

Why Does Time Seem to Pass?

SIMON PROSSER

University of St Andrews

According to the B-theory, the passage of time is an illusion. The B-theory therefore requires an explanation of this illusion before it can be regarded as fully satisfactory; yet very few B-theorists have taken up the challenge of trying to provide one. In this paper I take some first steps toward such an explanation by first making a methodological proposal, then a hypothesis about a key element in the phenomenology of temporal passage. The methodological proposal focuses on the representational content of the element of experience by virtue of which time seems to pass. The hypothesis involves the claim that the experience of change involves the representation of something enduring, rather than perduring, through any change.

1. The Problem

According to the B-theory, the passage of time is an illusion. Although times are objectively ordered, with every time *earlier* or *later* than every other, no time is objectively *past*, *present* or *future*.¹ The A-theory, by contrast, says that time passes. Here I shall use the term ‘A-theory’ to include any ‘dynamic’ view of time; the term thus encompasses presentism, growing block theories and shrinking block theories as well as more traditional ‘moving spotlight’ versions of the A-theory.²

The B-theory cannot be regarded as fully satisfactory until an adequate account has been given of the illusion of passage. For, as many philosophers and scientists have remarked, it seems to us that we experience time passing; and indeed this is often cited by A-theorists as the best reason for believing that time passes. The following is a small but representative sample of the many descriptions of the phenomenology given by both A-theorists and B-theorists:³

...We are not only aware of [the passage of time] when we reflect on our memories of what has happened. We just see time passing in front of us, in the movement of a second hand around a clock, or the falling of sand through an hourglass, or indeed any motion or change at all. (Robin Le Poidevin, 2007: 76)

There is hardly any experience that seems more persistently, or immediately given to us than the

¹ For an influential statement and defence of the B-theory see Mellor 1998; see also the papers collected in Oaklander and Smith 1994.

² Here I ignore versions of the A-theory according to which there are irreducibly tensed facts but no passage; or indeed any other theory that denies passage apart from the B-theory. My concern here is with passage rather than with tensed facts per se; though, in any case, any theory that denies passage must still explain why time seems to pass.

³ It is easy to find further examples; see Williams 1951: 466; Schuster 1986: 695; Oaklander and Smith 1994: 289; Craig 2000: 164-5; van Inwagen 2002: 64.

relentless flow of time. (G. Schlesinger, 1991: 427)

Does our impression of the flow of time, or the division of time into past, present and future, tell us nothing at all about how time *is* as opposed to how it merely appears to us muddle-headed humans? ...as a human being, I find it impossible to relinquish the sensation of a flowing time and a moving present moment. It is something so basic to my experience of the world that I am repelled by the claim that it is only an illusion or misperception. It seems to me that there is an aspect of time of great significance that we have so far overlooked in our description of the physical universe. (Davies 1995: 275)

[Experience is] a defeater-defeater that overwhelms any B-theoretic arguments against the reality of tense. (Craig 2000: 138)

In addition to shoring up the B-theory, a satisfactory B-theoretic account of passage experience would thus remove a major reason for preferring the A-theory. Nevertheless, while B-theorists standardly acknowledge the need for an explanation of the illusion of passage, very few have taken up the challenge of trying to provide one; it is as though the topic has fallen into a gap between metaphysics and philosophy of mind.⁴

Giving a B-theoretic explanation of why time seems to pass is a large and difficult project; it can seem hard to know where to start. One can only put forward hypotheses and defend their plausibility. My ambition in this paper is therefore modest; I shall take some steps toward an explanation, making some suggestions about methodology along the way, but I shall leave many questions unanswered. I shall only be concerned here with the immediate phenomenology of passage – the respect in which there is ‘something that it is like’ for time to seem to pass (the *phenomenal character* of the experience). I shall not attempt to explain our differing attitudes to past, present and future events; though an account of this must be integrated with an account of the phenomenology before the latter can be regarded as complete. I shall only say a very limited amount about the experienced *direction* of passage. What I shall do, however, is defend a hypothesis about a key element in the experience of passage. Specifically, I shall argue that the illusion of passage derives at least in part from the fact that experience represents objects as enduring, rather than perduring.⁵ Before discussing this, however, I shall briefly survey some existing work in this area; then I shall discuss methodological considerations before moving on to the main argument.

⁴ Time-consciousness has of course attracted the attention of many historical figures including Kant (1724/1781-7), Husserl (1859/1893-1937) and Bergson (e.g. 1888, 1922), and continues to receive attention from philosophers interested in those figures. Little of this work directly concerns the experience of the *passage* of time, however, as construed in the A-theory/B-theory debate; though this is not to say that such work is not relevant at all (see for example Gallagher 1998). Despite the relative lack of interest within the broadly analytic strain of philosophy there have recently been signs of a growing interest in at least some aspects of time consciousness. Much of this has concerned the *specious present* and the perception of succession (on which see below; but see also Le Poidevin 2007).

⁵ See Lewis 1986: §4.2. An object endures if it persists by strictly retaining its identity at each time, with no temporal parts, such that it exists in its entirety at each moment at which it exists; whereas an object perdures if it persists by having different parts at different times.

2. Existing Accounts

The main discussions of experience by philosophers engaged in the A/B-theory debate have concerned either Arthur Prior's (1959) 'thank goodness' problem or the *specious present*. The former does not really concern *experience* at all; it concerns our differential attitudes to an event depending on its tense. If the B-theory is true then no event is objectively 'over' (entirely *past*), so why does it ever make sense to say 'thank goodness that's over' about a traumatic past event, having dreaded that very same event when it was in the future?⁶ This is an important question, but nonetheless a different question from one that concerns us here; for, as noted above, although the attitudes and the phenomenology must ultimately be integrated, they are not the same thing. Moreover, it is not clear why an explanation of differing attitudes to different times should say anything about *passage*. We often differ in our attitudes to what is *up* and what is *down*, yet space does not thereby seem to *pass* between *up* and *down*. In the absence of further argument it is not yet clear why time should be different.

Some philosophers have claimed that the experience of *change* must be explained in terms of a *specious present*, wherein the content of experience encompasses an extended period rather than an instant. This was famously discussed by William James, later by C. D. Broad and others, and has recently attracted renewed attention.⁷ James (1890) argued for the specious present on the grounds that a succession of experiences is not sufficient for an experience of succession. The idea, roughly, is that if change involves a succession of states then the perception of it must encompass more than an instant. According to the B-theory change consists merely in there being one state of affairs at one time and a different state of affairs at another time. A-theorists, by contrast, hold that the B-theorist's 'at-at' notion does not capture *real* change, which is an essentially *dynamic* process of *becoming*.

Now, the notion of temporal passage is closely related to the latter notion of change; indeed the experience of dynamic change might be all there is to the experience of time passing (see for example the quotation from Le Poidevin, above). So it seems plausible that work on the specious present and, more generally, the perception of change should be relevant to an explanation of the experience of passage.⁸ But it cannot be anywhere near the whole story; for all current accounts seem compatible with the perceived change being the kind of change posited by the B-theory. We must explain what makes change

⁶ See for example the papers collected under the heading 'The Problem of our Experience of Time' in Oaklander and Smith 1994; see also Maclaurin and Dyke 2002, Prosser 2006.

⁷ See for example James 1890; Broad 1923, 1938; Dainton 2000, 2001, 2008; Gallagher 2003; Tye 2003; Kelly 2005; Le Poidevin 2007; Phillips forthcoming. According to some versions the experience itself, not just its content, is extended through time.

⁸ Not all accounts of change-perception involve the specious present, but they normally do involve a combination of different experienced times; see for example Le Poidevin 2007, chapter 5, for an alternative account in terms of short-term memory.

seem *dynamic*; and it is not clear that the specious present, in itself, can account for this.⁹

One of the few direct attempts to account for the illusion of passage is due to D. H. Mellor (1998: 122), who argued for an explanation in terms of the fact that our memories accumulate through time. The idea, roughly, is that because we remember the past, but not the future, this leads to a sense of moving from the past toward the future. Perhaps this might help explain the sense of time being *directional* and our associated feeling of an asymmetry between past and future; and indeed this is something about which my own proposal will say very little. It might also help explain our sense of the past being fixed and the future being open. But having a direction is one thing; passage is another. One can, for example, imagine space being directional without thereby seeming to *pass* (perhaps due to some asymmetry in the laws of physics). It is unclear why time should be any different. So Mellor's suggestion does not seem sufficient to account for the phenomenology of passage, even though it might be part of the story.

Perhaps it might be added that when we remember our own past experiences we remember that when those past experiences occurred our memories contained only events prior to *that* time. Consequently we have a sense of memories *accumulating*. But this still fails to offer a satisfactory account, for two reasons. Firstly, it seems implausibly complex as an explanation of the immediate conscious phenomenology, which seems to require no reflection on the contents of memories, let alone memories of earlier memories.¹⁰ Secondly, there is nothing in the notion of the accumulation of memories that is incompatible with the B-theory; for the B-theory agrees that memories at later times will differ in their contents in the relevant ways from memories at earlier times. But if one's experiences and memories represent the world as having only features consistent with the B-theory then it remains mysterious why time should seem to pass.

In any case, it is not my intention to give an exhaustive critique of previous attempts at explaining why time seems to pass. Instead I shall propose a new and quite different approach to the problem.

3. A Methodological Proposal

I start with a methodological question: how should we go about trying to explain why time seems to pass? Indeed, what should we expect such an explanation to look like? To help with this, we can turn to recent work in the philosophy of perception. Recently there has been a kind of 'representational turn' among philosophers interested in consciousness and perception, with an increasing emphasis on questions concerning the representational contents of perceptual experiences and the relation between these and the phenomenal characters of the experiences. In particular, according to *intentionalism* the phenomenal

⁹ Barry Dainton (2000, chapter 7; 2001, chapter 7) recognises that the specious present does not, in itself, explain the experience of passage, and instead posits 'immanent flow' as an intrinsic phenomenological property of all experiences. In the absence of a more detailed explanation of this feature, however, this strikes me as closer to naming the problem than to solving it. I am also dubious about whether Dainton's notion would be compatible with the intentionalist theory of perception that I wish to endorse.

¹⁰ See Dainton 2001: 95 for a similar point along with further objections to memory-based accounts.

character ('what it is like') of a perceptual experience supervenes on its representational content.¹¹

In what follows I shall assume a very weak and thus relatively uncontroversial version of intentionalism. Specifically, I assume that all perceptual experiences have representational contents and that these correlate intrasubjectively with phenomenal characters (the restriction to 'perceptual' experiences is intended to exclude feelings of nausea or other experiential states that are sometimes claimed to be non-representational).¹² What I then suggest is that the explanation of why time seems to pass should be given in terms of representational content, as follows:

Representational Explanation: To explain why time is experienced as passing it is sufficient to state the representational content of the relevant element of experience and explain why it has that representational content.

The motivation for this principle is best illustrated with an example. Consider a normally sighted subject looking at a square object. The subject has a visual experience with a 'square' phenomenal character. Suppose we wish to explain why the subject's experience has that phenomenal character. What we say will depend on the nature of the explanatory project. One may, for example, pose a question like this in the course of developing a full explanation of phenomenal consciousness. But sometimes something far more modest will suffice. Suppose, for example, that we merely wanted to know why the subject was experiencing a 'square' phenomenal character rather than, say, a 'triangular' phenomenal character. For some such purposes a sufficient answer might be: 'because the subject's experience represents a square'.

This more modest kind of explanation is sufficient for our purposes. In explaining the presence of passage phenomenology we do not need to explain phenomenology *per se*; we just need to explain why the experience of a given subject has that particular phenomenal character rather than a different one. This kind of explanation can be given in a satisfactory way even if the nature of conscious experience itself remains a mystery. In fact we often explain illusions in this more modest way; we explain the difference in phenomenal character between the experienced Müller-Lyer arrows in terms of the lines being perceptually represented as having different lengths, for example; and we then try to explain the illusion by explaining why the lines are represented that way. The phenomenal character *itself* is not really explained; but the illusion is nonetheless explained. In fact most, perhaps all, explanations of perceptual illusions have this form. The assumption seems sufficiently innocuous that it can go un-noticed.

¹¹ Different versions of intentionalism posit different strengths of supervenience (logical, nomological etc.), and may also differ with respect to the kinds of contents (non-conceptual, Russellian, Fregean etc.) upon which phenomenal character supervenes. For useful surveys of the options see Byrne 2001 and Chalmers 2004.

¹² While the assumption that perception is representational is probably now shared by the majority of philosophers of perception it is not uncontested; see for example Travis 2004. However I suspect that advocates of some of the opposing views could accept at least some elements of the theory that I shall put forward here, especially if their account of misperception is in terms of misrepresentation.

This kind of explanation is consistent with very weak correlations between representational contents and phenomenal characters. Suppose, for example, that due to spectrum inversion two subjects have experiences with different colour phenomenal characters when looking at an object of the same colour (green, say). Nevertheless, there is a level of explanation at which, when asked why one of the subjects is having the kind of experience they are having, one can respond by explaining that their experience represents the colour green. One can give this same explanation for both subjects. Explaining why the two subjects' experiences differ in phenomenal character *from each other* requires a different kind of explanation; but one that is part of a different explanatory project. Thus we can allow, if need be, that different subjects might enjoy experiences of temporal passage with different phenomenal characters while still being able to explain their experiences in terms of the same representational content. Cognitive scientists interested in explaining the Müller-Lyer or other perceptual illusions do not need to worry about the possibility of qualia inversion in giving their explanations. Explaining the illusion of passage should be no different.

My methodological proposal, then, is that we replace the question 'why does time seem to pass?' with two questions: firstly, 'what is represented by the element of experience that we associate with time seeming to pass?'; and secondly, 'why is that content represented?'. I shall now address the first of those questions, returning to the second later on. The next two sections will take some turns that might appear rather odd at first; but I hope this appearance will lessen when the position to which they lead becomes clearer in section 6.

4. An Obvious Answer Rejected

The first of our two questions may seem to have an obvious answer, namely that experience represents *that time passes* (or, equivalently, maybe every change is represented as *dynamic*, or there is some other related content incompatible with the B-theory. The following arguments apply equally to all such contents.) If this were so then the A-theorist and B-theorist could agree on what was represented but merely disagree over its truth-value. This cannot, however, be correct if currently popular theories of representation are anywhere near to being true. Recall that for present purposes the B-theory is assumed; the project is to explain why time seems to pass, given that assumption. But B-theorists normally take it to be necessarily false that time passes. Consequently for experience to represent *that time passes* it would have to represent a necessarily uninstantiated feature of the world. But, I suggest, experience cannot represent a necessary falsehood of this kind.

There are of course ways in which experience can represent necessary falsehoods. Perhaps the most frequently cited example is the *waterfall illusion* in which, following a period of looking at steady movement, a stationary object is perceived as moving even though its position does not appear to change. This kind of illusion is most plausibly explained in terms of the interaction between different information-processing channels, one of which detects motion while another detects position. The representation of a

necessary falsehood is therefore *combinatorial* in such cases; it arises from a combination of conflicting representations, each of which could have been veridical on its own. Most ‘impossible’ experiences can be understood in similar ways.¹³

It is not plausible, however, that a necessarily false representation of time passing could be combinatorial. For what would be combined with what? The passage of time is not held to consist in a combination of inconsistent phenomena, so it is hard to see how the representation of it could be combinatorial either.¹⁴ Moreover this would not seem true to the phenomenology; for whereas the phenomenology of the waterfall illusion does seem to involve two simultaneous conflicting elements there does not seem to be any corresponding simultaneous conflict in the phenomenology of temporal passage.

Consequently the state of affairs *that time passes* could only be represented in experience non-combinatorially. But this is deeply problematic. For while there is no current consensus about the representation relation, all current theories involve notions that do not seem to allow for the non-combinatorial representation of a necessarily uninstantiated feature. Theories that analyse representation in terms of causal relations cannot allow it, for example, because there can be no causal relation between an experiential state and a necessarily uninstantiated feature. Neither can informational theories (such as those advocated by Fodor 1990, Dretske 1994), for these require the representing state to be lawfully correlated with the represented state, and this cannot occur when the represented state is necessarily uninstantiated. Teleological theories (e.g. Millikan 1989) typically require the represented feature to play a role in the causal history of the representing state, and again this seems impossible for a necessarily uninstantiated feature. Moreover for all such theories the possibility of misrepresentation is parasitic on the possibility of veridical representation; but since there can be no veridical representation of a necessarily uninstantiated feature it would follow that there can be no misrepresentation of it either. So experience cannot represent *that time passes*.¹⁵

It might instead seem attractive to deny that the phenomenology of passage represents anything at all. Indeed some B-theorists have claimed that the phenomenology of passage is analogous to that of a secondary quality as understood by projectivists (see for example Boghossian and Velleman 1989 on projectivism about colours, or Blackburn 1984 on projectivism about moral values). Projectivists about colour claim that in colour experience a non-representational phenomenal property of the ‘visual field’ is mistakenly projected onto external objects, which are then taken to possess an objective colour property. The B-theoretic equivalent would presumably be that an illusory element of

¹³ For now I ignore illusions that can only appear as impossible *over time*; but see below.

¹⁴ Admittedly arguments based on McTaggart’s paradox accuse the A-theory of entailing that every event possesses an inconsistent combination of tensed properties (see Mellor 1998). But I assume that perception does not represent an event as having different tenses at the same time (though see below for issues quite close to this).

¹⁵ As a matter of fact I think that the A-theorist faces a similar problem in explaining how experience could represent veridically *that time passes*. In other work (Prosser 2000, 2007, forthcoming) I have given reasons for denying that the passage of time could be perceived; the difficulty in accounting for a veridical experiential representation of temporal passage can be derived from closely related arguments.

experience is caused in us by real (B-theoretic) temporal features of the world, and mistakenly ‘projected’ onto the world (see for example Le Poidevin 2007: chapter 7, responding to an argument against such views by Gale 1968).

To take this course would be to reject intentionalism, and with it the principle of representational explanation argued for above. Although I think the projectivist view is mistaken this is not the place to enter into the broader debate between intentionalists and those, like the projectivists, who think that experience contains non-representational elements. So rather than attempt to refute projectivism directly I shall simply proceed with the intentionalist approach, trusting that it will be vindicated by offering a more detailed and satisfying explanation of the phenomenology of temporal passage. The projectivist view, by contrast, will remain mysterious unless more can be said about the nature of the putative non-representational feature of experience, and about why it should occur.

5. A Contradiction in Experience

If passage experience does not represent *that time passes*, what does it represent? I shall argue that, notwithstanding all that has just been said, this element of experience represents a necessary falsehood. This does not contradict what was said above because, as I shall subsequently argue, the relevant representation arises through a combination of conflicting elements that concern different times, rather than a simultaneous conflict of the kind present in the waterfall illusion. These conflicting elements are involved in the representation of change, just as we might have expected.

Here, then, is the argument. It proceeds by showing that no contingent proposition can be the content of passage-experience; and since, by hypothesis, the experience is not veridical, it can only be a necessary falsehood:

- P1. Let P be any contingent perceivable proposition
- P2. There is a world, w , in which P is true and in which a subject, S , veridically perceives that P
- P3. In some such world w the subject S also experiences time as passing
- P4. Within a single subject at a single time no two phenomenologically distinct experiences have the same representational content
- P5. (From P2, P3 and P4): Since, in w , S perceives that P *and* experiences time as passing, the latter experience does not represent that P
- P6. If the experience of time passing does not represent that P in some such world w then it does not represent that P in the actual world

- C. (From P1, P5 and P6): The content of the experience of time passing is not contingent. Hence, given that it is not veridical, it is necessarily false

Each step of this argument will require some discussion. The restriction to *perceivable* propositions in P1 is intended to eliminate propositions that could not plausibly be the representational content of a single perceptual experience by any possible being (excluding omniscient deities etc.). For example, propositions concerning the future, or complex constructions involving logical connectives or quantifiers might not be perceivable in this sense (which is not to say that their truth value could not be discovered using perception; only that they cannot be represented by a single perceptual experience). In any case, if the domain of perceivable contingent propositions is larger than I am taking it to be this will not weaken the argument. I leave it open just what kind of proposition is at issue – different theories of perception ascribe different kinds of contents to perceptual states (Russellian propositions, sets of worlds etc.), but the argument should go through regardless.

P2 follows more or less trivially, given what is meant by ‘perceivable’ in P1. Note that the subject, *S*, need not be human; *S* may have quite different perceptual apparatus, making it possible to perceive things that humans cannot perceive (because they are too small, too large, require the perception of ultra-violet light, and so on).

P3 can only be defended through an appeal to intuitions. It is hard to imagine what it would be like to have experience and yet *not* experience time as passing. This may indicate that time seeming to pass is a necessary condition for any experience, and indeed I shall suggest a possible explanation for this below. But in case there are possible beings for whom time does not seem to pass, note that all that is required for P3 is that there is a possible being for whom time seems to pass, and who perceives that *P*. This claim seems plausible, and can be bolstered by considering a human being whose perceptual apparatus is gradually supplemented via some kind of sophisticated surgery until it is possible for them to perceive that *P*. If, for example, perceiving that *P* required being able to detect X-rays we can imagine the sensory range of the subject’s visual system being expanded to include X-rays, or that they are given a new sensory modality for that purpose, complete with new sensory organs and brain circuitry. This would require major brain surgery, of course; but given that the phenomenology of passage is not associated with any particular sensory modality in actual humans, it is hard to see why adding a sensory modality should interfere with the phenomenology of passage. So, although I acknowledge that the case for P3 depends on intuitions about far-off possibilities, it does seem significantly more plausible than its negation.

P4 should not be very controversial. Presumably a major function of perception is to allow the subject to make discriminations, and differences in phenomenal character are central to this. There cannot be a difference in how things appear, phenomenologically, without there thereby being a difference in how things are represented as being, at least for a given subject at a given time.¹⁶ One can, of course, perceive the same event via

¹⁶ See Byrne 2001 for arguments to this effect. Note that we only need worry about the intra-personal case, where Byrne’s arguments are strongest.

different sensory modalities, with differing phenomenology; but the different sensory modalities invariably provide different information (that, after all, is why we *have* different sensory modalities).

P5 follows from P2, P3 and P4; if one's experience perceptually represents that *P*, with an associated phenomenal character, and *also* represents that time is passing, with a *different* phenomenal character, then the representational content of the latter is not that *P*.

P6 again requires an appeal to intuitions. On the strongest versions of intentionalism phenomenal characters and representational contents correlate uniquely across all subjects and possible worlds (see e.g. Dretske 1993, Tye 1995, 2000, 2002). In that case, whatever is represented by temporal passage phenomenology in subject *S* in world *w* is the same for us. But weaker versions of intentionalism allow weaker correlations holding, for example, just within a subject in a world, or perhaps across nomologically equivalent worlds. This might make it seem possible that passage experience represents different contents in subject *S* and in us. I have three things to say in response to this. Firstly, note that if this allowed passage experience to have a contingent content, that content would have to vary from world to world in just such a way as to avoid coinciding with the content of any other perceptual experience. This seems odd; if the content of passage experience could vary from world to world in this way it is hard to see how its presence could be explained, and equally hard to see why the same passage phenomenology should arise in each world.

Secondly, even if one held that *some* aspects of phenomenology could vary their representational contents across worlds or subjects, one might not hold this of *all* aspects. One might, for example, hold that colour experiences can be inverted relative to representational contents; but one might not want to extend this to perceptions of shape. It is not clear that the representational contents of, say, *square* and *circular* experiences can be swapped while their phenomenal characters remain the same; one reason being that the phenomenal characters seem hard to separate from the ability to judge that squares tessellate whereas circles do not.¹⁷ So it may be that some phenomenal characters are tied to cognitive roles, even if not all of them are; and, if so, it seems quite plausible to hold this true of the experience of time passing. It is hard to imagine how the very same phenomenology could be experienced as a representation of something quite different.

Finally, consider again the thought experiment described above in which a subject's perceptual apparatus is surgically enhanced. We can imagine the enhancement carried out gradually; perhaps the subject even remains conscious throughout. At each stage time seems to the subject to be passing, but at the same time the subject becomes able to perceive new and previously imperceptible states of affairs. It is hard to see why the new experiences should cause the passage phenomenology to change its representational content. But if it does not change then for any *P* we can arrive at a world in which the subject perceives that *P*, experiences time as passing, and the latter experience represents

¹⁷ There are complex issues here that may be connected with what one should say about *Molyneux's Question*. For relevant aspects of this see Thomson 1974 and Evans's (1985) riposte.

what it would represent in the actual world.

We thus arrive at the conclusion that the representational content of passage experience is not contingent. To arrive at the final conclusion, that it is a necessary falsehood, we must rule out necessary truth. My assumption is that the experience of passage is an illusion, even though it does not involve a false content *that time passes*. So, if it is illusory, the content of passage phenomenology is a necessary falsehood. Admittedly the argument thus far does, in principle, leave open the possibility that passage phenomenology represents a necessary truth that we somehow mistake for a feature of time. But since I cannot see a plausible way for this to work I shall set aside the hypothesis unless no plausible necessary falsehood can be found. And, as I shall now argue, there is in fact a quite plausible candidate to be the necessary falsehood represented by the experience of passage.

6. Endurance and Passage

As mentioned in the introduction, my proposal concerns the representation of entities as enduring, rather than perduring. In fact I am not the only person to have suggested that endurance has an important role to play. David Velleman argues as follows:

Whatever the future draws nearer to, or the past recedes from, must be something that can exist at different positions in time with its identity intact. And we have already found such a thing - or the illusion of one, at least - in the form of the enduring self... I exist in my entirety at successive moments in time, thereby moving in my entirety with respect to events. As I move through time, future events draw nearer to me and past events recede. Time truly passes, in the sense that it passes *me*. (Velleman 2006: 12-13.)

I shall remain neutral about whether it is the representation of an enduring *self* or of other enduring objects that matters (though the question is doubtless important); my more modest aim here is to draw attention to the importance of the representation of endurance, rather than perdurance, in the representation of change, and thus passage.

I agree with Velleman as far as he goes; but I think more can be added. Endurance is important because it plays a key role in the way in which we experience *change*. Consider the following passage from Kant who, while defending the *Principle of Permanence of Substance* in the First Analogy of the *Critique of Pure Reason*, wrote:

The correct understanding of the concept of *alteration* is also grounded upon [recognition of] this permanence. Coming to be and ceasing to be are not alterations of that which comes to be or ceases to be. Alteration is a way of existing which follows upon another way of existing of the same object. All that alters *persists*, and only its state changes... We can say, using a somewhat paradoxical expression, that only the permanent (substance) is altered... This permanent is what alone makes possible the representation of the transition from one state to another, and from not-being to being. These transitions can be empirically known only as changing determinations of that which is permanent (Kant 1929/1781-7: 216-7/ A187-A188/B231).

Kant's point, at least as I shall read him, is that in order for there to be a representation of

change ('alteration') there must also be a representation of something that retains its strict identity through the change – the *very same thing* is first *F*, then *not F*. Imagine, for example, seeing an object that is red up to time *t*, then blue from time *t* onward. What is the difference between experiencing this sequence as a change in an object's colour and experiencing it as the presence of a red object that ceases to exist at *t*, at which time a distinct blue object appears in the same place? The difference, quite clearly, is that in the former case an object retains its identity *through* the change, while in the latter case no object persists and so no object changes ('coming to be and ceasing to be are not alterations...'). There is of course a change in what exists at a certain location; but this at least requires it to be represented as the very same location. So in order to experience change our experience must also represent something retaining its identity through the change. This, I suggest, requires objects to be represented as enduring.

At this point it may be objected that the perdurance theory also holds that an object retains its identity through change; a single entity is temporally extended with an earlier part that is *F* and a later part that is *not F*.¹⁸ But whatever the truth may be about the metaphysics of persistence, I do not think that this adequately captures change *as we experience it*. Change is not experienced as an *F* temporal part succeeded by a *non-F* temporal part, with it somehow understood that both parts belong to the same composite whole; this does not correctly capture the phenomenology. Consider a spatial analogy in which a subject sees successive parts of a large object through a small window as it passes by. Suppose the object is red at one end and blue at the other; then the subject sees a kind of 'change' in the object's colour by first seeing only the red end then seeing only the blue end. But if the subject were aware of the circumstances the experience would not be of a *change* of the kind involved in seeing an object change colour over time; the subject would only be aware of an at-at variation across the spatial parts of a composite object. If the perdurantist were right then the phenomenology of temporal change should be at least partially analogous to this; yet it seems fundamentally different, involving no awareness of an articulation into temporal parts.

In the last section it was argued that the representational content associated with passage-experience is a necessary falsehood. This lends a degree of support to the theory just outlined; for if changing objects are represented as enduring then very same object is represented both as *F*, and as *not-F* – a contradiction (I shall discuss familiar objections to the equivalent claim in metaphysics below). Unlike the waterfall illusion, however, the contradiction is between representations of successive states rather than between simultaneous representations produced by different processing streams. This seems consistent with the phenomenology of change; the same object is represented as being in one state, then in another state incompatible with the first. This contradictory representation comes about because representations of successive states of an object are somehow combined. This is where theories of the specious present, or other theories in the same broad family, are relevant; such theories all suggest, in differing ways, that the experience of change requires a combination of representations of successive states of the

¹⁸ I shall set aside the stage view (Hawley 2001, Sider 2001); for present purposes the stage theorist is unlikely to have any objections that the perdurantist would not also have.

changing object. Different theories tell quite different stories about the nature of this combination and ultimately it will be important to determine which is correct. But we can set this aside for now; it is enough to establish the very broad shape of the proposal.

In fact the experience of change does not *always* require an explicit combination of conflicting representations. This is illustrated by the waterfall illusion, in which the subject experiences motion (change of position) without the experience itself changing. But this can be considered as a limiting case; if changes in enduring objects are contradictory then motion of an object is inherently contradictory.

To summarise, then, the proposal is that a key factor in time seeming to pass is that change is experienced as dynamic, and change is experienced as dynamic because the experience involves the representation of something enduring *through* the change. It is this notion of a single entity passing ‘through’ a change that captures at least a very important element of the experience of temporal passage. The proposal finds further support from the fact that the relevant content must be a necessary falsehood; and when change is represented as involving endurance the representation is contradictory. While this certainly does not prove that the proposed content is the relevant one it does count as evidence in the proposal’s favour.

At this point it is necessary to discuss some objections that are likely to seem pressing.

7. Responses to Objections

Objection 1: In effect I am appealing to the Johnston/Lewis (1986: §4.2) argument regarding the *problem of temporary intrinsics* in arguing for the contradictory content. According to this argument if an enduring object, O , changed in respect of an intrinsic property, F , then it would be true that O is F but also true that O is not F ; hence FO & $\neg FO$, a contradiction. Perdurantists conclude that temporal parts are needed in order to avoid the contradiction (FO_1 & $\neg FO_2$, where O has parts O_1 and O_2).

But it is sometimes objected that the time difference avoids the contradiction:

$$F(O, t_1) \text{ \& \> } \neg F(O, t_2) \quad [\text{i.e. } O \text{ is } F \text{ at } t_1 \text{ and } O \text{ is not } F \text{ at } t_2]$$

Reply: Notice, firstly, that $F(O, t_1) \text{ \& \> } \neg F(O, t_2)$ is an eternal truth compatible with the B-theory; O stands, eternally, in different relations to t_1 and t_2 . The content thus represents a B-theoretic world in which nothing changes (in the ‘dynamic’ sense). So if change *were* represented in this way it would be mysterious why it seems to us to be of the dynamic, A-theoretic kind. So there is a *prima facie* reason to doubt that change is represented in this way.

Secondly, one can simply agree with Lewis that the suggestion is implausible because it would mean that there were no intrinsic properties, only relations between objects and times. Moreover, even if there are independent problems concerning the notion of ‘intrinsic’ one might still find it implausible that all changeable properties are relations to times.

Thirdly, what matters is how properties and change are *represented* in experience, not

how they are in reality. Perhaps perception can represent properties as unrelated to times even if this is not the case in reality. Consider by analogy the perception of shape. It is sometimes suggested that shape is not intrinsic because of the relativistic contraction of moving objects; an object that is square relative to its rest frame is rectangular relative to a frame of reference in which it is moving. But the human visual system evolved in an environment in which relativistic effects were undetectable; and this might be a reason to think that perception represents a shape property that is not frame-relative. This claim, and the analogous claim that properties are represented as non-time-relative, does of course assume that there are possible non-relative properties that can be represented in perception. I am not certain what to say about this; defending the assumption would in any case require a lengthier discussion of the nature of properties and representation than I can give here. Alternatively, even if properties were represented as relations to times, a contradiction would still arise if the same time index appeared in both conjuncts. This could occur if, for example, the time were an unarticulated constituent of the representation, determined as the time of the experience (rather than the times of the experienced events).¹⁹ From the subject's point of view, although the content would seem to have the form $FO \ \& \ \neg FO$ its truth condition would be $F(O, t_1) \ \& \ \neg F(O, t_1)$ (or perhaps a more plausible surface form would be $\neg FO \ \& \ past \ (FO)$, as described under objection 2, below, with a B-theory semantics for *past*). Whether something like this can occur depends on the details of how different contents are combined in a specious present (or in short-term memory, etc.). I think this response may have some merit, but I must again acknowledge that a full defence would require a lengthier discussion than I can give here.²⁰

Still, the worst scenario for my view is that it would only be correct if changeable properties are not relations to times. This is not really a bad position to be in, given that the B-theory is being presupposed, and probably the majority of B-theorists accept views such as perdurance or stage theory that are most naturally combined with a view of changeable properties as non-time-relative. So even if I have to rest my claim on a denial that changeable properties are really relations to times, so be it.

Objection 2: Why not think that the world is represented as the presentist describes it (albeit falsely, if the B-theory is correct)? According to presentism reality consists in the present moment; but what is real changes. Consequently presentists can describe the successive states of reality involved in an intrinsic change as follows:

At t_1 :	$FO \ \& \ future \ (\neg FO)$
At t_2 :	$\neg FO \ \& \ past \ (FO)$

¹⁹ On unarticulated constituents see Perry 1986.

²⁰ The corresponding claim does seem plausible for the shape example. If an object were perceived as square when at rest and was then observed accelerating to very high speed, insofar as its shape could be seen by an observer remaining at rest then it seems plausible that it would look rectangular. Its shape would thus appear to change, even though its frame-relative shape properties would not change. This could be easily explained if the frame of reference were an unarticulated constituent, determined as the rest frame of the observer.

Perhaps a ‘*present*’ operator would be redundant. The propositions embedded in the *future* and *past* operators do not contradict the propositions outside the scope of the operator; so there is no time at which $(FO \ \& \ \neg FO)$ is true. The apparently conflicting truths at FO at t_1 and $\neg FO$ at t_2 do not contradict because there is no reality containing both. The truths stated at one time are all of the truths about the world (at that time). Since we do not perceive the future, the contents of an experience of change would perhaps be better represented as:

At t_1 : FO
 At t_2 : $\neg FO \ \& \ past(FO)$

Reply: It was argued above that given the truth of the B-theory there can be no perceptual representation of genuine A-series properties (because these are necessarily uninstantiated). Consequently the *future* and *past* operators must be given a B-theoretic interpretation in terms of ‘earlier than’ and ‘later than’ relations. But, in that case, the contradiction is not avoided. For example, given that F is intrinsic (or at least non-time-relative), and given the B-theory, ‘ FO is true *earlier than* $\neg FO$ is true’ entails $FO \ \& \ \neg FO$.

Nonetheless the proposal might capture something of how we *take* the world to be. Perhaps we are naturally disposed to think of the world in something like the way the presentist thinks of it. Moreover, if expressions like *past*, *present* and *future* are one-place predicates that we use in dealing with what is, in reality, a two-place B-series relation then if change is represented by contents of the above form (at t_2) this might help explain why it does not *seem* to us that change involves a contradiction, even though it really does.²¹ No formal contradiction is apparent because of the disguised, abbreviated (one-place) form of the tenses; yet at the level of truth-conditions there is a contradiction. Perhaps there are also resources here to help investigate the connection between the phenomenology and our differing attitudes toward past, present and future events, though I shall not develop this here.

Objection 3: The possibility of temporally *extended simples* has been neglected; an enduring object could appear red then blue by being extended through time and having an intrinsic *distributional* property (Parsons 2000, 2004), a temporal equivalent of being ‘striped’. This involves no contradiction.

Reply: Although this may well be a way to show that endurance is metaphysically possible (at least insofar as distributional properties are in good standing) it is not plausible that such properties are ordinarily represented by the human perceptual system. One reason for this is that when an object is perceived in an early phase of its existence it would be impossible, without seeing into the future, to determine which distributional property it possessed. Moreover if objects possess temporal distributional properties then

²¹ I defend this view of tenses as involving unarticulated constituents in Prosser 2006.

their properties never change. Consequently the world would be represented as unchanging and B-theoretic; but this fails to capture the phenomenology of change.

Objection 4: Time would seem to pass even if no object were perceived. And there are perceived changes that are not changes in any object; one hears the notes change while listening to music, for example; and if an object appears or disappears this is also perceived as a change. So it is not always true that something persists through a change.

Reply: It is true that not all changes involve the persistence of an object. But nonetheless there is always something constant through the change. When an object disappears this is represented as a change in what occupies a spatial location; this could not be represented without a constant representation of location. Note that the B-theorist can remove any objective contradiction by noting that there is an object at one *spatiotemporal* location and no object at another; there is never both an object, and no object, at a single spatiotemporal location. I suggest that experience does not capture this; places are represented as numerically the same at different times (which is why four-dimensional space-time is an unfamiliar concept for most people when they first encounter it). It is harder to know what to say about the musical case because it is not clear what we should say about the metaphysical nature of sounds. If, for example, a sound is a property of a musical instrument that produces it then when the note changes the musical instrument undergoes a change of property. If sounds are not properties but entities then what one should say depends on the kinds of entities they are. Either way, there is no clear reason to think there can be represented change without represented endurance. Finally we must consider experiences in sensory deprivation. While it is tempting to think that in the complete absence of sensory experience it could still seem to one that time was passing, it is not clear that one could ever be free from awareness of *something* – one's own thoughts, if nothing else. If there were a way for there to be a genuine absence of any experience then I find that my intuitions give out; I cannot imagine what it would be like to be in such a state, so I feel no compulsion to believe that time would still seem to pass. I suspect that such a state would constitute a complete absence of consciousness.

I leave open the question of the importance of a representation of an enduring self, as suggested by Velleman; it would be consistent with the general shape of my account to hold that time seems to pass because one is constantly aware of changes to oneself with oneself represented as the same enduring being throughout. A full discussion would take us beyond the scope of this paper, but doubtless there are important questions here.

8. Why is Endurance Represented?

I suggested above that the question of why time seems to pass should be replaced by the two questions: 'what is represented by the element of experience that we associate with time seeming to pass?' and 'why is that content represented?' Having suggested an answer to the first, I now turn to the second.

My hypothesis is that objects are represented as enduring because of a kind of

‘laziness’ or ‘economy’ on the part of the human visual system. This can be understood by considering the well-known *beta* phenomenon (often conflated with the *phi* phenomenon), which also helps illustrate part of the phenomenological difference that results from the representation of endurance.²² Beta motion is the illusion of apparent motion familiar from film and television, in which a series of still images at different positions is experienced as a single continuously moving object. Imagine first watching a slow sequence of images, slow enough that they are experienced as a series of distinct objects appearing and disappearing, one after the other. There is no persistence, and nothing moves. Imagine now the whole series repeated many times, with each repeated sequence quicker than the last. At some point a threshold is reached at which one’s perception switches and one seems instead to perceive a single moving object. At this point there is a clear change in the phenomenology. This, I suggest, is the point at which one’s experience represents an enduring object instead of a series of distinct short-lived objects. It is no coincidence that this is also the point at which one starts to experience *motion* (change of position), as well as other *changes* in the moving object (if successive still images differ in colour, for example, then one experiences a moving object that changes colour). One’s perceptual system is ‘lazy’ – it no longer ‘bothers’ to separate the still images as separate identities and instead puts them together as one single moving object, numerically identical throughout.²³ This saves computational power, especially downstream, and also has the advantage that an object briefly obscured from view continues to be perceived as the same object.

This computational economy is, I suggest, the chief reason why objects are represented as enduring rather than perduring; it is more economical to represent a simple enduring identity than a perduring identity that consists in the unity of a series of independently represented parts. The practical necessity of this computational economy would help explain the apparent impossibility of experience without the experience of passage. Suppose, further, that there were a being who did not experience the beta phenomenon and instead only experienced quicker and quicker sequences of still images, without motion or change. Suppose this being had an unlimited mental capacity and powers of discrimination; then, in the limit, the sequence would be experienced as a continuum of still images, yet still with no *motion* or *change* of any kind. This is more or less what experience would be like if objects were represented in experience as perduring; there would be representations of time-slices of objects at different positions,

²² On the difference between phi and beta see Steinman, Pizlo and Pizlo 2000. The phi phenomenon involves seeing an illusory moving object the same colour as the background *between* a series of still images.

²³ One should be careful to distinguish beta motion from the ‘persistence of vision’. The latter is the phenomenon whereby even a stationary series of flashes is seen as a steady dot when the flashes are close enough together in time. Beta motion can be experienced prior to this latter threshold, in which case it is still possible for the subject to discriminate separate still images while experiencing illusory motion. Nonetheless, grasping what one sees *as* a moving object requires seeing it as continuously existing (as one does when one sees an object moving in and out of patches of light). Perhaps the ‘laziness’ has as much to do with the persistence of vision as with beta; though beta is inherently ‘lazy’ in representing a single moving object rather than a series of parts.

perhaps understood as related to one another as parts of the persisting whole (perhaps in a manner analogous to the way in which dots in a grid may be seen as grouped into objects consisting of rows or columns). But there would be no experience of dynamic motion or change.

9. Concluding Remarks

To summarise: I began with a methodological proposal to the effect that, as with other perceptual illusions, the illusion of passage should be explained by determining what is represented by the illusory experience, and why. I then argued, perhaps surprisingly, that the relevant content is a necessary falsehood, yet not the necessary falsehood that time passes. I then put forward the hypothesis that the illusion of passage comes about because of the illusory and indeed contradictory way in which change is represented, involving the representation of something enduring through any change. I thus suggest that the representation of something enduring *through* a change is a key element in the phenomenology of temporal passage.

I acknowledge that the view proposed here is far from the whole story about why time seems to pass; at the very least, the account of the phenomenology of passage must be integrated with an account of our differing attitudes to events depending on whether we think of them as past, present or future. I have also said very little about the *direction* of experienced passage; I suspect that the asymmetry of memory is relevant to this, but I acknowledge that the absence of a developed account of this is a significant omission. Nevertheless I do think the proposal defended here captures something important about the experience of time and change; and in such an unexplored field, that counts as progress. For we have a sense of one state of affairs constantly giving way to a new and incompatible state of affairs; yet certain things exist *through* these changes. These metaphors may capture something of what we should expect if change is represented in experience in the way that I have suggested. Perhaps the proposal also captures something of the ubiquitous yet *elusive* nature of the experience of time passing. One is aware of time passing (or seeming to), yet it can be hard to find, in one's experience, anything like a distinct *quale* belonging to the passage of time. The proposal defended here, according to which the illusion of passage comes about through the *way* in which change is represented and not through any *additional* representation, helps explain this.²⁴

References

- Bergson, H. 1988. *Matter and Memory*. Translated by N.M. Paul and W.S. Palmer. New York: Zone Books.
 – 1992. *The Creative Mind*. Translated by M. L. Andison. New York: The Citadel Press.
 Translation of *La Pensée et le Mouvant* (1946).

²⁴ I would like to thank audiences in St Andrews, Edinburgh, Aberdeen and Krakow for helpful feedback.

- Blackburn, S. 1984. *Spreading the Word*. Oxford: Clarendon Press.
- Boghossian, P. A. and Velleman, J. D. 1989: "Colour as a Secondary Quality". *Mind*, 98: 81-103.
- Broad, C. D. 1923. *Scientific Thought*. London: Kegan Paul.
- 1938. *An Examination of McTaggart's Philosophy*. Cambridge: Cambridge University Press.
- Byrne, A. 2001. "Intentionalism Defended". *Philosophical Review*, 110: 199-239.
- Chalmers, D. J. 2004. "The Representational Character of Experience". In Brian Leiter (ed.), *The Future for Philosophy*. Oxford: Oxford University Press.
- Craig, W. L. 2000. *The Tensed Theory of Time: A Critical Examination*. Dordrecht: Kluwer Academic Publishers.
- Dainton, B. 2000. *Stream of Consciousness*. London: Routledge.
- 2001. *Time and Space*. Chesham: Acumen.
- Davies, P. 1995. *About Time: Einstein's Unfinished Revolution*. Harmondsworth: Penguin.
- Dretske, F. 1993. "Conscious Experience". *Mind*, 102: 263-83.
- 1994. "If You Can't Make One, You Don't Know How it Works". In P. French, T. Uehling and H. Wettstein (eds.), *Midwest Studies in Philosophy*, 19: 468-82.
- Evans, G. 1985. "Molyneux's Question". In Gareth Evans, *Collected Papers*. Edited by A. Phillips. Oxford: Clarendon Press.
- Fodor, J. A. 1990. *A Theory of Content and Other Essays*. Cambridge, MA: MIT Press.
- Gale, R. 1968. *The Language of Time*. London: Routledge & Kegan Paul.
- Gallagher, S. 1998. *The Inordinance of Time*. Evanston, Illinois: Northwestern University Press.
- 2003. "Sync-Ing in the Stream of Experience: Time-Consciousness in Broad, Husserl, and Dainton". *Psyche*, 9 (10), online at <<http://psyche.cs.monash.edu.au/symposia/dainton/gallagher.html>>.
- Hawley, K. 2001. *How Things Persist*. Oxford: Oxford University Press.
- Husserl, E. 1992/1893-1917. *On the Phenomenology of the Consciousness of Internal Time, 1893 -1917*. Translated by John Barnett Brough. Dordrecht, Springer.
- James, W. 1890. *The Principles of Psychology*. New York: Henry Holt. Reprinted Cambridge, MA: Harvard University Press, 1983.
- Kant, Immanuel. 1929/1781-7. *Critique of Pure Reason*. Translated by Norman Kemp Smith. London: Macmillan.
- Kelly, S. D. 2005. "The Puzzle of Temporal Experience". In A. Brook and K. Akins (eds.), *Cognition and the Brain: The Philosophy and Neuroscience Movement*. Cambridge: Cambridge University Press, 208-238.
- Le Poidevin, R. 2007. *The Images of Time*. Oxford: Oxford University Press.
- Lewis, D. 1986. *On the Plurality of Worlds*. Oxford: Blackwell.
- Maclaurin, J. and Dyke, H. 2002: "Thank Goodness That's Over: The Evolutionary Story". *Ratio*, 15: 276-292.
- Mellor, D. H. 1998. *Real Time II*. London/New York: Routledge.
- Millikan, R. G. 1989. "Biosemantics". *Journal of Philosophy*, 86: 281-97.
- Oaklander, L. Nathan and Smith, Quentin (eds.). 1994: *The New Theory of Time*. New

- Haven and London: Yale University Press.
- Parsons, J. 2000. "Must a Four-Dimensionalist Believe in Temporal Parts?" *Monist*, 83: 399-418.
- 2004. "Distributional Properties". In F. Jackson and G. Priest (eds.), *Lewisian Themes*. Oxford: Oxford University Press, 173-180.
- Perry, J. 1986. "Thought Without Representation". *Aristotelian Society Supplementary Volume*, 60: 137-52.
- Phillips, I. forthcoming. "Perceiving Temporal Properties". *European Journal of Philosophy*.
- Prior, A. N. 1959. "Thank Goodness That's Over". *Philosophy*, 34: 12-17.
- Prosser, S. 2000. "A New Problem for the A-Theory of Time". *The Philosophical Quarterly*, 50: 494-98.
- 2006. "Temporal Metaphysics in Z-Land". *Synthese*, 149: 77-96.
- 2007. "Could We Experience the Passage of Time?" *Ratio*, 20: 75-90. Reprinted in L. Nathan Oaklander (ed.), *Philosophy of Time: Critical Concepts in Philosophy*. New York/London: Routledge, 2008.
- forthcoming. "Passage and Perception". [Manuscript]
- Schlesinger, G. N. 1991. "E Pur Si Muove". *Philosophical Quarterly*, 41: 427-441.
- Schuster, M. M. 1986. "Is the Flow of Time Subjective?" *Review of Metaphysics*, 39: 695-714.
- Sider, T. 2001. *Four-Dimensionalism: An Ontology of Persistence and Time*. Oxford: Oxford University Press.
- Steinman, R. M., Pizlo, Z. and Pizlo, F. J. 2000. "Phi is Not Beta, and Why Wertheimer's Discovery Launched the Gestalt Revolution: A Minireview". *Vision Research*, 40: 2257-2264.
- Thomson, J. J. 1974. "Molyneux's Problem". *Journal of Philosophy*, 71: 637-650.
- Travis, C. 2004. "The Silence of the Senses". *Mind*, 113: 59-94.
- Tye, M. 1995. *Ten Problems of Consciousness*. Cambridge, MA: MIT Press/A Bradford Book.
- 2000. *Consciousness, Color, and Content*. Cambridge, MA: MIT Press/A Bradford Book.
- 2002. "Visual Qualia and Visual Content Revisited". In D. J. Chalmers (ed.), *Philosophy of Mind: Classical and Contemporary Readings*. Oxford: Oxford University Press.
- 2003. *Consciousness and Persons*. Cambridge, MA: M. I. T. Press.
- Velleman, J. David. 2006. "So it Goes". *Amherst Lecture in Philosophy*, 2006. Available at SSRN: <http://ssrn.com/abstract=1006901>.
- van Inwagen, P. 2002. *Metaphysics*. Second edition. Boulder/Oxford: Westview Press.
- Williams, D. C. 1951. "The Myth of Passage". *Journal of Philosophy*, 48: 457-472. Reprinted in R. Gale (ed.), *The Philosophy of Time*. Garden City, NY: Anchor, 1967: 98-116.