The Invisible Thin Red Line

Abstract

The aim of this paper is to argue that the adoption of an unrestricted principle of *bivalence* is compatible with a metaphysics that (i) denies that the future is real, (ii) adopts nomological indeterminism, and (iii) exploits a branching structure to provide a semantics for future contingent claims. To this end, we elaborate what we call Flow Fragmentalism, a view inspired by Kit Fine (2005)'s non-standard tense realism, according to which reality is divided up into maximally coherent collections of tensed facts. In this way, we show how to reconcile a genuinely A-theoretic branching-time model with the idea that there is a branch corresponding to the thin red line, that is, the branch that will turn out to be the actual future history of the world.

Keywords

Thin Red Line, Presentism, Branching Time, Tense Realism, Principle of Bivalence

1 Presentism and Bivalence Failure

Presentists hold that the present constitutes the whole of reality. Given that at present the future is not yet here, future contingent claims, such as: 'There will be a sea battle tomorrow', lack grounds – i.e., there is no fact of the matter to their truth or falsity. A presentist who agrees with this line of thought, and maintains that any truth requires a ground,[1] may be tempted to think that future contingent claims

[1] That is, that for every true claim there are *facts* in virtue of which the proposition it expresses is true. Although we are liberal on how to construe the notion of fact, in what follows we do assume that facts should not be identified with true propositions.

are neither true nor false, and thus to deny that the principle of bivalence holds unrestrictedly.[2] Bivalence, though, is a very elegant and well-behaved logical property, which we should not lightly dismiss on the ground of our preferred temporal metaphysics. Is there any strategy that the presentist can endorse to save bivalence? Two options present themselves quite naturally. Unfortunately, both come with theoretical costs. The first option is to endorse nomological determinism. If present truths, together with the laws of nature, necessitate future tensed truths, there is no reason to deny a determined truth-value to future contingent claims even if they lack future grounds (see Markosian 2013). But the issue of nomological determinism *vs.* nomological indeterminism is an empirical one, and it would be nice if the presentist could save bivalence even if the universe we happen to live in turns out to have indeterminist laws. Therefore, in what follows, we will assume that nomological indeterminism holds. The second option is to introduce in the present reality a fundamental ground for the truth of future contingents. In other words, the presentist could introduce in her metaphysics "brute facts" about which history among all the nomologically possible alternatives will be the actual one. If we represent, as is customary, nomologically possible histories through a tree-like structure, such brute facts would single out among all future branches a *thin red line* – i.e. the branch that will turn out to be the actual future history of the world.[3]

[2] See, for instance, Bourne (2006). In a similar vein, Le Poidevin (1991: 38) observes that "the extent to which the principle of bivalence is violated by statements about the past or future depends, for [the presentist], upon how much causal determinism he is prepared to allow. [...] In an indeterministic universe [...] many statements about the future must [...] lack a truth-value". To some extent, such a position might be thought of as sympathetic to Markosian (2013: 137)'s one. The latter seems to think that within a presentist framework, if laws of nature turned out to be wildly indeterministic, it would be impossible to evaluate contingent truths about the past as true or false. And, we add, similar considerations could be easily applied to future contingent claims.

[3] See Prior (1967). Linear time *is* compatible with indeterminism, but it is usually argued that to vindicate the intuition that the future is open we need branching and bivalence failure (see Belnap et al 2001; see Barnes and Cameron 2009 for a criticism of the idea and Torre 2011 for an overview). Here, we are not interested in whether branching or branching together with a thin red line vindicate any alleged intuition about the openness of the future. Our aim is to show that bivalence and non-standard presentism are compatible even on the assumption of nomological indeterminism and branching time.

However, following this strategy would put presentism in disadvantage with respect to eternalism, at least in its B-theoretic version. This is why. Even if eternalists can resort to "brute facts" to single out a thin red line among the future branches, there's a better strategy that they can follow, which is unavailable to the presentist. Let us label "the B-theoretic version of eternalism" that position that couples an eternalist ontology with the claim that at the fundamental level only tenseless facts – such as the fact that *Socrates is sitting at t* – obtain. Now, assuming a non-linear time towards the future, the B-theoretic model can be interpreted in two different ways. According to the first one, the eternalist block of tenseless facts is taken to be a block *multiverse*. In this case, facts located in different branches will all obtain in different alternative universes. Therefore, a future contingent claim is neither true nor false *simpliciter* and bivalence fails, although relative to one or another branch future contingents will also have a determinate truth-value.[4] According to the second way, the branching model is thought of as the structure of the canonical block universe; the B-theorist can adequately vindicate the claim that one of the branches is the thin red line. If the framework is B-theoretic, and tenseless facts are the most fundamental ones, there is no objective fact of the matter about which instant is present *simpliciter*. The notion of being present is understood in merely indexical terms, and each instant is present when considered with respect to itself, and past or future if considered with respect to instants that come before or after it (respectively) in the fundamental B-series. Therefore, we are allowed to take a "god's eye" view when providing truth-conditions for future contingents, and attribute a determined truth-value to each future contingent claim depending on how things will actually be. The idea of a thin red line without brute present-tensed facts about the actual future is thus a viable option within a B-theoretic eternalist framework,[5] but not for a presentist, since she resorts to tenseless facts at the

[4] See Saunders and Wallace (2008) and Wallace (*ms.*).

[5] This point is discussed in detail in [Suppressed for referee] , where it is also stressed that the same rationale would *not* hold in an A-theoretic framework. In an A-theoretic framework, there *is* a fact of the matter as to what time is the present. Hence, introducing a thin red line in the present moment would require the introduction of further brute facts about which future branch will be (as of now) the actual one. See also Øhrstrøm (2009).

fundamental level. More precisely, it is not a viable option for a *standard* presentist. However, we will argue that by endorsing what we call Flow Fragmentalism (a view inspired by Kit Fine (2005)'s non-standard tense realism) we can have our cake and eat it too – that is, we can avert the failure of bivalence by introducing a thin red line, while denying the reality of the future and buying nomological indeterminism.

Both presentists and flow fragmentalists maintain that the future is unreal. What does the presentist mean by such a claim? Consider the tensed fact that *Socrates is sitting (now)* – as opposed to the tenseless fact that *Socrates is sitting at t*. If Socrates is presently sitting, reality is constituted by the fact that *Socrates is sitting (now).* Assume that in a few minutes Socrates will be standing: can the presentist accept the future fact that corresponds to such a future-tensed truth? It depends on how we read 'future fact'. A future fact in a weak sense is a future-tensed fact that obtains at present. If Socrates will be standing in a few minutes, the fact that *Socrates will be standing* obtains at present (and hence it constitutes reality now). A future fact in a strong sense is a present-tensed fact that will obtain in the future. If Socrates will be standing in a few minutes (and he is sitting now), the fact that *Socrates is standing* will obtain in a few minutes (and hence it will constitute reality, which it does not now). Standard presentists can accept future facts in the weak sense, at least insofar as they resort to slightly "exotic" but presentism-friendly ideology or ontology – for instance, by resorting to "Lucretian" properties. The Lucretian presentist takes properties such as "being such that Socrates will be standing" to be an irreducible element of reality, and identify the future fact, in the weak sense, that *Socrates will be standing* with the fact that *the mereological sum of all the presently existing things is such that Socrates will be standing.*[6]

[6] See Bigelow (1996). Other options in the literature are adopting primitively tensed relations (Brogaard 2006 and Brogaard 2013), or to adopt the haecceitist version of presentism (Keller 2004, Ingram 2016a, 2016b), which defines past and future entities as uninstantiated "thisnesses". Still another option is to embrace a form of ersatzer presentism. The ersatzer takes times to be maximal abstract objects, that is, abstract representations of a given state of the world (see Bourne 2006 and Crisp 2007).

However, presentism is *not* compatible with accepting future facts in the strong sense. Indeed, for the presentist future facts in the strong sense are not facts at all, i.e., the extension of the very concept is empty. The facts that obtain at present are the facts that obtain *simpliciter*, and that constitute reality, namely the only facts there are. Thus, according to presentism, the future is unreal in the sense that there are no future facts in the strong sense. Note that the B-theoretic eternalist can accept future facts both in the weak and the strong sense – at least in so far as they are derivative and not fundamental. Tensed facts are the only kind of facts for which it makes sense to distinguish between facts that obtain in the present, in the past, and in the future. Tenseless facts, such as the fact that *Socrates is sitting at* t and the fact that *Socrates is standing at* t_1, are such that it either does not make sense to talk about them as obtaining in the present rather than in the past or the future, or they obtain indifferently in the past, in the present, and in the future. Now, as we have put it, the distinction between weak and strong facts is defined only for tensed facts, and hence, *at the fundamental level*, it makes no sense for the B-theorist. But if she accepts tensed facts at a non-fundamental level, she will have future facts both in the weak and in the strong sense – although only relative to times and histories. Imagine the fact that *Socrates is sitting at* t and the fact that *Socrates is standing at* t_1 constitute reality on a branch h, and that t_1 is future with respect to t. At the non-fundamental level of tensed facts, the B-theorist will have, on h, both the future fact (in the weak sense) that at t *Socrates will be standing* and the future fact (in the strong sense) that at t_1 *Socrates is standing*.[7]

This squares nicely with the considerations we have made before about the eternalist's strategy to have a thin red line without postulating "brute facts". An eternalist can maintain that, from the point of view of any time t considered as present, there are many future facts, in the weak sense, relative to each nomologically possible history. However, from a "god's eye" view, only one history is the actual future, and thus relative to a time (and *not* a time and a history) there is a single succession of future facts

[7] Can A-theoretic eternalism in its standard form (*viz.* the moving spotlight view) accept future facts in the strong sense? We believe – as Cameron (2015: 64-68), too, seems to – that doing so would lead to a form of McTaggartesque paradox. Hence the answer is no.

in the strong sense: the ones that will actually obtain. Again, nothing of the sort is viable to presentism, whose only way to maintain unrestricted bivalence is singling out by fiat which future facts (in the weak sense) are the ones on the thin red line.

The central thesis of this paper is that, in contrast to presentism, Flow Fragmentalism can be coupled with the idea that there is a thin red line without inflating the ontology with brute facts about the actual future. We will show how to fictionally order what Fine calls "fragments" in a tree-like structure that branches towards the future. As we will argue, under the hypothesis that we live in a single universe (and not a multiverse), not all the branches can be taken to be part of reality. Given that reality encompasses a single time line, only the fragments belonging to a certain branch are "out there"; only one branch is properly part of reality. Thus, while presentism indeed encounters serious difficulties when it comes to saving bivalence together with the idea that future truths have a ground, Flow Fragmentalism allows us to develop an *A-theoretic* branching-time model that is fully compatible with the thin red line – *viz.* a theory that combine the idea of an objective passage of time with semantic determinacy of statements about the future.[8] Within a framework of this kind, one can finally adopt unrestricted bivalence for future contingents. Let us then turn to Flow Fragmentalism.

2 Flow Fragmentalism

Flow Fragmentalism vindicates the idea that only the present is real within a non-standard tense realist framework, in the sense of Fine (2005). Standard tense realism (StTR) maintains that tensed facts, such as the fact that *Socrates is sitting (now)*, constitute a coherent reality in an absolute sense. More precisely, StTR is the conjunction of the following three claims (Fine 2005: 270-2):[9]

[8] Leininger (2015) argues that presentism does not vindicate the passage of time (contrary to what is ordinarily held), because to do so requires to acknowledge the existence of the past. Although a full discussion of Leininger's argument lies behind the scope of the present paper, we believe the same objection cannot be raised against fragmentalism. See also Fine (2005: 286-288), and section 3 below.

[9] See also Fine (2006: 399-400).

Realism	Reality is constituted (at least, in part) by tensed facts.
Absolutism	The constitution of reality is an absolute matter, i.e. not relative to a time or other form of temporal standpoint.
Coherence	Reality is not contradictory; it is not constituted by facts with incompatible content.[10]

Note that – for reasons that we do not need to consider here – StTR proves to be incompatible with the claim that facts obtaining at any time constitute reality in the same way; that is, the following thesis:

Neutrality	No time is privileged; the tensed facts that constitute reality are not oriented towards one time as opposed to another.[11]

Non-standard forms of tense realism maintain *Neutrality*, while giving up either *Absolutism* or *Coherence*. Those who reject *Absolutism* embrace what Fine (2005) calls *External Relativism*. External relativists think of reality as a plethora of *perspectives*, each centred on a time, and the constitution of reality by tensed facts as irreducibly relative. The crucial point is that incompatible tensed facts constitute reality only relative to different perspectives, and there is no overall perspective encompassing all of them (it would be incoherent).

Those who reject *Coherence*, while keeping *Absolutism*, adopt *Fragmentalism*. The fragmentalist drops the assumption that reality is "of a whole", by thinking of reality as constituted by incompatible

[10] As Correia & Rosenkranz (2011) rightly stress, Fine takes coherence as a primitive notion, which is distinct and more specific than the ordinary notion. If there is no time in which both Socrates is furious and Plato is anxious, then those two facts do not cohere, in Fine's sense, although the two propositions that state those facts form a coherent (in the usual sense) set. See also note 11.

[11] As Fine (2005: 272) points out – when coupled with *Absolutism*, *Coherence*, and *Neutrality* – *Realism* gives rise to a version of McTaggart (1908)'s Paradox. If some qualitative variation through time occurs, reality will be constituted by incompatible tensed facts. Suppose for example that at t Socrates is sitting, while at t_1 he is standing. In the light of *Realism*, at t the tensed fact that *Socrates is sitting (now)* obtains, while at t_1 the tensed fact that *Socrates is standing (now)* obtains. Assuming both *Neutrality* and *Absolutism*, those two incompatible facts will constitute reality absolutely speaking and not with respect to a given time. But, under the hypothesis that *Coherence* holds, reality cannot contain incompatible facts.

tensed facts. More precisely, reality is divided up into maximally coherent collections of tensed facts, called *fragments*. Each fragment is internally coherent, but the whole of reality is not. That reality is incoherent does not entail that conjunctions of incompatible facts can obtain. Suppose for example that Socrates is now sitting and then standing. In describing such a case, fragmentalism resorts to two different fragments, one in which we find all past-, present- and future-tensed facts that obtain when the fact that *Socrates is sitting* obtains, and another in which we find all past-, present- and future-tensed facts that obtain when the fact that *Socrates is standing* obtains. Both the fact that *Socrates is sitting (now)* and the fact that *Socrates is standing (now)* constitute reality in an absolute sense, but the fact that *Socrates is standing (now)* obtains in a fragment of reality different from the one in which the fact that *Socrates is sitting (now)* obtains, and there is no fragment where their conjunction holds. Hence, even though constitution of reality is *not* irreducibly relative, facts obtain only relative to fragments. In our preferred idiom: "*within fragment* F_n, Socrates is sitting (or, the fact that *Socrates is sitting* obtains)", and "*within fragment* F_m, Socrates is standing (or, the fact that *Socrates is standing* obtains)".

While for the standard tense realist obtainment in the present is obtainment *simpliciter*, for the fragmentalist there is no obtainment *simpliciter*, but only *within a fragment*. Yet, constitution is absolute (contrary to what the external relativist maintains), and so past and future facts in the strong sense *are* facts, since they constitute reality, even if they do not obtain at present.[12] Thus, in our take

[12] We are aware that this is not the only way to cash out Fine's idea. Lipman (2015), for instance, offers a different interpretation of the view, by characterising it through the elucidation of a primitive notion of co-obtainment, rather than by distinguishing relative obtainment from absolute constitution. Roughly, when two facts co-obtain "they form a unified qualitative manifestation of the relevant objects, one single bit of world within which the things are a certain way" (p. 3127), and when two facts do not co-obtain "relative to the one fact, the other fact is not there at all" (p. 3128). Those remarks would suit us as glosses to our notions of "obtaining within the same fragment" and "obtaining in two different fragments" (respectively). Lipman also stresses that "fragmentalism is not the view that there literally speaking are entities called fragments relative to which thing obtain" (p. 3129). We *agree* with this last remark, since – as we will stress below – (i) we do not allow quantification over fragments, and (ii) relativisation of obtainment to fragment needs to be coupled with absolute constitution to give us fragmentalism. A full discussion of differences and similarity between Lipman's proposal and the view

on the position, fragmentalism requires a form of double talk: the absolute talk of constitution and the irreducibly relative talk of obtainment. It is important to stress that the latter does not represent merely a "coherence" constraint on how we can describe the reality constituted by incoherent facts. Each way of talking is metaphysically fundamental: as a whole, reality is incoherent (after all, Coherence does not hold), even though there is *no instance* of a conjunction of incoherent facts, since along the temporal dimension reality is coherently fragmented – *viz.* divided into fragments constituted by facts that cohere with one another.[13]

The distinction between which facts (absolutely) constitute reality and which facts (within a fragment) obtain also holds for facts about existence. Just as standard forms of tense realism are compatible with different ontologies, so are non-standard ones. Standard tense realists either accept the claim that only present things exist (i.e., they endorse standard presentism), or they deny that claim, thereby endorsing an eternalist ontology (i.e., a "moving spotlight view"), or an ontology encompassing the present and the past (i.e., a "growing block view"). Non-standard tense realists can differ from each other with respect to the facts about existence that they take to obtain *within each fragment*. In particular, Flow Fragmentalism is the view that within each fragment, a presentist ontology holds. Thus, it can be articulated in the two following claims:

Ontic Flow Fragmentalism	Within each fragment, only the present entities exist.
Factive Flow Fragmentalism	Within each fragment, only presently obtaining facts obtain.

According to Flow Fragmentalism, facts that obtain at the present time constitute reality in the same

exposed here is beyond the scope of the present paper. For another interpretation of Fine's view, see Loss (2017).

[13] Someone may complain that the distinction between (absolute) *constitution* and (irreducibly relative) *obtainment* is a piece of ideology, which only the fragmentalist have to endorse. This is true, but notice that the distinction does not come with acceptance of two distinct categories of properties or facts. Rather, it is a distinction between two *ways* facts relate to reality in the fragmentalist's picture. Thus, it may be a cost in terms of overall complexity, but not in terms of metaphysical burden, as accepting brute facts about the privileged future history is. For a detailed analysis of how to understand the notion of obtainment in a fragmentalist framework, see [suppressed for referee].

sense as the facts that obtain at times different from the present: they constitute reality absolutely speaking. But, for each fragment reality is as it is at a particular time, and thus it is internally coherent.

Thus, reality is divided into fragments that do not cohere with each other, but no conjunction of incompatible facts obtains. One may object that Flow Fragmentalism is by no means able to vindicate the idea that, in a sense, only the present is real, since facts about the existence of future and past entities do compose reality. But in so far as Flow Fragmentalism is a non-standard form of tense realism, this objection is unfair. The ontology to which a tense realist is committed depends on the (tensed) facts about existence that she accepts, i.e., that she accepts *as obtaining*. Now, while in the standard framework obtainment is absolute and for a presentist facts about existence change as time goes by (e.g., the domain of the standard presentist once contained Julius Caesar, but no longer does so), in the fragmentalist framework obtainment is irreducibly relative – hence reality does not cohere with respect to what exists, although the domain of each fragment will contain only what is present.[14]

3 Fragmentalism and the flow of time

Now, can Flow Fragmentalism secure bivalence for future contingents more easily than presentism? An obvious strategy to achieve this is to order the fragments in a sequence, which could play the role of a temporal succession of instants ordered by an earlier-later relation. Through such a "pseudo B-relation" $<_{ps}$, the flow fragmentalist can provide bivalent truth-conditions for future contingents in the familiar way. Imagine that two fragments F_1 and F_2 are such that within F_1 all facts that obtain at a certain instant t_1 obtain, and within F_2 all facts that obtain at a certain instant t_2 obtain. We can stipulate that $F_1 <_{ps} F_2$ if and only if $t_1 < t_2$. Then, a future claim "in the future, ϕ" is true in F_n

[14] One may have the worry that Flow Fragmentalism entails some form of commitment to non-existing objects in order to avoid contradictory talk, but this is not so. While present-tensed facts about the first child born in the next century constitute reality as much as the present-tensed fact that she or he does not (yet) exist, it is not the case that she has a certain property *and* she does not exist, since facts about her non existence never obtain in the same fragments where facts about her having certain (present-tensed) properties obtain.

if and only if there is a fragment F_m such that $F_n <_{ps} F_m$, and within F_m the fact that ϕ obtains. By ordering the fragments we can put them to use as instants in a standard semantics for tenses. Although we maintain that this idea is roughly on the right track, we see at least three problems that it must face.

Firstly, $<_{ps}$ is not a *temporal* sequence, since it holds between fragments and not between instants. Fragments are collections of presently obtaining facts, and therefore no fragment comes before or after another. Even worse, there are literally no facts "connecting" them, since facts obtain only within fragments, and there is no "super-fragment" encompassing them all within which facts concerning $<_{ps}$ can obtain. If so, one may wonder how such a view would vindicate – as tense realism in general aspires to do – the reality of the flow of time.

Secondly, and relatedly, the flow fragmentalist seems to accept explicit quantification over fragments: "in the future, ϕ" is true in F_n if and only if *there is* a fragment F_m such that $F_n <_{ps} F_m$, and within F_m the fact that ϕ obtains. But if fragments can be quantified over, and they can play the role that instants play in standard eternalist B-theory, where exactly is the distinction between the two positions? The whole picture of a *presentist* metaphysics starts to fade.[15]

Thirdly, even if the two former difficulties can be overcome, bivalence for future contingents would be secured *only if* $<_{ps}$ is linear, that is if the order of fragments is total. But why should that be so? After all, within each fragment the present is the only reality, and the only future facts we find are future facts in the weak sense, i.e., future-tensed facts presently obtaining. Those future facts can be about a *branching*, rather linear temporal topology. Indeed, this is what we should expect by expanding to the non-standard case the picture that we discussed at the beginning. But if this is the story within each fragment, then it seems that the relation $<_{ps}$ that holds between fragments should be equally branching towards one of its sides. If so, resorting to it clearly cannot solve the problem of bivalence. What to do, then? In this section and in the next one, we deal with the first two difficulties, and in

[15] Tallant (2013) raises a similar complaint for non-standard forms of presentism in general. One could also notice the similarity between the kind of truth-condition suggested in the text and customary tenseless accounts of tensed meaning; see, for instance, Dyke (2003).

section 5 we will deal with the third one.

Whilst the second problem points at how to distinguish Flow Fragmentalism from the "block view", i.e. standard B-theoretic eternalism, the first one can be seen as a challenge to distinguish it from "the spotlight view", i.e. A-theoretic eternalism, in particular from its "super-time" version. As Brad Skow argues in a series of related articles on the spotlight view, we can articulate the idea that the present (or the NOW, in his terminology) moves from one instant to the next one in the temporal series, by resorting to a further dimension – *viz.* super-time – in which this movement takes place. Points in super-time are ordered by a relation that "mimics" the linear topology and metric of B-series of instants. Thus, from the perspective of a point of super-time T_n, an instant t_n is present, and all those coming before it (all t_x such that $t_x < t_n$) are past, and all those coming after it (all t_x such that $t_n < t_x$) are future. This allows us to provide an account of the flow of time as the movement of the NOW through the temporal series.[16]

> So with supertime we can make sense of the NOW's motion: for the NOW to move is to be located at different times relative to different points of supertime. (Skow 2012: 224)

It should be quite clear that the super-time construal of the spotlight view and non-standard tense realism bear similarities. Points of super-time closely resemble fragments (or perspectives). As with fragmentalism, facts obtain within fragments (and as with external relativism, reality is constituted by tensed facts relatively to perspectives), in the super-time story *from the perspective of* different points of super-time, different instants are past/present/future, and hence (we can assume) certain tensed facts rather than others obtain. Yet, there is a crucial difference between the two views.

This difference has two aspects: Skow's super-time is a *metaphor*[17] to explain the *standard* form of

[16] Note that in his Skow (2015), though, he defends a "block universe" view.

[17] Skow's super-time is not "hyper-time", *viz.* a second dimension of time, as the one sometimes discussed in the framework of time travel scenarios (see Meiland 1974 and van Inwagen 2010). Rather, it bears similarity to Schleisinger (1991)'s modal notion of "meta-time".

eternalist tense realism. Fragments and perspectives are not meant to be metaphors, but to be fundamental ingredients of a metaphysical picture. But what is super-time a metaphor of? The spot-lighter has to be careful not to collapse the series of super-time points with the actual B-series of instants, on pain of collapsing her position into a form of B-theory in disguise. Thus, it cannot be a metaphor of tenseless facts concerning which instants are past, present or future relative to each other. But she must also be careful not to duplicate time in her picture, by introducing a *further* actual temporal series, in which the NOW can "flow". The "third way" is to construe super-time as a metaphor of irreducible tensed facts, expressed by primitive tense operators.

> Talk of the NOW's motion is to be understood using primitive tense operators [...]. "The NOW is moving into the future" means (roughly) "The NOW is located at t, and *it will be the case that* the NOW is located at a time later than t". (Skow 2012: 224)

That is why the metaphor is about a standard form of tense realism. This is a crucial aspect of the view: in the standard picture, one time is present *simpliciter*, and not relative to perspectives or fragments. The movement of the NOW along the super-time series is thus a metaphor for the changes in which facts are absolutely present. As Pooley rightly notes in discussing Skow's view, the problem is that there are *two times* in this picture: there is the A-theoretic super-time, understood in primitively tensed terms, and there is the B-theoretic time of the temporal series on which the spotlight shines and moves.[18] However, Flow Fragmentalism is different and it has to stand no such charge. As a *non-standard* form of tense realism, it accepts *Neutrality* and hence absolute constitution, but relativizes obtainment. Within each fragment, only one instant t is present, and all past-, present-, future-tensed facts obtain at present. But all fragments are on a par, and no one corresponds to what time is present *simpliciter*. Hence, within each fragment time is *A-theoretic*: fragments are constituted by irreducible tensed facts, and the flow of time is a feature of reality within each fragment. In the fragmentalist pic-

[18] Already Williams (1951) points out a similar problem for the view that he attributes to McTaggart. Pooley (2013) dislikes the duplication of time because of the epistemic problems it gives rise to (see Braddon-Mitchell 2004).

ture there is no movement of the absolute NOW along the series of fragments, and hence there is no super-time. Yet, if we are right, there is a pseudo B-series. Thus, it seems that the fragmentalist has a two-time problem, all in all. It is that while in the spotlight view super-time is A-theoretic and normal time is B-theoretic, in the fragmentalist picture "super time" (i.e. the pseudo B-series of fragments) is B-theoretic, while ordinary time (i.e. time within each fragment) is A-theoretic.

But this distinction makes all the difference, because the flow fragmentalist – unlike the super-time spot-lighter – *can* avoid the two-time objection by taking the ordering of fragments by $<_{ps}$ to be a fiction. Indeed, that is precisely how we propose to solve the first predicament: $<_{ps}$ is not a temporal series, but a fiction – a fiction that does not lead to a two-time problem because, in contrast to super time, it does not encode an A-theoretic dimension built on top of a B-theoretic block universe. But how are we to recover the ordering of $<_{ps}$, if reality is fragmented? It seems that we are never in a position to recover at once all the elements that we need to construct such series; there is no uber-fragment in which facts concerning $<_{ps}$ can obtain. Pooley notices an analogous problem with respect to the external relativist account of the passage of time in terms of variation through different temporal perspectives:

> Does this variation with temporal perspective provide us with a sense in which the non-standard view vindicates the passage of time? There is an apparent problem with the suggestion that it does. The variation is not itself a fact about how reality is. Our model of the view includes such variation but [...] features of the model that transcend what is true from each temporal perspective do not correspond to perspective-independent facts about reality. There are meant to be no such facts. (Pooley 2013: 336)

This is correct also for Flow Fragmentalism: the pseudo B-series is not grounded in facts connecting the different fragments, and cannot be, since there are no such facts. But this is how it should be. The story about $<_{ps}$ is a fiction that is not grounded in such alleged facts. Nonetheless, the fiction is *justified* by the very metaphysical hypotheses about temporal reality that constitute the core of Flow

Fragmentalism. By facing the second problem (how to differentiate fragmentalism-cum-$<_{ps}$ from B-theoretic eternalism) and the third one (how to recover bivalence if $<_{ps}$ is a tree-like order), we will also clarify how the fiction is to be conceived.

4 Overlap and Branching Ordering

The dangerous proximity between the position we advance and standard B-theory is given by the fact that we proposed to provide bivalent truth-conditions for future contingents by quantifying over fragments ordered by $<_{ps}$. It should be clear from what we said at the end of the previous section that this quantification is to be understood as part of the fiction. But what is the reality behind this fiction? A hint comes from Fine himself, when he spells out the account of the flow of time in the fragmentalist picture: "Any fact is plausibly taken to belong to a 'fragment' or maximally coherent collection of facts; and so reality will divide up into a number of different but *possibly overlapping* fragments" (2005: 281, italics ours). Roughly speaking, two fragments are said to be partially overlapping if they share some tensed facts, such as the fact that *there were dinosaurs*. Intuitively, the fragmentalist can hold that, since a tensed fact of this kind is "temporal", the relation of overlap between these two fragments is sufficient to order them in a temporal succession. Tallant (2013) contended that

> the trouble with such a proposal, aside from it being extremely controversial, is that these facts are insufficiently refined to act as suitable ground for true propositions about the past (and future) and when they are replaced with facts that *are* suitable, we find that the distinct fragments of reality will no longer overlap. (Tallant 2013: 293, italics in the original)

As an example, Tallant proposes to consider a true proposition like 'Jonathan was hungry five minutes ago'. Its truth – he underlines – cannot be adequately grounded by the tensed fact *Jonathan was hungry*, but rather by the more precise tensed fact that *Jonathan was hungry five minutes ago*. To put it another way, the truth of 'Jonathan was hungry five minutes ago' cannot supervene on *Jonathan's*

having been hungry, but must instead supervene on the more specific *Jonathan's having been hungry five minutes ago*. But it is easy to see that this more specific tensed fact *cannot* overlap with the fragment that represents how things will be in another minute, "for, in another minute, the tensed fact that we will require is not *Jonathan's having been hungry five minutes ago*, but *Jonathan's having been hungry six minutes ago*" (p. 294).

Nothing prevents us – Tallant concludes – from thinking of the fragments as constituted only by more specific tensed facts of this kind. But then it is hard to make sense to the claim that different fragments can overlap. Hence, the fragmentalist cannot explain how to order her fragments in a temporal sequence.

We think that Tallant's reply can be overcome. We are willing to admit that there are many propositions whose truth supervenes on "more specific" tensed facts, such as the fact that *Jonathan was hungry five minutes ago*. Consequently, we admit that we are required to think of fragments as constituted by such metric tensed facts. However, we disagree about whether this is sufficient for claiming that fragments cannot overlap. To be clear about the point of our reply, consider a fragment F containing the tensed fact that *dinosaurs became extinct at least 65 million years ago*. Given that tensed fact, in F the proposition 'Dinosaurs became extinct at least 65 million years ago' is obviously true. Note that if in F this proposition is true, then in F the proposition 'Dinosaurs became extinct at least 64 million years ago' is also true, since the former entails the latter. It follows that F must also contain the tensed fact that *dinosaurs became extinct at least 64 million years ago*. Now, nothing prevents the fact that *dinosaurs became extinct at least 64 million years ago* from obtaining in another fragment – call it F_n. But then F and F_n share at least one tensed fact, namely the fact that *dinosaurs became extinct at least 64 million years ago*. In other terms, F and F_n are partially overlapping.

We have no reason to exclude tensed facts like *dinosaurs became extinct at least 65 million years ago* from the inventory of what Tallant calls "more precise" tensed facts. On the contrary, note that the former can be thought of as *supervening* on the latter. After all, if it is true that Jonathan was hungry five minutes ago, *a fortiori* it will be true also that Jonathan was hungry at least five minutes ago.

As we have underlined in the previous section, since each fragment contains no more than presently existing things, every past/future fact that we find in a given fragment is a past/future fact in the weak sense: a past-future-tensed fact presently obtaining. The same goes for the "at least" tensed facts such as the ones that we just took into consideration: they are non-present weak facts and thus kosher for the presentist. The pseudo B-series of fragment can then be reconstructed out of the overlap of "at-least" facts among fragments. Of course, we are spelling out a fiction here: there are no facts about the overlap of fragments, because those would obtain only within an incoherent "uber-fragment". And yet our model encompasses overlapping fragments. This is what the very hypotheses that fragments are constituted by "at least" facts, among other facts, let us conclude. Even more interestingly for our purposes, an order can also be reconstructed in the case within each fragment the tensed facts are about a branching temporal succession and the relation $<_{ps}$ is branching towards one of its sides. But how exactly is the relation of overlap sufficient for ordering the fragments along such a branching succession? Let us turn to a slightly more regimented framework.

We introduce the sentential operator $ATLEAST_{-n}$, to be read informally as 'at least n million years ago'.[19] Given a present-tensed proposition such as *dinosaurs become extinct*, $ATLEAST_{-n}$(dinosaurs become extinct) is to be read as the past-tensed proposition 'dinosaurs became extinct at least n million years ago'. Now, consider for example a fragment, F_0, containing the tensed fact that *dinosaurs became extinct at least 65 million years ago*, that is, a fragment in which $ATLEAST_{-65}$(dinosaurs become extinct) is true. Furthermore, while F_0 contains the tensed facts that *dinosaurs became extinct at least 64 million years ago*, that *dinosaurs became extinct at least 63 million years ago*, and so on and so forth, it does not contain the tensed fact that *dinosaurs became extinct at least 66 million years ago*. Now, we can order the fragments to be placed in the trunk whose upper bound is F_0 (see Fig. 1) by analysing how they overlap with F_0.

More precisely, given a fragment F_n, it will be part of the trunk if and only if it does not contain

[19] Or any other unit of time, such as days or seconds. Here we are taking into account the discrete case; the case of a dense time requires further complications that fall beyond the scope of this paper.

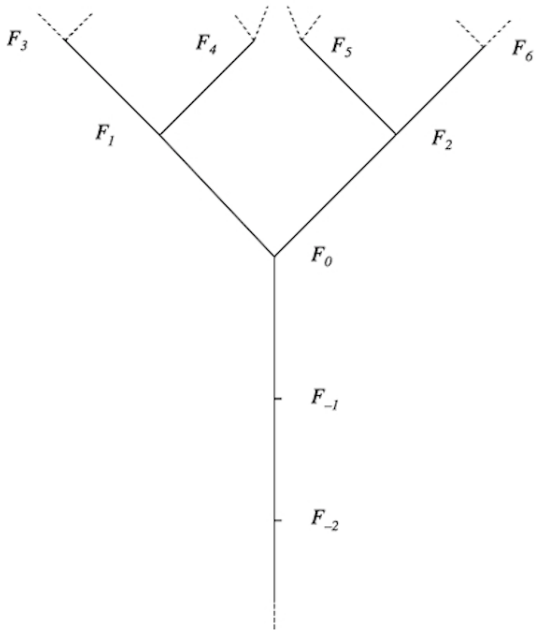

Figure 1: A branching succession of fragments with respect to F_0

the tensed fact that *dinosaurs became extinct at least 65 million years ago*. Conversely, it will be located in one of the branches if and only if it contains the tensed fact that *dinosaurs became extinct at least 65 million years ago*. Analysing the overlap relation also allows us to determine *the order* in which the fragments are disposed along the trunk. Take for example two fragments F_{-1} and F_{-2}. Suppose that F_{-2} contains the tensed fact that *dinosaurs became extinct at least 63 million years ago*, while F_{-1} also contains the tensed fact that *dinosaurs became extinct at least 64 million years ago*. In other words, there is at least one tensed fact obtaining in F_0 that also obtains in F_{-1}, but not in F_{-2}. In this case, F_{-1} will be closer to the upper bound than F_{-2} (in more formal terms, it holds that $F_{-2} <_{ps} F_{-1}$). To synthesise in a motto: the larger the overlap, the smaller the distance to the upper bound. This would suffice to order completely the fragment in the case of linear time (i.e., if, within each fragment, time is linear). But if the future-tensed facts within each fragment are about a branching structure, as we are assuming, we need some further refinement.

In order to calculate the distance (from the upper bound of the trunk) of the fragments that are disposed along the branches we can adopt the previous strategy, but calculating their distance to the upper bound of the trunk may no longer be sufficient for pinpointing their location. Consider Figure 1.[20] Assume that both F_1 and F_2 contain the tensed fact that *dinosaurs became extinct at least 66 million years ago*, and they do not contain the tensed fact that *dinosaurs became extinct at least 67 million years ago*. It follows that they are at the same distance to F_0. This is sufficient for determining their position (in this case, the motto will be: the smaller the overlap, the larger the distance to the upper bound), but only because they are directly connected to the upper bound F_0. But what about the higher branches? Consider F_3 and F_5. Even though we are told that they are disposed to the same distance to F_0 (assume both that they contain the tensed fact that *dinosaurs became extinct at least 67 million years ago* and that they do not contain the tensed fact that *dinosaurs became extinct at least 68 million years ago*), we cannot determine either whether F_3 is connected to F_1 or to F_2 or whether F_5 is connected to F_1 or to F_2. To this end, we need a slightly more refined method. Our proposal is the following. Since – *ex hypothesi* – F_1 and F_2 are two distinct fragments, there is at least one proposition – call it p – such that if p is true in the former, then p is false in the latter, and vice versa. Suppose that p is the proposition 'human beings become extinct' and that it is true in F_1. It follows that in every fragment connected to F_1 it will be true that $ATLEAST_{-1}(p)$, while in every fragment connected to F_2 this proposition will be false. Hence, F_3 will be connected to F_1 if and only if it contains the tensed fact that *human beings became extinct at least 1 million years ago*, while F_5 will be connected to F_1 if and only if it does not contain this fact. This gives us the ordering of the fragments in a branching structure.

The fiction of the branching pseudo B-relation gives us what we need to order the fragments in a way that mimics the temporal succession within each fragment, which is the reality behind the fiction. The difference with respect to the B-theory is therefore profound. According the the B-theorist, reality is constituted by all facts that obtain at all times in a coherent whole (since those facts are tenseless).

[20] To keep things simple, we assume that F_1 and F_2 are the only "future" fragments directly connected to F_0. Analogously, we assume that in the "future" of both F_1 and F_2 there are no more than two fragments.

According to the flow fragmentalist, there is no such coherent whole, and the order of the fragments is fictionally reconstructed from the information about the overlap between fragments which we can recover from the tensed facts that presently obtain within a given fragment. Unlike the fiction of super-time, such a fiction is B-theoretic rather than A-theoretic, but it does not surreptitiously reintroduce tenseless elements at the fundamental level. The pseudo B-relation is neither an irreducible tenseless relation nor a non-fundamental relation that can be reduced to tensed facts. There are no facts about $<_{ps}$ on which the fiction is grounded. The reality behind the fiction is the collection of tensed facts that obtain within one fragment. The hypothesis that reality is as the fragmentalist says – i.e. a fragmented whole of coherent collections of tensed facts – licenses the fiction of a series of partially overlapping fragments which reflects the temporal series that we find within each fragment.

5 The Invisible Thin Red Line

As we have just stressed, the pseudo B-relation mimics the temporal succession within each fragment. Therefore, since we have assumed that within each fragment time has a branching topology, the fiction will be about a branching ordering of fragments. In other words, $<_{ps}$ is a partial order, such that it is linear towards one of its sides, but non-linear towards the other. If so, such a fiction seems to be useless for providing *bivalent* truth-conditions (in a metaphysically "robust" sense) for future contingents. Within each fragment time branches, and no future-tensed facts presently obtaining are privileged in any metaphysical sense. As we have pointed out in the introduction, what we need is a thin red line that singles out the actual course of events among all nomological possible alternatives. That is, we need a way to express – in the fiction – which fragments contain facts that constitute reality. We could, of course, *insert* a thin red line within each fragment, just as the presentist can insert brute facts about which one of the possible future histories will be the actual one. In that way the fiction itself will contain a thin red line. But such a maneuver would condemn any account of how to single out a thin

red line in the ordering of fragments to being circular, or at any rate grounded on the very same brute facts that we find within each fragment. As Pooley also notices, the only information we can recover within each fragment is that a single course of events will be the actual future, but not which one it will be.

> While a given branching structure (absent a thin red line) does not encode a single sequence of the kind we have been considering, it does encode that the future tensed facts that hold at later and later times correspond to some such sequence. (Pooley 2013: 342)

To appreciate the point, remember that we are dealing here not with a multiverse idea of reality, but with a single – albeit fragmented – universe. If the reality of the flow fragmentalist is a multiverse in which every possible future alternative actualises in some alternative universe, then there is no reason to think that bivalence for future contingents should hold. In such a case, the branching structure of fragments highlighted in the previous section can be taken at face value – so to speak – to provide truth conditions relativized to histories, while leaving undetermined whether a future contingent is true *simpliciter* within a given fragment. From the point of view of each fragment the different histories to which truth is relativized represent the distinct universes, which are all "out there" in the fragmented reality. Thus, although the branching order of fragments would still be a fiction, every fragment that we postulate in the fiction will correspond to a part of the fragmented reality, since in a multiverse all nomologically possible alternatives will be realised.

Consider a very simple situation in which we ask whether in one unit of time it will be the case that p[21] within a fragment F_0:

$[\mathrm{WILL}_1 p]^{F_0} = ?$

Assuming that p is contingent, there will be two (simplifying things) future histories h_1 and h_2 such that according to h_1 it will be the case that p, and according to h_2 it will be the case that $\neg p$. Following

[21] We will use the metric tense operator $\mathrm{WILL}_n\phi$ to express that it will be the case that ϕ in n units of time. The non-metric tense operator $\mathrm{WILL}\phi$ is defined in the usual way as: for some n, it is true that $\mathrm{WILL}_n\phi$. See Prior (1968).

the procedure described above (by resorting to the "at least" facts we find in F_0), we can construct a fiction in which two fragments F_1 and F_2 are both at a distance of one unit from F_0 and are such that within F_1 it is the case that p and within F_2 it is the case that $\neg p$.

$[p]^{F_1}$

$[\neg p]^{F_2}$

In the fiction, history h_1 "passes through" F_1 and history h_2 "passes through" F_2 (see Fig. 2). Hence, while it is not settled whether within F_0 it will be the case that p in one unit time, the fiction of $<_{ps}$ allows us to state that within F_0 relatively to history h_1 it will be the case in one unit of time that p, while relatively to history h_2 it will not:

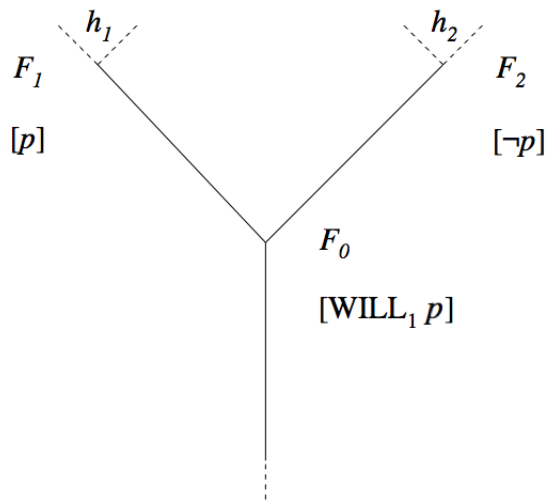

Figure 2: h_1 "passes through" F_1, while h_2 "passes through" F_2

$[\text{WILL}_1 p]^{F_0}$ = Ind

$[\text{WILL}_1 p]^{F_0,\, h_1}$ = T

$[\text{WILL}_1 p]^{F_0,\, h_2}$ = F

Notice that although histories are not fictional, since they are constituted of future facts in the weak sense that obtains within F_0, the trunk and the branches constituted by succession of fragments are

fictional, since within each fragment presently obtaining facts are the only facts that obtain, and in fragments such as F_1 and F_2 we find facts that do not obtain at present (from the point of view of F_0). Yet, on the assumption that we live in a multiverse, we are justified in taking the fiction as corresponding to two distinct, but both actually existing, parts of reality. After all, both histories will be actual, although in two different universes.

The situation is different if we live in one single universe with a single time line, and branching towards the future is just what reality is like from the point of view of each fragment. In such a case, as we have seen, the fiction that we can construct about the ordering of fragments will contain the information that *not all fragments* that constitute the different branches are part of reality. In other words, we know that in the fiction we are postulating *more* fragments than there actually are. We can still relativize truth to nomologically possible histories, if we like, but on the assumption that the fragmented reality is unique and encompasses one single time line, we are not authorised to take all fictional branches of fragments as part of reality. Although within each fragment all *histories* are not fictional and equally on a par, we know that only one of the *branches* is "out there" in the fragmented reality (see Fig. 3).

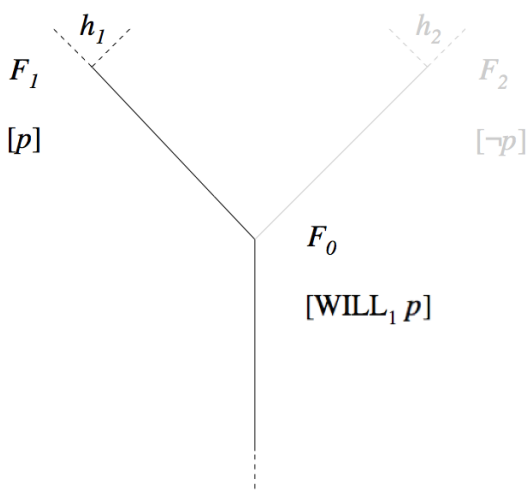

Figure 3: Reality is constituted only by facts in h_1

What, then, are the options for the flow fragmentalist who does not endorse a multiverse view of reality? One is to exploit the fiction to provide supervaluationist truth-conditions for future contingents. That would save the law of excluded middle, but still jettison bivalence. Pooley seems to favour such an option, on the grounds that there is neither a "global" point of view, nor an "end of time" perspective ("the end of time is never reached" (Pooley 2013: 343)) from which we can reconstruct the information about the whole of reality. In his words:

> Just as the tensed facts that hold as of some time are not reducible to tenseless facts, there is no need for them to be deducible from the tensed facts that hold as of other times. As of t, it is neither true nor false that there will be a sea battle at t'. As of t', it is true that a sea battle is raging. [...] it might seem that this open-future version of non-standard *A* Theory better captures the passage of time than a version in which the tensed facts as of one time can be read off from those that hold at another. In the latter case, it is hard to see what the insistence that such facts are not reducible comes to, for there *is* a unique representation of reality – the block universe – from which the perspectival facts can be derived. This is no longer true of the open-future model. The primordial branching structure captures only how things might turn out, not how they will turn out. (Pooley 2013: 343, italics in the original)

As we have already stressed in differentiating Flow Fragmentalism from standard B-theory, we agree that – given the irreducible tensed nature of the facts that obtain within each fragment – information about "future" perspectives cannot be recovered from "earlier" ones (scare quotes are due, since we are talking about the ordering of the fragment in the fiction of $<_{ps}$). And yet there is something puzzling in the idea that the fragmentalist picture "captures only how things might turn out, not how they will turn out". Although we are barred from recovering information about the future, in the fragmentalist picture reality is *not* constituted by all facts that, in the fiction, obtain within each fragment (unless we live in a multiverse). Therefore, the very hypothesis that reality is fragmented (and we do not live in

a multiverse) elicits the idea that in the fiction one of the branches *must* be singled out as the thin red line, i.e., the one corresponding to the actual course of future events. Of course, such a thin red line is epistemically inaccessible from within a single fragment, since within each fragment the future is not real, and we have access only to facts that obtain in the fragment we find ourselves in. If we introduce such a thin red line in the fragmentalist fiction of a pseudo B-series of fragments, then, it would be *invisible* at an epistemic level. Indeed, it would be invisible even at a metaphysical level as well. Thus, in the fiction also the talk of fragments that *are on the invisible thin red line* [ITRL] is justified. To express the pseudo-relation between fragments belonging to a certain pseudo-succession of fragments, in analogy with our use of $<_{ps}$, we will use the symbol $\in_{ps}$. This situation allows us to formulate explicit bivalent truth-conditions for future contingents as follows:

> $[\text{WILL}\phi]^{F_n} =$ T if and only if there is a fragment $F_m \in_{ps}$ ITRL such that $F_n <_{ps} F_m$, and $[\phi]^{F_m}$ = T[22]

We agree with Pooley that we do not find facts about a thin red line either in an uber-fragment in which all facts that constitute reality obtain (there is no such incoherent thing), or in a fragment corresponding to the end of time ("the end of time is never reached"). But in order to postulate a thin red line across the ordering of $<_{ps}$ we do not need further facts that can ground it. As with the construction of the tree of fragments, what we need is a *justification* to introduce such a fiction. And it is the metaphysical hypothesis that reality is made of incoherent fragments in which incompatible tensed facts obtain, together with the possibility of cooking up a story about their ordering, that justifies (barring a multiverse) the introduction of an invisible thin red line in the fiction. Since within each fragment

[22] To repeat, we are dealing with tensed facts constituting reality in an absolute manner. The fact that we are required to evaluate "WILLϕ" with respect to a specific fragment F_n does not conflict with the claim that to the flow fragmentalist bivalence holds *unrestrictedly*; no more than the fact that we are bound to evaluate the sentence – to say – "Socrates is sitting" relative to a given instant conflicts with the claim that its truth supervenes on a tensed fact, the fact that *Socrates is sitting (now)*, constituting reality in an absolute sense.

the future branches, but ex hypothesis there is *one* fragmented reality with *one* temporal dimension, it would be unfaithful to the metaphysics that we are assuming *not* to postulate it in the fiction.

That is why, as distinct from presentism, adding a thin red line is no extra cost for the flow fragmentalist. In the standard picture, having a thin red line entails accepting facts about what the actual future will be within the perspective of the present time, which is the only real perspective. Such facts are either brute or come at additional costs in terms of primitive ideology. But in the fragmentalist version of the story, we are not required to accept facts about the actual future within each fragment. If fragmentalism is true, we know that an invisible thin red line can't fail to be out there, since only the fragments that form a certain sequence in the fiction are part of reality; all others are not part of reality at all. At one point, Pooley seems to be sympathetic to such an idea:

> The model of the non-standard variant of the view *does* involve a particular sequence [a sequence of perspectives that stands for the actual future course of events]. Each element of it represents the irreducibly tensed facts that hold as of some time. This might seem to give us a more explicit representation of once open possibilities being settled by the passage of time: what is indeterminate as of t is settled in such-and-such a way as of t'. But care is needed: the sequence of trees does not represent how reality is absolutely, as conceived from no particular temporal point of view. (Pooley 2013: 342, italics in the original)

As we have seen, "care" pushes Pooley to reject the idea that the fact that "the view *does* involve a particular sequence" justifies the endorsement of a thin red line. That may be because Pooley uses a different version of non-standard tense realism from us – external relativism on his part, and fragmentalism on ours.

Remember that while both external relativism and fragmentalism accept *Neutrality*, external relativism rejects *Absolutism* while fragmentalism rejects *Coherence*, as we repeat below.

Absolutism The constitution of reality is an absolute matter, i.e. not relative to a time or other form of

temporal standpoint.

Coherence Reality is not contradictory; it is not constituted by facts with incompatible content.

Thus, the fragmentalist does not accept that the constitution of *reality* is irreducible relative to fragments (or perspectives, or points in super-time, or what have you); although she does relativize what facts obtain to fragments: we are never allowed to claim that facts that we find in a different fragment from the one in which certain facts obtain also obtain.[23] The fragmentalist reality is not "of a whole" because as a whole it would be incoherent, but it is nonetheless constituted by all tensed facts in a *absolute* sense. On the other hand, in the external relativist picture, tensed facts do not constitute one reality, since they only constitute reality *relative* to perspectives. This makes a difference when it comes to the fiction of ordering the fragment with $<_{ps}$. In an external relativist framework, it is not only that we don't find a global perspective or a perspective as of the end of time, we do not find a reality constituted by all the facts that we find along the thin red line, indeed along any of the fictional fragments. Hence, in an external relativist framework the postulation of a thin red line would be a fiction about a further reality constituted by incompatible facts. This may be a price that someone endorsing such a version of non-standard tense realism – as Pooley in the paper we just quoted – may not be willing to accept. But in the fragmentalist version, since *Coherence* but not *Absolutism* is dropped, the postulation of such a reality is no additional cost at all; indeed, an incoherent but fragmented whole of incompatible tensed facts is the *only* reality that the model posits. And although the metaphysical hypotheses concerning such a reality entail that neither the branching order of the fragments nor the branch that corresponds to the actual future can even in principle be "seen" (since no facts that ground them obtain), those very hypotheses entitle us to construct a fiction about a sequence of fragments and an invisible thin red line.

[23] Fine (2005: 297) claims: "In stating that a fact belongs to reality, we adopt a general perspective, but in stating that a fact obtains, we adopt the current perspective". Again, such claims do not merely reflect limitations in what we can express, but encode substantive metaphysical theses.

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