that can belong to at most one possible world (including the possible world itself) or in terms of properties that can be instantiated in different possible worlds. All that it is assumed here is that contexts include time as a parameter of the second kind, which leaves unsettled the issue of the individuation of utterances. But even if contexts were so defined as to make utterances relative to possible worlds, it is not clear what should be wrong with that. Suppose that the actual world is part of the context that constitutes my present utterance of the sentence 'I'm writing a paper'. Then what I'm saying concerns the actual world, that is, I'm saying that I'm actually writing a paper. Trivially, my utterance is a necessarily true utterance that belongs only to the actual world. But this is acceptable. In particular, it does not contradict the apparent contingency of the fact that I'm writing a paper. For that contingency can be explained without referring to utterances so individuated: if we define an utterance* in terms of contextual parameters shared by different possible worlds, then my present utterance* of 'I'm writing a paper' is true in the actual world but false in some other world. The case of (2) is similar. If contexts are so defined as to include histories, then the future contingency of the sea battle is not to be phrased in terms of different histories in which the same utterance takes different truth-values, but rather in terms of different histories in which the same utterance* takes different truth-values. So it is hard to see how the uniqueness of the history to which an utterance belongs can have deterministic consequences.

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[27] Note that rejecting branching is not quite the same thing as rejecting the tree model. The tree model is a formal apparatus, and a formal apparatus can be interpreted in more than one way. An alternative and equally legitimate interpretation of the model is that according to which the branches of the tree represent possible sequences of states rather than possible courses of events that instantiate them. Two histories may be in the same state up to a certain time, so a single segment in the diagram can represent the common sequence of states that ends at that time. On this interpretation, no conflict arises between the tree model and Ockhamism. Even if the actual history instantiates a single sequence of states, the other sequences of states are equally possible, as they are instantiated by wholly distinct histories.

[28] MacFarlane (2003, p. 326).

The second argument hinges on a distinction that sometimes is drawn between 'determined', read as 'subject to determination', and 'determinate', read as 'attribute-specific': while the property expressed by the first term concerns some kind of relation between events located at different times, that expressed by the second concerns some sort of completeness in the features that events have at any given time. With this distinction in mind, it might be contended that, even if Ockhamism does not entail that the future is determined, it nonetheless entails that there is a determinate future.[29]

This argument is wrongheaded. The distinction between the two properties is legitimate. But it is questionable that the second property matters to the issue of whether the universe is deterministic or indeterministic. The notion of a determinate possible future is something that an indeterminist can accept, as it is proved by the fact that the friends of branching accept it. If one endorses branching, one contemplates a plurality of possible futures each of which is determinate. What the Ockhamism entails is simply that one of them is actual.[30]

Note that similar considerations undermine the objection that according to Ockhamism the future 'exists'. An indeterminist can accept that there are many possible futures each of which exists. Again, the friends of branching accept it. Ockhamism requires no ontological addition in that sense. What it requires is simply that one among the existing possible futures is actual. Obviously, when one says that a possible future – actual or non-actual – exists, the verb 'exists' is to be read in a tenseless way, since existence is understood as a property that can be shared by past, present and future things. A tenseless reading of 'exists' must be distinguished from a present tense reading, that is, from a reading according to which existence is a property that only present things possess. The claim that the future exists makes little sense on a reading of the second kind. Future things are not present, they are future. However, the claim is almost trivial on a reading of the first kind. The present instant is not our last instant. Many others are to come, and the world will be in some way at each of them. The way it will be is our future, or so we are tempted to say.

The third argument expresses a residual doubt that may be fostered by the way in which branching is usually advertised. According to branching, it might be contended, the future is open. According to divergence, it is not. Since the openness of the future is what we really care about, it is pointless to talk of indeterminism without branching.[31]

The flimsiness of this argument hides behind the meaning of the word 'open', which plays a key rhetorical role. In ordinary talk, 'open' is often used to indicate positive features that could as well be defined otherwise: think about 'open mind', 'open person', 'open society', and so on. The same goes for the future. Few would

[29] The distinction is drawn in McCall (1976, p. 339).

[30] McCall (1976, p. 340), recognizes the irrelevance of the second property.

[31] See MacFarlane (2003, p. 326, 2008, pp. 81–82).

deny that having an open future is good, or that it is better than having a closed future. But the question is why. A natural explanation is that in this case the positive charge associated to 'open' involves a modal connotation: what makes an open future good is that things can go in more than one way. However, insofar as the modal connotation is couched in terms of existence of different histories, any view that postulates such histories is able to account for it. Thus, if 'open' is read in the way that best explains its positive charge, branching is not the only view that makes the future open. By contrast, if 'open' is so construed that it applies only to branching, that is, if 'the future is open' means 'two histories can have as a common temporal part the present state of affairs and what precedes it', then it may be right to say that Ockhamism prevents the future from being open. But in that case 'open' looses much of its appeal, and it is no longer obvious that the future is open.

Neither of the arguments examined puts in jeopardy Ockhamism, and it is not clear whether better arguments can be provided. Of course, there may be readers who are so in the grip of the metaphor of the tree that they are incapable of conceiving indeterminism in any way other than branching. They may still contend that indeterminism without branching isn't 'really' indeterminism. No attempt will be made to argue with them. Unless an adequate justification is provided for that contention, to insist on it is simply to beg the question.

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