

Advanced Temporalising

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0. Introduction

There is a widespread assumption that *B-theorists* – according to whom there is no fundamental distinction between present and non-present times – should interpret tense operators such as ‘It was the case that’ and ‘It will be the case five minutes hence that’ as implicit quantifier-restrictors, so that (for example) an utterance at the present time n of the sentence ‘It was the case that there are dinosaurs’ is true just in case there are dinosaurs located at some time t earlier than n . However, it is easy to show that this interpretation of the tense operators causes problems for B-theorists when combined with certain other natural B-theoretic commitments. In this paper, I argue that a good way for B-theorists to avoid these problems is to treat the tense operators as redundant when the sentences in their scope are *qualitative* – that is, not about any particular individual(s).

The paper is structured as follows: in §1, I describe the B-theory. In §2, I show how the standard interpretation of the tense operators as quantifier-restrictors causes problems for B-theorists. I also describe the well-known analogous problem for *Modal Realists*, according to whom there is no fundamental distinction between actual and merely possible worlds. In §3, I show that B-theorists can avoid the problems described in §2 by rejecting the standard interpretation of the tense operators as quantifier-restrictors in favour of the view that the tense operators are redundant when the sentences in their scope are qualitative. I then describe and respond to what I take to be the most serious objection to this view, namely, that it

has highly implausible consequences given the B-theory. Finally, in §4 I describe four alternative B-theoretic strategies for avoiding the problems generated by the standard interpretation of the tense operators. I describe objections to each of these strategies. My aim is not to provide a decisive argument in favour of the ‘redundancy’ view described in §3; rather, it is to establish the more modest conclusion that that view ought to be taken seriously as an alternative to the strategies described in §4.

1. *The B-theory*

The ‘B-theory of time’ is sometimes characterized informally as the view that ‘time is like space’, or that ‘all times are on a par’, or that ‘time does not flow’, and or that ‘tense is unreal’.¹ While there is something to be said for each of these slogans, we can make more progress by thinking of the B-theory as combining the following two theses:

TEMPORAL PARITY: There is no fundamental distinction between present and non-present times²

PROPOSITIONAL ETERNALISM: Every proposition is if true always true

A few words on each of these. Temporal Parity is supposed to read as implying that *being present* doesn’t metaphysically distinguish this time *n* from other times. However, it is not

¹ B-theorists include Beer (2010), Deng (2013), and Sider (2001).

² I assume that there are such things as times (or ‘moments’). Many contemporary B-theorists identify times with maximal simultaneous regions of spacetime (or ‘hyperplanes’). See, for example, Sider (2001) and Skow (2015). Strictly speaking, for B-theorists something is a time only relative to a *frame of reference* – given the Special Theory of Relativity, there is no non-frame-relative foliation of spacetime into hyperplanes. For ease of exposition, in what follows I write as if there are times *simpliciter* according to the B-theory, as this makes no important difference to the arguments in what follows.

supposed to be read as implying that there is *nothing* special about n , or indeed nothing *metaphysically* special about n – for example, it is consistent with Temporal Parity that n is God’s favourite time, and therefore (plausibly) metaphysically special relative to every other time. But even if n is God’s favourite time, it doesn’t follow that *being present* metaphysically distinguishes n from other times.

What *does* make n present according to the B-theory? The best way to answer this question is to ask a different but closely related question: what does ‘the present time’ mean given the B-theory? According to the standard B-theoretic account, ‘the present time’ is an indexical term like ‘here’, and means the same as ‘this time’ – it refers directly to the time of utterance on any occasion of use. It follows that given the B-theory, an assertive utterance at the present time n of the sentence ‘ n is the present time’ expresses the proposition that $n = n$. In that sense, for B-theorists the question ‘What makes this time the present time?’ is like the question ‘What makes this place here?’ – just as *being here* doesn’t metaphysically distinguish this place from other places, *being present* doesn’t metaphysically distinguish this time from other times.

B-theorists defend Temporal Parity. *A-theorists*, in contrast, defend *Temporal Disparity*:

TEMPORAL DISPARITY: There is a fundamental distinction between present and non-present times

However, A-theorists disagree among themselves about what metaphysically distinguishes the present time from other times. For example, some *Presentists* identify times with maximal, consistent, sometime-true propositions, and hold that for a time t to be present is

just for t to be *true*.³ Among non-Presentist A-theorists, some hold that the present time is just *the time than which there is no later*; some that it is *the time that instantiates fundamental presentness*; and some that it is *the accurate time*, where an time t is *accurate* iff for all propositions p , p is true at t iff p is true simpliciter.⁴

Propositional Eternalism is the view that every proposition is if true always true, or in other words, that every proposition is *permanent*. For example, according to the standard B-theoretic account, the sentence

(1) It is raining in Cork

as uttered at the present time n expresses the permanent proposition that it is raining in Cork at n .

Some B-theorists may argue that they reject Propositional Eternalism, as follows: propositions are *properties of times*, so that e.g. the proposition that there are dodos is just the property G such that for any time t , $G(t)$ just in case there are dodos located at t .⁵ A permanent proposition is a property of times that is true at – i.e. possessed by – either every time or no times, and a *temporary proposition* is a property of times that is true at some but not all times. It follows that given the B-theory, there are temporary propositions – e.g. the proposition that there are dodos, which is true at some but not all times – and therefore Propositional Eternalism is false.

However, Propositional Eternalism is not intended to be read as inconsistent with the view that there are ‘temporary propositions’ in the sense just described. Assuming that there

³ See, for example, Bourne (2006), Crisp (2007) and Markosian (2004).

⁴ The first view is held by some defenders of the *Growing Block Theory*, such as Broad (1923); the second view is held by some *Moving Spotlight Theorists*, such as Deasy (2015); and the third view is held by e.g. Bacon (2018).

⁵ See e.g. Sider (2001, 20-21) and Zimmerman (2005).

are such things as propositions, Propositional Eternalism should be read as the view that for all x , if x is a proposition then if x is true, always, x is true – where the predicate ‘is true’ expresses a *monadic* property, rather than a dyadic property (i.e. relation) such as the *true-at* relation between propositions and times described above. And on this reading, Propositional Eternalism is true given the B-theory.

We saw above that according to the standard B-theoretic account, the predicate ‘is the present time’ as uttered at the present time n expresses the property of being identical to n . Notice that the property of being identical to n is a *permanent property* – a property that is never gained or lost over time – and therefore that according to the standard B-theoretic account, the proposition that n is the present time is a permanent proposition. In contrast, consider the A-theorist, according to whom for n to be present is for n to possess some metaphysically special property F (such as being true, or being accurate). For the A-theorist, F had better be a *temporary* (indeed, instantaneous) property of times – otherwise, she is open to the charge of defending a view according to which presentness is ‘frozen’ at a certain time. It follows that if the A-theory is true, there is at least one temporary proposition – namely, the proposition that n is F – and A-theorists must accept *Propositional Temporalism*:

PROPOSITIONAL TEMPORALISM: Some propositions are sometimes true and sometimes false

Finally, given that Temporal Disparity plausibly implies Propositional Temporalism, it follows (contraposing) that Propositional Eternalism implies Temporal Parity. Therefore, all that is required in order to be a B-theorist is to accept Propositional Eternalism (correctly interpreted).

I have characterised the B-theory in terms of Temporal Parity and Propositional Eternalism. But is there more to being a B-theorist? According to Sider (2001, 13-14), the B-theory implies ‘reductionism about tense’, the thesis that ‘tokens of tensed sentence types... can be given tenseless truth-conditions’. What exactly does this mean? Think of a ‘tensed sentence type’ as a sentence-type whose natural regimentation is in the language of Quantified Tense Logic (QTL). QTL is the result of adding tense operators such as ‘P’ – pronounced ‘It was the case that’ – and ‘F’ – pronounced ‘It will be the case that’ – to standard first-order predicate logic. Given ‘P’ and ‘F’, we can define the further tense operators ‘H’ (‘It always has been the case that’), ‘G’ (‘It is always going to be the case that’), ‘A’ (‘It is always the case that’) and ‘S’ (‘It is sometimes the case that’) as follows:

$$H\varphi =_{\text{def}} \neg P\neg\varphi$$

$$G\varphi =_{\text{def}} \neg F\neg\varphi$$

$$A\varphi =_{\text{def}} H\varphi \wedge \varphi \wedge G\varphi$$

$$S\varphi =_{\text{def}} P\varphi \vee \varphi \vee F\varphi$$

For example, the sentence

(2) There used to be dinosaurs

is a tensed sentence – it is naturally regimented in QTL as follows (where ‘*D*’ expresses the property of being a dinosaur):

(3) $P \exists x D x$

A simple way to understand the claim that tensed sentences such as (2) can be given ‘tenseless truth-conditions’ is as the claim that sentences such as (2) express (relative to contexts of utterance) permanent propositions. In that case, ‘reductionism about tense’ follows straightforwardly from Propositional Eternalism. However, for most B-theorists, there is more to ‘reductionism about tense’ than Propositional Eternalism. For example, consider the sentence

(4) Sometimes, there are dinosaurs

(4) is a tensed sentence in the sense described above – it is naturally regimented in QTL as follows:

(5) $S \exists x D x$

Moreover, the proposition that sometimes, there are dinosaurs is a permanent proposition. However, B-theorists standardly reject the claim that the relevant ‘tenseless truth condition’ for (4) is that sometimes, there are dinosaurs. The reason is that when B-theorists say that tensed sentences such as (2) and (4) can be given ‘tenseless truth-conditions’, what they typically mean is that the truth-conditions for such sentences can be stated in a language that is entirely free of tense operators such as ‘S’. Insofar as B-theorists take this language to be more ‘metaphysically perspicuous’ than QTL, this reflects a B-theoretic commitment to the thesis of *Anti-tensism*:

ANTI-TENSISM: Tense operators are metaphysically non-fundamental⁶

For example, here is Sider (2011, 24; read ‘B-theorist’ for ‘Spatializer’):

Spatializers do not admit tense operators into their fundamental ideology, since they can describe temporal reality without them – by quantifying over past and future entities and predicating features of them relative to times. Spatializers may use tense operators in their *non*fundamental languages, since they can give a metaphysical semantics for the language of quantified tense logic in their tense-operator-free fundamental language.

In other words, ‘reductionism about tense’ implies that the truth-conditions for tensed sentences such as (2) and (4) can in principle be stated in a ‘fundamental language’ that is both free of tense operators (given Anti-tensism) and all of whose sentences express – relative to contexts of utterance – permanent propositions (given Propositional Eternalism). It follows that the relevant ‘tenseless truth-condition’ for sentence (4) cannot be that sometimes, there are dinosaurs. More generally, it follows that for B-theorists, QTL is ‘metaphysically second-rate’, as it contains expressions – in particular, tense operators such as ‘P’ and ‘F’ – which fail to ‘carve reality at the joints’. However, as Sider indicates in the above quotation, this does not mean that B-theorists can simply bypass QTL. Rather, an important part of the B-theoretic project is to provide (as Sider 2011 puts it) a ‘metaphysical semantics’ for QTL in the B-theorist’s fundamental, tense operator-free language. The question of how to do this –

⁶ Note that Anti-tensism neither implies nor is implied by Propositional Eternalism. For example, in the left-to-right direction, Deasy (2015) defends a view that combines Anti-tensism with Propositional Temporalism. In the right-to-left direction, one could (for example) defend a view that combines Propositional Eternalism with the thesis that the tense operators ‘S’ is metaphysically fundamental.

and in particular, of how to interpret the tense operators when the sentences in their scope are not about any particular individuals – is at the heart of this paper.

2. *Locator*

Consider the following characterization of the B-theory (“eternalism”) due to Sider (2006, 77-8):

For the eternalist, past- and future-tensed claims are ultimately made true by claims that quantify over past and future times and entities. For instance, an assertion of ‘It was the case that ϕ ’ is true iff ϕ is true at some time located before the assertion. Construing (2) [‘Dinosaurs once existed’] (somewhat artificially) as having this form, the eternalist thinks of (2) as amounting to:

(2_E) There exist dinosaurs, located temporally before us.

$\exists x(Dx \& Bxu)$

Note that (2_E) entails that there exist dinosaurs ($\exists xDx$). Presentists, on the other hand, deny that past-tense statements give way to statements quantifying over past entities. Rather, such statements involve primitive, unanalyzeable tense operators. The presentist’s rendition of (2) is this:

(2_P) It was the case that: there exist dinosaurs.

$P \exists xDx$

‘P’ symbolizes the past-tense operator *it was the case that*. (Other tense operators include *it will be the case that*, and *it is always the case that*.) Inside the scope of such a tense operator, the existential quantifier is not existentially committing; that is why the truth of (2_P) is consistent with presentism.

According to Sider, if the sentence ‘Dinosaurs once existed’ is regimented as

(3) $P \exists xDx$

then given the B-theory, (3) ‘amounts to’ – i.e. express the same state of affairs as – the sentence (where ‘ T ’ expresses the property of being a time; ‘ $<$ ’ expresses the *earlier-than* relation between times; ‘ n ’ names the present time; and ‘ L ’ expresses the location-relation between times and their occupants):

$$(6) \exists x(Tx \wedge x < n \wedge \exists y(Dy \wedge L(y,x)))$$

(There is a time t earlier than now such that there are dinosaurs located at t)

Why think this? Sider assumes that given the B-theory, the tense operator ‘P’ functions as an implicit quantifier over times which restricts the individual quantifiers (e.g. the ‘existential’ quantifier ‘ $\exists x$ ’) in its scope to things located at the relevant time. As Sider puts it in the passage quoted above: “an assertion of ‘It was the case that φ ’ is true iff φ is true at some time located before the assertion”. Hence the unrestricted ‘existential’ quantifier ‘ $\exists x$ ’ in sentence (3) is restricted in sentence (6) to things located at some time earlier than now. Similarly, here is Sider (2011, 241):

Spatializers may use tense operators in their *non*fundamental languages, since they can give a metaphysical semantics for the language of quantified tense logic in their tense-operator-free fundamental language. Such a semantics will, for example, count an utterance of $P \exists x Dx$ that takes place at t_0 as being true iff some dinosaur is located before t_0 .

It seems clear from the above that for Sider, the B-theory implies (or at least, ought to be combined with) the following analyses of the tense operators ‘P’ and ‘F’ (where ‘ $[\varphi]^x$ ’ is read as equivalent to φ but with all quantifiers in φ restricted to the occupants of x):⁷

⁷ Following Dorr (2016), I use ‘ $\varphi := \psi$ ’ to mean ‘for it to be the case that φ is for it to be the case that ψ ’.

$$P\varphi := \exists x(Tx \wedge x < n \wedge [\varphi]^x)$$

(For it to be the case that it was that φ is for it to be the case that, restricting attention to things located at some past time t , φ)

$$F\varphi := \exists x(Tx \wedge n < x \wedge [\varphi]^x)$$

(For it to be the case that it will be that φ is for it to be the case that, restricting attention to things located at some future time t , φ)

Given the standard definitions of the tense operators ‘S’ and ‘A’ in terms of ‘P’ and ‘F’ (see §1 above), these analyses imply:

$$S\varphi := \exists x(Tx \wedge [\varphi]^x)$$

(For it to be the case that sometimes φ is for it to be the case that, restricting attention to things located at some time t , φ)

$$A\varphi := \forall x(Tx \supset [\varphi]^x)$$

(For it to be the case that always φ is for it to be the case that, restricting attention to things located at any time t , φ)

More generally, Sider appears to assume that the B-theory implies (or ought to be combined with) the following thesis:

LOCATOR: The standard tense operators ('P', 'F', 'S' and 'A') are implicit quantifiers over times which restrict the explicit individual quantifiers (' \forall ' and ' \exists ') in their scope to things located at the relevant time(s)

The assumption that the B-theory implies (or ought to be combined with) Locator seems to be widespread in the philosophy of time, even if it is seldom explicitly stated.⁸ And it is easy to see why this assumption is made: as we saw in §1 above, B-theorists are committed to providing a 'metaphysical semantics' for sentences such as

(3) $P \exists x D x$

in their fundamental, tense operator-free language – and Locator provides a natural way of reductively analysing the tense operators that appear in such sentences.

However, while Locator seems to work well for sentences such as (3), it causes problems when applied to certain other sentences. For example, we can define what it is for two things to be *instantmates* as follows:

x and y are instantmates $\stackrel{\text{def}}{=} \exists z (Tz \wedge L(x,z) \wedge L(y,z))$

In short, for two things to be instantmates is for there to be some time at which they are both located. Now, most B-theorists accept that some things are *not* instantmates, such as Napoleon and Queen Elizabeth II – i.e. that there are (quantifying unrestrictedly) *non-instantmates*:

⁸ In addition to the evidence from Sider (2001, 2011) cited above, see Marshall (2016, 8).

NON-INSTANTMATES: There are non-instantmates

Moreover, most B-theorists accept the tense-logical axiom that one can always validly infer ‘Sometimes, φ ’ from ‘ φ ’, or in other words, that whatever is the case is *sometimes* the case:

SOMETIMES INTRODUCTION: $\varphi \supset S\varphi$

Sometimes Introduction is the temporal analogue of the widely accepted modal axiom T , according to which whatever is the case is metaphysically possible:

$T: \varphi \supset \diamond\varphi$

Non-instantmates and Sometimes Introduction jointly imply

(7) Sometimes, there are non-instantmates

But given Locator, (7) implies

(8) There is a time t such that there are non-instantmates located at t

which implies a contradiction given the definition of ‘non-instantmates’.

Similarly, most B-theorists hold that there are (quantifying unrestrictedly) many (distinct) times:

TIMES: There are many times

Given Sometimes Introduction, Times implies

(9) Sometimes, there are many times

And given Locator, (9) implies

(10) There is a time t such that there are many times located at t

However, given that for any times t and t^* , t is located at t^* iff $t = t^*$, (10) implies a contradiction. In short, it appears that Locator is inconsistent with some other very natural B-theoretic commitments.

The problems for B-theorists arising from an acceptance of Locator and theses such as Non-instantmates and Times should be familiar to those acquainted with the ‘advanced modalizing’ debate concerning the correct interpretation of the modal operators ‘ \diamond ’ (‘It is metaphysically possible that’) and ‘ \square ’ (‘It is metaphysically necessary that’) given Lewis’s (1986) ‘Modal Realism’.⁹ For example, Modal Realists accept that there are (quantifying unrestrictedly) many (distinct) possible worlds:¹⁰

WORLDS: There are many possible worlds

⁹ On this debate, see especially Divers (1999, 2002 §4.3, 2014), Dorr (*Counterparts* MS), Jago (2016), Marshall (2016), Noonan (2014), Parsons (2012), and Williamson (2013, 16-17).

¹⁰ Lewis (1986) identifies *possible worlds* with maximal mereological sums of spatiotemporally interrelated individuals.

But they also accept the modal analogue of Locator – call it *M-Locator* – and therefore accept the following analyses of ‘ \diamond ’ and ‘ \square ’ (where ‘ W ’ expresses the property of being a possible world, and ‘ $[\varphi]^x$ ’ is read as equivalent to φ but with all quantifiers in φ restricted to the inhabitants of x):

$$\diamond\varphi := \exists x(Wx \wedge [\varphi]^x)$$

(For it to be the case that it is metaphysically possible that φ is for it to be the case that, restricting attention to things located in some possible world w , φ)

$$\square\varphi := \forall x(Wx \supset [\varphi]^x)$$

(For it to be the case that it is metaphysically necessary that φ is for it to be the case that, restricting attention to things located in any possible world w , φ)

Given T, Worlds implies:

(11) Possibly, there are many possible worlds

But given M-Locator, (11) implies:

(12) There is a possible world w such that there are many possible worlds located in w

which implies a contradiction given that for any worlds w and w^* , w is located in w^* iff $w = w^*$. In short, it seems that M-Locator is inconsistent with some other very natural Modal Realist commitments. (Consider also the sentence ‘There are things such that there is no possible world in which they are both located’).

We have seen that Locator causes serious problems for B-theorists when applied to sentences such as

(9) Sometimes, there are many times

just as M-Locator causes serious problems for Modal Realists when applied to sentences such as

(11) Possibly, there are many possible worlds

These problems should come as no surprise. The standard B-theoretic analyses of the tense operators as expressed by Locator are designed to handle tense operators as they appear in the QTL-regimentations of ordinary tensed sentences such as

(2) There used to be dinosaurs

But they are not designed to handle tense operators as they appear in sentences such as (9) above, in which the operators are applied to the unrestrictedly quantified sentences which B-theorists use to express their particular view of temporal reality. Similarly, the standard Modal Realist analyses of the (metaphysical) modal operators as expressed by M-Locator are designed to handle the modal operators as they appear in the regimentations into Quantified Modal Logic (QML) of ordinary modal sentences such as

(13) There could be blue swans

But they are not designed to handle modal operators as they appear in sentences such as (11) above, in which the operators are applied to the unrestrictedly quantified sentences which Modal Realists use to express their particular (peculiar) view of modal reality.¹¹

3. Redundancy

The question of how Modal Realists should address the problems generated by M-Locator has received far more attention than the analogous question of how B-theorists should address the problems generated by Locator.¹² In §4 below, I describe some well-known answers to the modal question due to Divers (1999, 2002), Bricker (2001), and Parsons (2012). However, the aim of this paper is to make progress on the temporal question, by defending a certain answer to that question. The answer is straightforward: B-theorists should reject Locator in favour of the view that the standard tense operators ‘P’ and ‘F’ are redundant when the sentences within their scope are *qualitative* – that is, not about any particular individual(s) (more on this below). Call this view *Redundancy*.¹³

REDUNDANCY: For any qualitative sentence φ , $P\varphi$ and $F\varphi$ are equivalent to φ

Given the standard definitions of the tense operators ‘S’ and ‘A’ in terms of ‘P’ and ‘F’, Redundancy implies that for any qualitative sentence φ , $S\varphi$ and $A\varphi$ are equivalent to φ .

¹¹ A thought: why not simply replace ‘*T*’ in the Locator-theoretic analyses of the tense operators and ‘*W*’ in the M-Locator-theoretic analyses of the modal operators with ‘*T**’ and ‘*W**’ respectively, where ‘*T**’ expresses the property of being a fusion of times and ‘*W**’ expresses the property of being a fusion of possible worlds? I consider this strategy in §4.2 below.

¹² Dorr (*Counterparts* MS) addresses the temporal question but prioritises the modal question, and Marshall (2016) mentions the temporal question but otherwise focuses on the modal question.

¹³ Dorr (*Counterparts* MS) argues that B-theorists should accept Redundancy. However, note that Dorr’s defence of the thesis is quite different from that presented here.

Redundancy clearly provides B-theorists with a solution to the problems generated by Locator. For example, given that Non-instantmates is a qualitative sentence – i.e. it is not about any particular individual(s) – it follows given Redundancy that the tense operator in the sentence

(7) Sometimes, there are non-instantmates

is redundant, and therefore that (7) is equivalent to Non-instantmates. Similarly, given that Times is a qualitative sentence – i.e. it is not about any particular individual(s) – it follows given Redundancy that the tense operator in the sentence

(9) Sometimes, there are many times

is redundant, and therefore (9) is equivalent to Times.

Similarly, call the view that the standard modal operators ‘ \diamond ’ and ‘ \square ’ are redundant when the sentences within their scope are qualitative *M-Redundancy*:

M-REDUNDANCY: For any qualitative sentence φ , $\diamond\varphi$ and $\square\varphi$ are equivalent to φ ¹⁴

M-Redundancy clearly provides Modal Realists with a solution to the problems generated by M-Locator. For example, given that Worlds is a qualitative sentence – it is not about any particular individual(s) – it follows given M-Redundancy that the modal operator in the sentence

¹⁴ Noonan (2014) argues that Modal Realists should accept M-Redundancy.

(11) Possibly, there are many possible worlds

is redundant, and therefore that (11) is equivalent to Worlds.

Returning to the temporal case, it is worth pausing to make a couple of points about Redundancy. First, Redundancy relies on the notion of a *qualitative sentence*, characterized above as a sentence that is not about any particular individual(s). But what is it for a sentence to be *about* a particular individual? Following Bacon (2019), say that a *qualitative proposition* is a proposition that is not about any particular individual, and a proposition that is not qualitative is *haecceistic*. For example, the proposition that Xanthippe was wise is a haecceistic proposition, as it is about the particular individual Xanthippe, but the proposition that someone was wise is a qualitative proposition, as it is not about any particular individual(s). Then we can say that a qualitative sentence is a sentence that expresses a qualitative proposition, and a haecceistic sentence is a sentence that expresses a haecceistic proposition.

However, some might not find this answer very satisfying, on the grounds that we have simply replaced the question of what it is for a *sentence* to be about a particular individual with the question of what it is for a *proposition* to be about a particular individual. As Bacon (ibid, 3) points out, given a metaphysics of propositions according to which propositions are structured entities with (monadic or polyadic) properties and particular individuals as literal constituents, we could say that a proposition p is about a particular individual a just in case p has a as a constituent, and is not about any particular individual(s) – i.e. is qualitative – just in case p has no particular individual(s) as constituents. However, as Bacon also points out, some philosophers prefer a more coarse-grained theory of propositions according to which, for example, the propositions $p \vee q$ and $\neg(\neg p \wedge \neg q)$ are identical. Such philosophers may simply have to take the notion of a proposition's being *about* a particular

individual as primitive, understanding it via examples such as the propositions that Xanthippe was wise (which is about Xanthippe) and the proposition that someone was wise (which is not about any particular individual(s)).¹⁵

An alternative approach is to try to avoid talk of ‘aboutness’ altogether, and instead characterise qualitative sentences in linguistic terms. For example, we might say that a qualitative sentence is a sentence that is free from ‘singular’ (or ‘directly referential’) terms like proper names, demonstratives, and free variables; or a sentence that is built entirely from quantifiers, logical connectives, and ‘non-singular’ predicates. But what exactly is a ‘singular term’, and what exactly is a ‘non-singular predicate’? Unless we are willing to use notions like *aboutness*, it may be that the best way to understand these notions is simply via examples: for example, ‘is a swan is a non-singular predicate, but ‘is French’ is not, as it is equivalent to the predicate ‘is from France’, which contains the singular term ‘France’.

Second, Redundancy obviously tells us nothing about how B-theorists should interpret the standard tense operators when the sentences in their scope are haecceistic (i.e. express propositions about particular individuals). For example, consider the sentence:

(14) Obama used to be a lawyer

Typically, B-theorists hold that (14) reduces to something like (where ‘*a*’ names Obama):

(15) $\exists x(Tx \wedge x < n \wedge \text{Lawyer}(a,x))$

(There is a time *t* earlier than now such that Obama is a lawyer at *t*)

¹⁵ As Bacon (ibid, 3-4) points out, even if the notion of a proposition’s being *qualitative* is taken as primitive, ‘we can nonetheless connect it to other related concepts, thus widening the circle of analysis’.

However, this is not the end of the story: exactly what it is according to the B-theory for Obama to be a lawyer *at some past time* will depend on which theory of persistence B-theorists accept.¹⁶ Briefly, on an ‘endurantist’ account, (15) is made true by the fact that there is a time t earlier than n such that Obama bears the permanent *lawyer-at* relation to t ; on a ‘perdurantist’ account, (15) is made true by the fact that there is a time t earlier than n such that there is an instantaneous temporal part¹⁷ of Obama which is a lawyer and is located at t ; and on a temporal counterpart-theoretic (or ‘exdurantist’) account, (15) is made true by the fact that there is a time t earlier than n such that there is a temporal counterpart¹⁸ of Obama which is a lawyer and which is located at t . Whichever theory is preferred, however, it remains the case that B-theorists typically interpret the tense operators in a haecceistic sentence like (14) as non-redundant.

Given as we have seen that Redundancy provides a relatively simple and elegant solution to the problems generated by Locator, it is natural to wonder why the view is not standardly accepted by B-theorists. A plausible reason is that Redundancy implies *Qualitative Permanentarianism*:

QUALITATIVE PERMANENTARIANISM: For any qualitative sentence φ , $\varphi \supset A\varphi$

As we saw above, the B-theory is standardly taken to imply the truth of the sentence

(6) $\exists x(Tx \wedge x < n \wedge \exists y(Dy \wedge L(y,x)))$

(There is a time t earlier than now such that there are dinosaurs located at t)

¹⁶ See especially Haslanger & R. M. Kurtz (2006) and Magidor (2016) for discussion of theories of persistence.

¹⁷ Following Sider (2001, 59) we can say that some x is an *instantaneous temporal part* of some y at time t iff (i) x is located at and only at t ; (ii) x is part of y at t ; and (iii) x overlaps at t everything that is part of y at t .

¹⁸ A *temporal counterpart* of Obama is an instantaneous object that resembles Obama in relevant respects. See Hawley (2001) for a defence of temporal counterpart theory (‘the stage view’).

which implies

(16) $\exists xDx$ ¹⁹

(There are dinosaurs)

But given Qualitative Permanentarianism, (16) implies

(17) $\Box \exists xDx$

(It is always the case that there are dinosaurs)

And – so the objection goes – (17) is highly implausible (or ‘counterintuitive’). For example, here is Marshall (2016, 11) on the analogous modal case (where ‘(3)’ refers to the sentence ‘ $\Box \exists xBx$ ’ – to be read ‘Necessarily, there are blue swans’ – and ‘QR modal realism’ refers to the conjunction of Modal Realism and M-Redundancy):

(3), however, is highly implausible, since, even if there are blue swans as modal realists claim, surely there might have been no such entities. The claim that it is necessary that there is a blue swan somewhere in the pluriverse of L-worlds (given there is in fact a blue swan in this pluriverse) is *prima facie* no more plausible than the claim that it is necessary that there is an alien creature somewhere in our universe (given there is in fact an alien creature somewhere in our universe). Even if there are alien creatures on some planet in our universe, it is surely merely contingent that there are such creatures. Similarly, even if there are blue swans in some L-world in the pluriverse, it is surely merely contingent that there are such swans. Hence, it is highly plausible that, contra QR modal realism, it is not necessary that there is a blue swan.

¹⁹ See e.g. Sider (2011, 241): ‘thus he [the B-theorist] accepts “There are dinosaurs”, $\exists xDx$ ’.

Call the conjunction of the B-theory and Redundancy the *RB-theory*. An analogous objection to the RB-theory would run: '(17) is highly implausible, since, even if there are dinosaurs as B-theorists claim, surely there are sometimes no such entities. The claim that there are always dinosaurs somewhere in the spacetime manifold (given there is in fact a dinosaur in the manifold) is *prima facie* no more plausible than the claim that there are always alien creatures somewhere in our universe (given there is in fact an alien creature somewhere in our universe). Even if there are alien creatures on some planet in our universe, it is surely only sometimes the case that there are such creatures. Similarly, even if there are dinosaurs in some region of the manifold, it is surely only sometimes the case that there are dinosaurs.'

Call this objection to the RB-theory the *Implausibility Objection*.²⁰ A more general version of the objection is simply that the RB-theory implies that there is no *de dicto* change (i.e. change in qualitative states of affairs), and it is highly implausible that there is no *de dicto* change; therefore, we have a good reason to reject the RB-theory.

I think that RB-theorists can provide a convincing response to the Implausibility Objection. The first point to make is that judgements of plausibility typically depend on one's antecedent theoretical commitments, and even simply on the sorts of views and theoretical considerations to which one has been exposed. For example, a person with little exposure to the B-theory might find (16) (' $\exists xDx$ ') highly implausible – but sufficient time spent in the company of B-theorists might cause her to find the sentence quite plausible. Similarly, a B-theorist who is used to interpreting the tense operators in line with Locator will find the sentence

²⁰ Jago (2016, 4) raises a similar objection to Divers's (1999, 2002) proposed interpretation of the standard modal operators. See §4.1 below.

(18) $S \neg \exists x Dx$

(Sometimes, it is not the case that there are dinosaurs)

highly plausible – but sufficient time spent in the company of RB-theorists might cause her to find the sentence implausible.²¹

Indeed, even in the absence of Redundancy, the truth of a sentence like (17) can be seen as plausible given the B-theory. In particular, there is a very natural sense in which, given the B-theory, *reality as a whole does not change*. But unrestricted quantification – the kind of quantification used in the sentence

(16) $\exists x Dx$

– is quantification over all of reality. Therefore, B-theorists should not expect there to be any change in the state of affairs expressed by (16). But if there is no change in the state of affairs expressed by (16) – and tense operators are a means of capturing change, or its absence – then it is natural for B-theorists to accept that there are (quantifying unrestrictedly) *always* dinosaurs, and therefore that (17) is true.

The idea that (17) is true given the B-theory can be made even more plausible by focusing on some of the typical B-theoretic commitments that naturally align with the truth of (17). For example, as we saw above in §1, the B-theory implies Propositional Eternalism, the thesis that every proposition is permanent. But given Propositional Eternalism, it follows that the proposition that there are dinosaurs is always true. So, the B-theory implies:

²¹ Note that the claim here is not that B-theorists who find (17) implausible must be confusing that sentence with the false sentence ‘There are dinosaurs located at every time’. One might clearly distinguish those sentences and still find (17) implausible. The claim is simply that sufficient exposure to the RB-theory can come to make (17) seem plausible.

(19) It is always a fact that there are dinosaurs²²

And it may seem strange – even if it is consistent – to hold that it is always a fact that there are dinosaurs, but it is not always the case that there are dinosaurs. Given the truth of (19), the truth of (17) seems quite natural. Similarly, as we saw above, the B-theory is typically taken to imply the truth of (16) ($\exists xDx$). Given Propositional Eternalism, it follows that whenever anyone assertively utters (16), they express a truth. And it may seem strange – even if it is consistent – to hold that whenever anyone assertively utters the sentence $\exists xDx$ they express a truth, but it is not always the case that there are dinosaurs. Given that whenever anyone assertively utters the sentence $\exists xDx$ they express a truth, the truth of (17) seems quite natural. Finally, even B-theorists who reject Redundancy typically accept that the standard tense operators are redundant when the sentences in their scope are qualitative but the individual quantifiers in their scope are already explicitly restricted to the inhabitants of some time(s). For example, the B-theory is typically taken to imply:

(20) $\forall x(Tx \wedge \exists y(Dy \wedge L(y,x)))$

(Always, there is a time t such that there are dinosaurs located at t)

And it may seem strange – even if it is consistent – to hold that it is always the case there are dinosaurs located at some time, but it is not always the case that there are dinosaurs. Given the truth of (20), the truth of (17) seems quite natural.

²² ‘Fact’ here just means ‘true proposition’.

A second response that RB-theorists can make to the Implausibility Objection is to point out that while they are committed to the truth of (17), they are *not* thereby committed to the claim that anyone who assertively utters the sentence

(21) There used to be dinosaurs, but there are none now

expresses a contradiction – they can still make good sense of ordinary tensed talk. In particular, the reading of (21) on which it expresses a contradiction given Redundancy is one on which the quantifiers are read as *unrestricted*. However, it is widely accepted that much quantification in ordinary thought and speech is implicitly restricted. For example, RB-theorists can interpret the quantifiers in an ordinary assertive utterance of (21) as implicitly restricted to the inhabitants of Earth, so that the sentence is interpreted as having the form (where ‘*e*’ refers to Earth and ‘*Hx*’ means ‘*x* is inhabited by dinosaurs’):

(22) $P(He) \wedge \neg He$

(It was the case that Earth is inhabited by dinosaurs, and it is not the case that Earth is inhabited by dinosaurs)

Given the RB-theory, the tense operator ‘P’ in the left-hand conjunct of (22) can be interpreted as non-redundant, as the sentence in its scope (‘*He*’) is haecceistic – it expresses a proposition about the particular Earth. Similarly, consider the sentence

(23) Dinosaurs don’t always exist

RB-theorists are not committed to the claim that anyone who assertively utters (23) expresses a falsehood. For example, RB-theorists can interpret the quantifier in an ordinary assertive utterance of (23) as restricted to the inhabitants of Earth (as in (22)), so that the sentence expresses the true proposition that it is not the case that always, Earth is inhabited by dinosaurs:

(24) $\neg AHe$

The general lesson here is that RB-theorists are not significantly worse off than B-theorists who accept Locator when it comes to making sense of ordinary tensed thought and speech – all they require is the commonplace idea that quantification in ordinary thought and speech is often implicitly restricted. Indeed, given that B-theorists who accept Locator accept the truth of (16), they need to account for the truth of ordinary utterances of sentences like

(25) Dinosaurs don't exist

They typically do this by interpreting the quantifier in an ordinary assertive utterance of (25) as restricted to things located at the present time n , so that (25) expresses the true proposition that there are no dinosaurs located at n .

Finally, RB-theorists can draw attention to the fact that, like B-theorists who accept Locator, they accept Anti-tensism, the thesis that there are no metaphysically fundamental tense operators. Therefore, although RB-theorists hold that sentences (16) ($\exists xDx$) and (17) ($\neg A \exists xDx$) are logically equivalent, like B-theorists who accept Locator they deny that (16) and (17) provide equally 'metaphysically perspicuous' ways of expressing the relevant state of affairs. More generally, the question of whether B-theorists should accept Redundancy is

not a question concerning the truth of some sentence of the B-theorist's fundamental, tense operator-free language. RB-theorists are in complete agreement with B-theorists who accept Locator concerning the fundamental facts.²³ Among other things, this means that when it comes to describing *fundamental* temporal reality, RB-theorists have exactly the same expressive resources as B-theorists who accept Locator. For example, while the sentence

$$(18) S \neg \exists x D x$$

(Sometimes, it is not the case that there are dinosaurs)

is false given the RB-theory, the following sentence is, of course, true:

$$(26) \exists x (T x \wedge \neg \exists y (D y \wedge L(y, x)))$$

(There is a time t such that it is not the case that there are dinosaurs located at t)

In this case, the only relevant implication for B-theorists of accepting Redundancy is that (18) is not equivalent to (26). But the non-equivalence of these sentences given Redundancy would hardly be a good reason for rejecting the view, given that it provides a relatively simple and elegant solution to the problems generated by Locator.

I have described what I take to be a convincing B-theoretic response (or rather, set of responses) to the Implausibility Objection. (Modal Realists can make analogous responses to the analogous objection.) I hope that this has strengthened the case for a B-theoretic acceptance of Redundancy as a solution to the problems generated by Locator. But there is

²³ This should not be taken to imply that the dispute is not important. For example, if RB-theorists denied that e.g. what is the case always will have been the case ($\varphi \supset GP\varphi$), that would be a good reason for rejecting the view.

more to be said, because accepting Redundancy is not the only way for B-theorists to avoid the problems generated by Locator.

4. *Alternatives*

In this section I consider four alternative strategies available to B-theorists for avoiding the problems generated by Locator. The first three, like the strategy defended in §3 above, involve the rejection/modification of Locator. They are: endorsing the temporal analogue of Divers's (1999, 2002) analyses of the modal operators (§4.1); endorsing the temporal analogue of Bricker's (2001) analyses of the modal operators (§4.2); and endorsing the temporal analogue of Parsons's (2012) analyses of the modal operators (§4.3). The fourth strategy involves rejecting Sometimes Introduction (§4.4). In each case I describe an objection to the relevant strategy.

4.1 Divers's Strategy

As Divers (1999, 228, fn.9; 2002, 47, fn.14) points out, Lewis (1986) seems to have been aware of the potential for the interpretation of the modal operators as quantifier-restrictors (i.e. for an acceptance of M-Locator) to generate problems for Modal Realism. In particular, Lewis writes (1986, 6):

Two qualifications concerning our restrictive modifiers. (1) I do not suppose that they must restrict all quantifiers in their scope, without exception... 'At some small worlds, there is a natural number too big to measure any class of individuals' can be true even if the large number that makes it true is no part of the small world.

Lewis's point seems to be that Modal Realists should allow that for certain sentences, the modal operator 'At possible world w ' does not have the expected world-restricting effect on the quantifiers in its scope. Similarly, it is natural to think that the modal operator in the sentence

(11) Possibly, there are many possible worlds²⁴

does not have the expected world-restricting effect on the quantifiers in its scope, so that (11) is equivalent to Worlds; and similarly for the sentence

(27) Necessarily, there are many possible worlds

The question is, for *which* sentences should Modal Realists hold that the modal operators fail to restrict the quantifiers in their scope (and are, therefore, redundant)? Divers (1999, 2002) argues that Modal Realists should hold that the standard modal operators '◇' and '□' are redundant when the sentences within their scope are 'extraordinary', where an *extraordinary sentence* is one whose subject matter is things not all of which are located in a single possible world. As Divers (2002, 50) puts it:

GR appeals to the extraordinary interpretation of modal claims whenever she intends or interprets the non-modal content as content that is not world-restricted content.

²⁴ (11) is an example of what Divers (1999, 219) calls 'advanced modalizing'.

In other words, Divers argues that Modal Realists should accept the following analyses of the standard modal operators (where an *ordinary sentence* is a sentence that is not extraordinary):²⁵

$$\diamond\varphi := (\varphi \text{ is ordinary} \wedge \exists x(Wx \wedge [\varphi]^x)) \vee (\varphi \text{ is extraordinary} \wedge \varphi)$$

(For it to be the case that it is metaphysically possible that φ is for it to be the case that either φ is an ordinary sentence and restricting attention to things located in some possible world w , φ , or φ is an extraordinary sentence and φ)

$$\Box\varphi := (\varphi \text{ is ordinary} \wedge \forall x(Wx \supset [\varphi]^x)) \vee (\varphi \text{ is extraordinary} \wedge \varphi)$$

(For it to be the case that it is metaphysically necessary that φ is for it to be the case that either φ is an ordinary sentence and restricting attention to things located in any possible world w , φ , or φ is an extraordinary sentence and φ)

It is clear that Divers's analyses provide Modal Realists with a way of avoiding the problems generated by M-Locator described in §2: for example, given that Worlds is an extraordinary sentence, it follows given Divers's analyses that (11) and (27) above are both equivalent to Worlds.

For that reason, B-theorists might be tempted to respond to the problems for their view generated by Locator by rejecting Locator in favour of the following Divers-inspired analyses of the standard tense operators (where a *temporally extraordinary sentence* is one

²⁵ Note that Divers (2014) rejects the reading of Divers (2002) according to which the argument there is that Modal Realists should treat the standard modal operators as redundant when applied to a certain kind of sentence. Rather, Divers (2014) argues that Divers (2002) should be read as arguing that Modal Realists should treat the operators as redundant *in cases where it is charitable to Modal Realism to do so* (see especially Divers 2014, 868). Marshall (2016, 17ff) interprets the latter strategy as implying that 'possibly' and 'necessarily' are ambiguous, and objects to the strategy on those grounds.

whose subject matter is things such that there is no time at which they are all located – i.e. *non-instantmates* in the sense of §2 above – and a *temporally ordinary sentence* is a sentence that is not temporally extraordinary):

$$P\varphi := (\varphi \text{ is temporally ordinary} \wedge \exists x(Tx \wedge x < n \wedge [\varphi]^x)) \vee (\varphi \text{ is temporally extraordinary} \wedge \varphi)$$

$$F\varphi := (\varphi \text{ is temporally ordinary} \wedge \exists x(Tx \wedge n < x \wedge [\varphi]^x)) \vee (\varphi \text{ is temporally extraordinary} \wedge \varphi)$$

Given the standard definitions of the tense operators ‘S’ and ‘A’ in terms of ‘P’ and ‘F’, these analyses imply:

$$S\varphi := (\varphi \text{ is temporally ordinary} \wedge \exists x(Tx \wedge [\varphi]^x)) \vee (\varphi \text{ is temporally extraordinary} \wedge \varphi)$$

$$A\varphi := (\varphi \text{ is temporally ordinary} \wedge \forall x(Tx \supset [\varphi]^x)) \vee (\varphi \text{ is temporally extraordinary} \wedge \varphi)$$

Call these the *Extraordinary Analyses* of the standard tense operators. It is clear that the Extraordinary Analyses avoid the problems for B-theorists generated by Locator. For example, given that Times is a temporally extraordinary sentence – i.e. its subject matter is things such that there is no time at which they are all located – it follows given the Extraordinary Analyses that the sentence

(9) Sometimes, there are many times

is equivalent to Times.

As a strategy for avoiding the problems for B-theorists generated by an acceptance of Locator, the Extraordinary Analysis is similar to Redundancy. The key difference concerns the kind of sentences for which the standard tense operators are treated as redundant: ‘temporally extraordinary sentences’ in the case of the Extraordinary Analyses, and qualitative sentences in the case of Redundancy. Moreover, both strategies face the Implausibility Objection: for example, given that according to the B-theory there is no time at which all dinosaurs are located, the sentence

(16) $\exists xDx$

is a temporally extraordinary sentence, and therefore given the Extraordinary Analyses implies

(17) $A \exists xDx$

The question, then, is whether there is any good reason for B-theorists to prefer Redundancy to the Extraordinary Analyses. And it seems there is: given certain standard tense-logical principles, the interpretation of the standard tense operators as redundant when applied to temporally extraordinary sentences gives rise to further problems for B-theorists.

To see this, let us first shift to the modal case, and consider the following pair of sentences (where ‘*a*’ names me; ‘*S*’ expresses the property of being a sibling; ‘*R*’ expresses

the relation of being located in the same possible world; and ‘*b*’ names some individual located in a possible world other than this one):²⁶

(28) $\diamond\neg Sa$

(Possibly, it is not the case that I am a sibling)

(29) $\Box(Sa \wedge \neg Rab)$

(Necessarily, I am a sibling and it is not the case that I am located in the same possible world as *b*)

Given the standard modal principles that (i) if $\Box(\varphi \wedge \psi)$ then $\Box\varphi$ and that (ii) if $\Box\varphi$ then $\neg\diamond\neg\varphi$, (28) and (29) are inconsistent. However, notice that the sentence

(30) $Sa \wedge \neg Rab$

is an extraordinary sentence in Divers’s sense: it is a sentence whose subject matter is things not all of which are located in a single possible world. It follows that on Divers’s analyses of the standard modal operators, the modal operator in (29) is redundant, and therefore (29) is equivalent to (30). And given that (30) is true given Modal Realism – it is true that I am a sibling and it is not the case that I am located in the same possible world as *b* – it follows that on Divers’s analyses, (29) is true given Modal Realism. But as (28) is also true given Modal Realism, it follows that on Divers’s analyses, given Modal Realism (28) and (29) are both true. However, as we saw above, (28) and (29) are inconsistent.²⁷

²⁶ This objection is due to Marshall (2016, 17, fn.43).

²⁷ See Divers & J. Parry (2017) for a possible response to this sort of objection.

Now let us return to the temporal case. Consider the following pair of sentences (where ‘*a*’ names me; ‘*S*’ expresses the property of being a sibling; ‘*R**’ expresses the relation of being an instantmate; and ‘*b**’ names some non-instantmate of mine, e.g. Xanthippe):

(31) $S \neg Sa$

(Sometimes, it is not the case that I am a sibling)

(32) $A(Sa \wedge \neg R^*ab^*)$

(Always, I am a sibling and there is no time at which *b* and I are co-located)

Given the standard tense-logical principles that (i) if $A(\varphi \wedge \psi)$ then $A\varphi$ and that (ii) if $A\varphi$ then $\neg S\neg\varphi$, (31) and (32) are inconsistent. However, notice that the sentence

(33) $Sa \wedge \neg R^*ab^*$

is temporally extraordinary: it is a sentence whose subject matter is things such that there is no time at which they are all located. It follows that on the Extraordinary Analyses, the tense operator in (32) is redundant, and therefore (32) is equivalent to (33). And given that (33) is true given the B-theory – it is true that I am a sibling and there is no time at which *b* and I are co-located – it follows that on the Extraordinary Analyses, (32) is true given the B-theory. But as (31) is also true given the B-theory, it follows that on the Extraordinary Analyses, given the B-theory (31) and (32) are both true. However, as we saw above, (31) and (32) are inconsistent. Moreover, note that B-theorists who accept Redundancy do not face this problem, as (33) is not a qualitative sentence – it expresses a proposition about particular

individuals (me and *b*) – and therefore it does not follow given Redundancy that (32) is equivalent to (33), and therefore that (32) is true. It follows that B-theorists who accept Redundancy can defend an interpretation of (32) on which it is false, for example, by accepting a temporal-counterpart theoretic account of persistence and arguing that (32) implies the false claim that all of my temporal counterparts are siblings.²⁸

4.2 Bricker's Strategy

As Lewis (1986, 71) points out, Modal Realism implies that 'island universes' – universes with spatiotemporally disconnected parts – are metaphysically impossible. The reason is straightforward: given M-Locator, the sentence (where '*Ux*' means '*x* is an island universe')

$$(34) \diamond \exists x Ux$$

(Possibly, there is an island universe)

is equivalent to

$$(35) \exists x (Wx \wedge \exists y (Uy \wedge L(y,x)))$$

(There is a possible world *w* such that there is an island universe located in *w*)

But given the Modal Realist thesis that possible worlds are maximal mereological sums of spatiotemporally connected individuals, (35) implies a contradiction. Bricker (2001) argues that Modal Realists can account for the possibility of island universes by rejecting M-Locator

²⁸ See Hawley (2001) for a defence of a version of temporal counterpart theory ('stage theory'). See also Lewis (1968, 1971) on modal counterpart theory.

in favour of the following analyses of the modal operators (where ‘ Fx ’ means ‘ x is a fusion of possible worlds’):

$$\diamond\varphi := \exists x(Fx \wedge [\varphi]^x)$$

(For it to be the case that it is metaphysically possible that φ is for it to be the case that, restricting attention to things located in some fusion of possible worlds f , φ)

$$\Box\varphi := \forall x(Fx \supset [\varphi]^x)$$

(For it to be the case that it is metaphysically necessary that φ is for it to be the case that, restricting attention to things located in any fusion of possible worlds f , φ)

Given Bricker’s analyses, (34) is not equivalent to (35) but to the true sentence

$$(36) \exists x(Fx \wedge \exists y(Uy \wedge L(y,x)))$$

(There is a fusion of possible worlds f such that there is an island universe located in f)

Moreover, Bricker’s analyses provide Modal Realists with a way of avoiding the problems generated by M-Locator described in §2: for example, given Bricker’s analysis of ‘ \diamond ’, the sentence

(11) Possibly, there are many possible worlds

is equivalent to the true sentence

(37) There is a fusion of possible worlds f such that there are many possible worlds located in f

For that reason, B-theorists might be tempted to respond to the problems for their view generated by Locator by rejecting Locator in favour of the following Bricker-inspired analyses of the standard tense operators (where ‘ Ix ’ means ‘ x is an interval of time’):²⁹

$$P\varphi := \exists x(Ix \wedge x < n \wedge [\varphi]^x)$$

$$F\varphi := \exists x(Ix \wedge n < x \wedge [\varphi]^x)$$

Given the standard definitions of the tense operators ‘S’ and ‘A’ in terms of ‘P’ and ‘F’, these analyses imply:

$$S\varphi := \exists x(Ix \wedge [\varphi]^x)$$

$$A\varphi := \forall x(Ix \supset [\varphi]^x)$$

Call these the *Interval Analyses* of the standard tense operators. It is clear that the Interval Analyses avoid the problems for B-theorists generated by Locator – for example, given the Interval Analyses, the sentence

(9) Sometimes, there are many times

²⁹ See especially Viebahn (forthcoming, *Synthese*).

is equivalent to the true sentence

(38) There is an interval of time i such that there are many times located at i

Moreover, the Interval Analyses avoid the Implausibility Objection: given the Interval Analyses, the sentence

(17) $\neg \exists x Dx$

is equivalent to the false sentence

(39) $\forall x(Ix \supset \exists y(Dy \wedge L(y,x)))$

(For any interval of time i , there are dinosaurs located at i)

(I do not think this is really an advantage of the Interval Analyses, as I think that the truth of (17) is in fact *plausible* given the B-theory, for the reasons described in §3 above. However, I am aware that judgements of plausibility vary, and that many will judge the truth of (17) to be implausible given the B-theory.)

We have seen that the Interval Analyses provide B-theorists with a solution to the problems generated by Locator that also avoids the Implausibility Objection. It might seem, therefore, that B-theorists should prefer the Interval Analyses to Redundancy. However, B-theorists who endorse the Interval Analyses face the temporal analogue of a well-known

problem faced by Modal Realists who endorse Bricker's analyses of the standard modal operators.³⁰

To see this, consider the fact that on the standard B-theoretic account of *truth simpliciter* for sentences, a sentence φ as uttered at a time t is true simpliciter just in case φ is true relative to t . For example, according to the standard B-theoretic account, an utterance at the present time n of the sentence 'There are [restrictedly speaking] no dinosaurs' is true simpliciter, as it is true that there are no dinosaurs located at n . However, the combination of the Interval Analyses with this account of truth simpliciter gives rise to surprising results. Here is Jago (2016, 636-7) on the analogous modal case:

Suppose we... say that, by definition, an utterance of 'A' is true simpliciter iff it is true relative to the world of utterance. Then it is analytic that, for restricted contents, truth simpliciter requires truth relative to some world. So it is also analytic (given how Lewisian metaphysics defines 'world') that truth simpliciter requires truth relative to some spatiotemporally connected entity. But, given the plurality-of-worlds analysis, some possible truths are not like this. 'There are exactly two penguins, and they are not worldmates' is false but possibly true, on the plurality of worlds analysis. The problem is that, on the present approach, it is analytic that it is false simpliciter, and an analytically false statement cannot possibly be true. So we must reject this first option.

The idea is that the combination of "the plurality-of-worlds analysis" – i.e. Bricker's (2001) analyses of the standard modal operators – with the standard Modal Realist account of truth simpliciter gives rise to the surprising result that for some (interpreted) sentences φ (e.g. the sentence 'There are [restrictedly speaking] two spatiotemporally disconnected blue swans'), no utterances of φ are true simpliciter, even though some (in fact, *all*) utterances of 'Possibly φ ' are true simpliciter. And this is certainly surprising: one might think that if one accepted

³⁰ See Bricker (2001), Jago (2016, §7), and Divers (2002, 103-105) for relevant discussion.

the truth simpliciter of the sentence ‘Possibly, there are [restrictedly speaking] two spatiotemporally disconnected blue swans’ one should, in the absence of relevant empirical evidence, be open-minded as regards whether there are [restrictedly speaking] two spatiotemporally disconnected blue swans, and therefore open-minded as regards whether if one asserted ‘There are [restrictedly speaking] two spatiotemporally disconnected blue swans’ one’s utterance would be true simpliciter.

Similarly, the combination of the Interval Analyses with the standard B-theoretic account of truth simpliciter gives rise to the surprising result that for some (interpreted) sentences φ (e.g. the sentence ‘There is [restrictedly speaking] an extended interval of time’), no utterances of φ are true simpliciter, even though some (in fact, *all*) utterances of ‘Sometimes φ ’ are true simpliciter. And this is certainly surprising: one might think that if one accepted the truth simpliciter of the sentence ‘Sometimes, there is [restrictedly speaking] an extended interval of time’ one should, in the absence of relevant empirical evidence, be open-minded as regards whether there is [restrictedly speaking] an extended interval of time, and therefore open-minded as regards whether if one asserted ‘There is [restrictedly speaking] an extended interval of time’ one’s utterance would be true simpliciter.³¹

The natural way for B-theorists who endorse the Interval Analyses to try to avoid the above result is to revise the standard B-theoretic account of truth simpliciter for sentences. However, there does not seem to be a way to do this that does not lead to further (even more serious) problems. For example, suppose the defender of the Interval Analyses holds that a

³¹ Philosophers who accept the Kripkean defence of the contingent a priori might not be so troubled by these results. For example, consider the sentence ‘The standard metre stick is more than a metre long’. Given the definition of ‘a metre long’, any utterance of that sentence is false simpliciter, even though some utterances of the sentence ‘Possibly, the standard metre stick is more than a metre long’ are true simpliciter (Kripke 1980, 54-6). A defender of Bricker’s analyses of the modal operators could coherently argue that the sentence ‘There are [restrictedly speaking] spatiotemporally disconnected blue swans’ is relevantly like the sentence ‘The standard metre stick is more than a metre long’. Similarly, a defender of the Interval Analyses could argue that the sentence ‘There is [restrictedly speaking] an extended interval of time’ is (on their view) an example of the ‘temporary a priori’.

sentence φ as uttered at a time t is true simpliciter just in case φ is true relative to some interval i that contains t . In that case, an utterance at the present time n of the sentence ‘There are [restrictedly speaking] no dinosaurs’ is both true simpliciter and false simpliciter, as there is an interval i that contains n and contains dinosaurs, and another interval i^* (distinct from i) that contains n but does not contain dinosaurs. On the other hand, suppose she holds that a sentence φ as uttered at a time t is true simpliciter just in case φ is true relative to *every* interval i that contains t . In that case, an utterance at the present time n of the sentence ‘There are [restrictedly speaking] no dinosaurs’ is false simpliciter, as some of the intervals that contain n also contain dinosaurs. However, we would expect an utterance at the present time n of the sentence ‘There are [restrictedly speaking] no dinosaurs’ to be *true* simpliciter, not false simpliciter.

Bricker’s solution to the modal analogue of the above problem is to combine his ‘island-universe-friendly’ analyses of the standard modal operators with the view that some possible world w or fusion of possible worlds f possesses the primitive property of *being actual*.³² An analogous B-theoretic solution would be to combine the Interval Analyses with the thesis that some time t possesses the primitive property of *being present*. However, in that case there would be a fundamental distinction between present and non-present times, and Temporal Parity would be false. Moreover, on pain of defending a view according to which presentness was ‘frozen’ at a certain time, the B-theorist would have to allow that the proposition that t is present is temporary, in which case Propositional Eternalism would be false. But as we saw above in §1, Temporal Parity and Propositional Eternalism are essential B-theoretic theses. Therefore, B-theorists cannot accept this solution to the problem generated by the Interval Analyses.

³² Bricker (2001) writes: “On the brand of [modal] realism I am propounding, there is an absolute fact as to which among all the possible worlds has been actualized; call it realism *with absolute actualization*.”

4.3 Parsons's Strategy

Parsons (2012) argues that Modal Realists should respond to the problems generated by M-Locator by rejecting M-Locator in favour of the following 'T-preserving Analyses' of the modal operators:

$$\diamond\varphi := \exists x(Wx \wedge [\varphi]^x) \vee \varphi$$

(For it to be the case that it is metaphysically possible that φ is for it to be the case that restricting attention to things located in some possible world w , φ , or φ)

$$\Box\varphi := \forall x(Wx \supset [\varphi]^x) \wedge \varphi$$

(For it to be the case that it is metaphysically necessary that φ is for it to be the case that restricting attention to things located in any possible world w , φ , and φ)

It is clear that Parsons's analyses provide Modal Realists with a way of avoiding the problems generated by M-Locator described in §2 above: for example, given the above analysis of ' \diamond ', the sentence

(11) Possibly, there are many possible worlds

is equivalent to Worlds. For that reason, B-theorists might be tempted to respond to the problems for their view generated by Locator by rejecting Locator in favour of the following Parsons-inspired analyses of the standard tense operators:

$$P\varphi := \exists x(Tx \wedge x < n \wedge [\varphi]^x) \vee \varphi$$

$$F\varphi := \exists x(Tx \wedge n < x \wedge [\varphi]^x) \vee \varphi$$

Given the standard definitions of the tense operators ‘S’ and ‘A’ in terms of ‘P’ and ‘F’, these analyses imply:

$$S\varphi := \exists x(Tx \wedge [\varphi]^x) \vee \varphi$$

$$A\varphi := \forall x(Tx \supset [\varphi]^x) \wedge \varphi$$

Call these the *Parsons Analyses* of the standard tense operators. It is clear that the Parsons Analyses avoid the problems for B-theorists generated by Locator – for example, given the Parsons Analyses, the sentence

(9) Sometimes, there are many times

is equivalent to Times. Moreover, the Parsons Analyses avoid the Implausibility Objection: given the Parsons Analyses, the sentence

(17) $A \exists x Dx$

is equivalent to the false sentence

(40) $\forall x(Tx \supset \exists y(Dy \wedge L(y,x))) \wedge \exists x Dx$

(For any time t , there are dinosaurs located at t , and there are dinosaurs)

(As above, I do not think the falsehood of (17) is *really* an advantage of the Parsons Analyses, but for dialectical purposes I allow that it is.)

We have seen that the Parsons Analyses provide B-theorists with a solution to the problems generated by Locator that also avoids the Implausibility Objection. It might seem, therefore, that B-theorists should prefer the Parsons Analyses to Redundancy. However, there is a good reason for B-theorists to reject the Parsons Analyses: given the Parsons Analyses, the following sentences are both true:³³

(9) Sometimes, there are many times

(41) Sometimes, there is exactly one time

Thus the Parsons Analyses deliver the unwelcome result that given the B-theory, the number of times varies over time. Moreover, the analyses imply that it is never the case that there are exactly n times for any n greater than 1. (For example, that there are exactly two times is neither true simpliciter, nor true when attention is restricted to things located at some time t .) So given the Parsons Analyses, although the number of times varies over time, the number of times there is is never precise (except when it is 1). Something has clearly gone wrong. In contrast, given Redundancy, it is always the case given the B-theory that there are many times, and never the case that there is exactly one time (or exactly two times, or exactly three times, and so on).

³³ Dorr (*Counterparts* MS) describes a similar argument against the modal analogue of the Parsons Analyses. For a distinct argument against the Parsons Analyses, see Jago (2016, §4).

4.4 Sometimes Introduction

So far we have focused on B-theoretic strategies for avoiding the problems generated by Locator which, like the strategy of accepting Redundancy, involve the rejection/modification of Locator. We now turn to consider an alternative type of strategy: to retain Locator, and instead reject Sometimes Introduction.³⁴

SOMETIMES INTRODUCTION: $\varphi \supset S\varphi$

As mentioned in §2 above, Sometimes Introduction is the temporal analogue of the widely-accepted modal axiom T ($\varphi \supset \diamond\varphi$).³⁵ However, Sometimes Introduction might strike some as less obviously true than T. In particular, some might be tempted to reject Sometimes Introduction on the grounds that there is a class of ‘atemporal’ (or ‘timeless’) truths such that, for any atemporal truth p , it is not the case that sometimes p .³⁶ Natural candidates for such truths are mathematical and logical truths, as well as truths that in some sense ‘concern the whole of temporal reality’, such as that there are many times. A B-theorist could try to avoid

³⁴ Note that Locator and Sometimes Introduction are independent theses: Sometimes Introduction tells us that whenever we have a sentence φ we can validly infer $S\varphi$; Locator tells us that we should understand the tense operators (including ‘S’) as quantifiers over times which restrict the individual quantifiers in their scope to things located at the relevant times. Neither thesis implies the other. For example, both Bricker (2001) and Parsons (2012) accept T ($\varphi \supset \diamond\varphi$) – the modal analogue of Sometimes Introduction – even though they both reject M-Locator. (Indeed, Parsons describes T as an ‘obviously valid pattern of inference’ and names his analysis of ‘ \diamond ’ the ‘T-preserving analysis’). Similarly, one could consistently accept Locator and reject Sometimes Introduction: in that case, one would hold that one cannot always validly infer $S\varphi$ from φ , and that $S\varphi$ should be understood as equivalent to ‘Restricting attention to things located at some time t , φ ’. Finally, it is of course possible for B-theorists to try to avoid the problems generated by Locator by rejecting both Locator *and* Sometimes Introduction – but such a strategy has no obvious advantages over the strategies contemplated here of rejecting one or other of those theses.

³⁵ Some philosophers have contemplated the falsehood of T. For example, Halbach, Leitgeb & Welch (2003) argue that those who prefer an interpretation of modal notions as predicates should reject T, and Noonan (1994) recommends that modal realists reject T in order to avoid the problems generated by M-Locator.

³⁶ One could try to co-opt Fine’s (2005) distinction between ‘inner’ and ‘outer’ truth in defence of this distinction. However, see Williamson (2002) for powerful arguments against this approach.

the problems generated by Locator by arguing that the sentences which lead to contradiction given Sometimes Introduction and Locator (such as Times and Non-instantmates) are sentences which express atemporal truths in the above sense, and are therefore counterexamples to Sometimes Introduction. Call a B-theorist who defends this strategy an *Atemporalist B-theorist*.

An immediate problem with the above strategy is that given that what is not sometimes the case is never the case, it follows that for any atemporal truth p , if p then it is never the case that p . But is very hard to accept that something is the case and yet never the case – that what is never the case is not the case will strike many as axiomatic. For example, if the Atemporalist B-theorist argues that Times (‘There are many times’) expresses an atemporal truth, then her view implies

(42) There are many times and there are never many times

But that is very strange: if it is never the case that there are many times, then (surely) it is not the case that there are many times.

A natural way for the Atemporalist B-theorist to respond to the above objection is to argue that on her view, Locator is true, and therefore tense operators such as ‘S’ and ‘A’ are to be understood as implicit quantifiers over times which restrict the quantifiers in their scope to the relevant times:

$$S\phi := \exists x(Tx \wedge [\phi]^x)$$

$$A\phi := \forall x(Tx \supset [\phi]^x)$$

In that case, on her view (42) above is equivalent to:

(43) There are many times and there is no time t such that there are many times located at t

And all B-theorists (including RB-theorists) accept the truth of (43). More generally, the Atemporalist B-theorist can argue that the above objection from the truth on her view of sentences like (42) fails to take into account what those sentences *really mean* in the mouth of a B-theorist who accepts Locator.³⁷

However, this response has limited force against the objection. Even if it follows given the Atemporalist B-theory that (42) reduces to (43), it remains a significant cost of the Atemporalist B-theorist's view that she accepts the truth of sentences such as (42) of the form ' $\varphi \wedge \neg S\varphi$ '. After all, it matters just as much given the B-theory as it does given e.g. Presentism or the Growing Block which *tensed* sentences are true. If it did not, then (for example) the Implausibility Objection against the RB-theory from the truth on that view of sentences such as

(17) $A \exists x D x$

would have no force at all – RB-theorists could simply respond that on their view, (17) is equivalent to

(16) $\exists x D x$

³⁷ I am grateful to an anonymous referee for drawing my attention to this possible response.

which is not at all implausible given the B-theory. Similarly, if it didn't matter which tensed sentences were true given the B-theory, there would be no good reason for RB-theorists to restrict Redundancy to qualitative sentences – they could instead accept the simpler thesis of *Total Redundancy*:

TOTAL REDUNDANCY: For any sentence φ , $P\varphi$ and $F\varphi$ are equivalent to φ

But of course, there are excellent reasons for RB-theorists to prefer Redundancy to Total Redundancy, as Total Redundancy implies *Permanitarianism*:

PERMANENTARIANISM: For any sentence φ , $\varphi \supset A\varphi$

And Permanitarianism is clearly false: if it is true, then given that I am sitting it follows that

(44) I am always sitting

Now suppose a Permanitarianist B-theorist tried to defend her view by arguing that given the Permanitarianist B-theory, what (44) *really means* is that I am sitting. It should be clear that this response would do little to address the obvious falsehood of the Permanitarianist B-theory.

More generally, as we saw above in §1, an important part of the B-theoretic project is to provide a 'metaphysical semantics' for QTL in the B-theorist's fundamental, operator-free language – and the problems generated by Locator described in §2 show is that this is not a straightforward task. But the fact that the B-theorist's *fundamental* language is free of tense

operators does not mean that she can simply ignore the consequences for QTL of any proposed solution to the problems generated by Locator. In particular, the axioms of QTL are no less plausible for being stated in a non-fundamental language – and therefore any strategy for avoiding the problems generated by Locator that rejects them bears a significant cost.

A more plausible way for the B-theorist to reject Sometimes Introduction is to argue as follows:³⁸ first, there are distinct *tensed* and *tenseless* languages, where if a language L is tensed then all of the quantifiers of L are either tensed or equivalent to a disjunction of tensed quantifiers. In particular, natural language English (just ‘English’ from now on) is tensed in this sense: English quantifiers must always be read as either past, present, or future tensed (or as a disjunction of all three). For example, here is Stoneham (2009, 202-3, emphasis added):

The English verbs ‘to exist’ and ‘to be’ *must always be tensed*: we cannot say that something exists without saying more specifically that it does [now], has or will exist.

In contrast, tenseless languages contain ‘tenseless quantifiers’: i.e. quantifiers that carry no temporal information whatsoever, and so are not even equivalent to a disjunction of tensed quantifiers. For example, it is natural to think that the quantifiers of standard first-order predicate logic (‘ \forall ’ and ‘ \exists ’) are tenseless in this sense. If so, then standard first-order predicate logic is a tenseless language.³⁹

With the distinction between tensed and tenseless languages in mind, consider (e.g.) the argument from Locator, Times and Sometimes Introduction to the contradictory (10):

(10) There is a time t such that there are many times located at t

³⁸ Parsons (2012, §5) describes and rejects the modal analogue of this strategy.

³⁹ See Stoneham (2009) for an argument that the quantifiers of standard first-order predicate logic must ultimately be understood as tensed. See Deasy (2019) for a response to this argument.

If Times ('There are many times') as it appears in that argument is a sentence of English, then given that all English quantifiers are tensed, Times is false: even given the B-theory, it is not the case *there are now* many times; *there is now* exactly one time.⁴⁰ So Times as it appears in that argument must contain a tenseless quantifier, in which case it is a *tenseless* sentence. (If it is not then the argument from Locator, Times and Sometimes Introduction to (10) is unsound, and Locator does not generate a problem for B-theorists). But if Times is a tenseless sentence, it is not a legitimate substitution-instance of Sometimes Introduction, because Sometimes Introduction is a logical truth only when what is substituted for φ is a *tensed* sentence. Moreover, this does not commit the B-theorist to the truth of sentence (42)

(42) There are many times and there are never many times

because for any tenseless sentence φ , tense operators cannot (meaningfully) be applied to φ – in that sense, tenseless sentences are simply 'out of the tense game'. More generally, B-theorists can avoid the problems generated by Locator by arguing that sentences such as Times and Non-instantmates are true given the B-theory *only if they are tenseless sentences* – in which case, they are not legitimate substitution-instances of Sometimes Introduction, as they cannot (meaningfully) be combined with tense operators such as 'S'.

The problem with the above argument is that it relies on a premise that B-theorists should reject, namely, that all English quantifiers are either tensed or equivalent to a disjunction of tensed quantifiers. Call this thesis *Tensed Quantifiers*:

⁴⁰ It is also false according to the B-theory that *there are now, were, or will be* many times.

TENSED QUANTIFIERS: All English quantifiers are either tensed or equivalent to a disjunction of tensed quantifiers

There are a number of good reasons for B-theorists to reject Tensed Quantifiers. First, Tensed Quantifiers implies that it is impossible for B-theorists to state their characteristic theses in English (or any other tensed language). For example, as we saw in §2 above, B-theorists typically hold that

$$(6) \exists x(Tx \wedge x < n \wedge \exists y(Dy \wedge L(y,x)))$$

(There is a time t earlier than now such that there are dinosaurs located at t)

which implies

$$(16) \exists xDx$$

(There are dinosaurs)

However, given Tensed Quantifiers, B-theorists simply cannot assert (16) in English – the best they can do is assert the sentence

$$(45) \text{ There are now, were, or will be dinosaurs}$$

But (45) fails to express a characteristically B-theoretic thesis: for example, no Presentist would deny that there were dinosaurs, and therefore that (45) is true. It follows that given Tensed Quantifiers, the only way for B-theorists to express their characteristic theses is to use a language – call it *Eternalese* – that extends English by the addition of the tenseless

quantifiers ‘ \exists ’ and ‘ \forall ’ whose domain is distinct from the domains of the past, present and future tensed quantifiers of English.⁴¹ Eternalese is the ‘home’ language of the B-theory: it is only when B-theorists speak Eternalese that they succeed in expressing characteristically B-theoretic theses.⁴² Brogaard (2012, 152) describes something like this view (read ‘B-theorist’ for ‘metaphysical eternalist’):

One might, of course, insist that the ontological commitments of the metaphysical eternalist are inexpressible in English. When philosophers say things like ‘Socrates exists,’ they might be taken to speak a regimented language that, in spite of being superficially similar to English, allows for additional readings of tensed sentences.

The problem is that it is very hard to believe that B-theorists cannot express their characteristic theses in English. The natural view is that in order to express a truth concerning the existence simpliciter of dinosaurs, B-theorists simply need to use the unrestricted ‘existential’ quantifier in English – in other words, to utter some sentence of English with the logical form ‘ $\exists xDx$ ’. And it is not just B-theorists who cannot express their characteristic views in English given Tensed Quantifiers. For example, consider the sentences:

(46) The universe is expanding

(47) There are two English Queens named ‘Elizabeth’

⁴¹ Tenseless quantifiers might be characterised as the quantifiers of the fundamental ‘joint carving’ language – see especially Sider (2004, §2.2) and Sider (2011).

⁴² Note that as well as rejecting Sometimes Introduction, B-theorists who accept Tensed Quantifiers will also reject Locator as either as a claim about English or as a claim about Eternalese. However, they can still hold that e.g. the English sentence ‘There were dinosaurs’ (with past tensed quantifier ‘there were’) is true iff there are dinosaurs located at some past time (with tenseless quantifier ‘there are’) – and more generally, that all tensed facts are ‘grounded in’ tenseless facts. In that sense, such B-theorists can think of Locator as a ‘translation manual’ from English to Eternalese.

Given Tensed Quantifiers, whenever anyone assertively utters (46) or (47) they either express a falsehood, or express a truth but are not speaking English. However, that seems wrong: surely Neil deGrasse Tyson can use (46) to express a truth without ceasing to speak English, and surely a student of history can use (47) to express a truth without ceasing to speak English.⁴³

More generally, from the perspective of one who *rejects* Tensed Quantifiers, the view appears to be one according to which there is no genuinely unrestricted quantification in English, but rather all quantification is restricted either to what there is now, was, or will be (or some disjunction of these).⁴⁴ However, it is very hard to believe that there is no unrestricted quantification in English. To use an example of Williamson's (2003,415-6), when Quine (1961) asks 'What is there?' and answers 'Everything', it is clear that he is both speaking English and quantifying unrestrictedly – he is not asking the question 'What is there now?' (or 'What is now, was, or will be?'), and he does not answer 'Everything there is now' (or 'Everything there is now, was, or will be').

Moreover, it is hard to see *why* we should think that there is no genuinely unrestricted quantification in English. After all, the B-theoretic defender of Tensed Quantifiers cannot claim that there is no such thing as unrestricted quantification: as a B-theorist, she must allow that she can use unrestricted quantifiers ('tenseless quantifiers') in order to express her distinctive views. But if we can understand and express unrestricted quantifiers, there seems to be no good reason to deny that unrestricted quantifiers can be understood and expressed in English. Even if unrestricted quantification is in some sense an innovation, English can surely

⁴³ Brogaard (2012, 152-3) makes a similar argument.

⁴⁴ Of course, the defender of Tensed Quantifiers will reject this characterisation of their view – they will say that what we are calling 'unrestricted quantification' here is really just 'tenseless quantification'.

expand to encompass expressions that express the relevant notions.⁴⁵

5. Conclusion

The problems for Modal Realists generated by M-Locator are well-known, and continue to receive significant attention from philosophers. However, the analogous problems for B-theorists has received much less attention. This is surprising, because – as far as I am aware – the B-theory has significantly more adherents than Modal Realism. In this paper I have attempted to redress the balance somewhat by focusing primarily on the temporal case. In particular, I have argued that a good way for B-theorists to respond to the problems for their view generated by Locator is to reject Locator in favour of Redundancy, the view that the standard tense operators are redundant when the sentences in their scope are qualitative.

The arguments in favour of Redundancy are not decisive. But whether or not B-theorists accept them, what the ‘advanced temporalising’ debate shows is that it matters a great deal how B-theorists interpret the standard tense operators. This is something of which it is easy to lose sight when one is thinking about the B-theory, because the view is routinely characterized as a theory according to which tense is not required in order to provide a fundamental description of reality. But even if there are no tense operators (or predicates like ‘is past’ and ‘is present’) in the B-theorist’s fundamental ‘joint-carving’ language, B-theorists still have important questions to answer concerning the ‘tense-related’ implications of their view – for example, whether or not the B-theory implies Qualitative Permanentarianism.

Given that this question can be understood as the question of whether, according to the B-

⁴⁵ The defender of Tensed Quantifiers might respond to this point as follows: given the Principle of Charity, the English expression ‘there is’ cannot be read as expressing the same notion as the ‘tenseless quantifier’ of Eternalese, because English speakers typically regard sentences like ‘There are dinosaurs’ as obviously false (see, for example, Hirsch 2004). Opponents of Tensed Quantifiers can respond to this point by arguing *à la* Sider (2011) that the unrestricted sense of ‘there is’ is a *highly eligible* meaning, and that this eligibility outweighs the relevant divergence of usage.

theory, there is change in the qualitative facts, it is an important question for B-theorists to answer.

References

Bacon, A. (2018). Tense and relativity. *Noûs* 52: 667-696.

_____. (2019). Is reality fundamentally qualitative? *Philosophical Studies* 176: 259-95.

Beer, M. (2010). Tense and truth-conditions. *Philosophia* 38: 265-9.

Bricker, P. (2001). Island universes and the analysis of modality. In G. Preyer & F. Siebelt (eds.). *Reality and Humean Supervenience: Essays on the Philosophy of David Lewis*. Rowman and Littlefield.

Broad, C. D. (1923). *Scientific Thought*. Harcourt Brace.

Brogaard, B. (2012). *Transient Truths*. Oxford University Press.

Crisp, T. (2007). Presentism and grounding. *Noûs* 41: 90-109.

Deasy, D. (2015). The moving spotlight theory. *Philosophical Studies* 172: 2073-89.

_____. (2019). The triviality argument against Presentism. *Synthese* 196: 3369-88.

Deng, N. (2013). On explaining why time seems to pass. *The Southern Journal of Philosophy* 51: 367-82.

Divers, J. (1999). A genuine realist theory of advanced modalizing. *Mind* 108: 217-39.

_____. (2002). *Possible Worlds*. Routledge.

_____. (2014). The modal status of the Lewisian analysis of modality. *Mind* 123: 861-72.

- Divers, J. & J. Parry. (forthcoming, *Analysis*). Advanced modalizing *de dicto* and *de re*.
- Dorr, C. (2016). To be F is to be G. *Philosophical Perspectives* 30: 39-134.
- _____. (Unpublished MS). *Counterparts*.
- Fine, K. (2005). *Modality and Tense: Philosophical Papers*. Oxford University Press.
- Halbach, V., Leitgeb, H. & P. Welch (2003). Possible-worlds semantics for modal notions conceived as predicates. *Journal of Philosophical Logic* 32: 179-223.
- Haslanger, S. & R. M. Kurtz (eds.) (2006). *Persistence*. MIT Press.
- Hawley, K. (2001). *How Things Persist*. Oxford University Press.
- Hirsch, E. (2004). Comments on Theodore Sider's Four-dimensionalism. *Philosophy and Phenomenological Research* 68: 658-64.
- Jago, M. (2016). Advanced modalizing problems. *Mind* 125: 627-42.
- Lewis, D. (1968). Counterpart theory and quantified modal logic. *The Journal of Philosophy* 65: 113-26.
- _____. (1971). Counterparts of persons and their bodies. *The Journal of Philosophy* 68: 203-11.
- _____. (1986). *On the Plurality of Worlds*. Blackwell.
- Magidor, O. (2016). Endurantism vs. perdurantism?: A debate reconsidered. *Noûs* 50: 509-32.
- Markosian, N. (2004). In defence of presentism. In D. Zimmerman (ed.). *Oxford Studies in Metaphysics Volume 1*. Oxford University Press.

- Marshall, D (2016). A puzzle for modal realism. *Philosopher's Imprint* 16: 1-24.
- Noonan, H. (1994). In defence of the letter of fictionalism. *Analysis* 54: 133-9.
- _____. (2014). The adequacy of genuine modal realism. *Mind* 123: 851-60.
- Parsons, J. (2012). Against advanced modalizing. In J. Maclaurin (ed.). *Rationis Defensor: Essays in Honour of Colin Cheyne*. Springer Netherlands.
- Quine, W. V. O. (1961). On what there is. In T. Crane & K. Farkas (eds.). *From a Logical Point of View*. Harvard University Press.
- Russell, J. (forthcoming, *Noûs*). Temporary safety hazards.
- Sider, T. (2001). *Four-dimensionalism: An Ontology of Persistence and Time*. Oxford University Press.
- _____. (2004). Replies to Gallois, Hirsch and Markosian. *Philosophy and Phenomenological Research* 68: 674-87.
- _____. (2006). Quantifiers and temporal ontology. *Mind* 115: 75-97.
- _____. (2011). *Writing the Book of the World*. Oxford University Press.
- Skow, B. (2015). *Objective Becoming*. Oxford University Press.
- Stoneham, T. (2009). Time and truth: the presentism-eternalism debate. *Philosophy* 84: 201-18.
- Viebahn, E. (forthcoming, *Synthese*). Presentism, eternalism and where things are located.
- Williamson, T. (2013). *Modal Logic as Metaphysics*. Oxford University Press.

_____. (2003). Everything. *Philosophical Perspectives* 17: 415-65.

_____. (2002). Necessary existents. In A. O'Hear (ed.). *Logic, Thought and Language*.
Cambridge University Press.

Zimmerman, D. (2005). The A-theory of time, the B-theory of time, and 'Taking Tense Seriously'. *Dialectica* 59: 401-57.