

**For the Time Being:**  
**Our Experience of Time in the Block Universe**

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THESIS

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For Mom and Pop.  
Das ees.

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## SUMMARY

Traditionally, our thinking about time has been dominated by two images. On the one hand, our experience of the future rushing into the present and becoming the past provides us with a dynamic image of time. According to this model, genuine change is brought about by time itself changing and passing. On the other hand, the temporal order of events is seen as having a certain permanence or stability regardless of this experience of change – my birth is before my death, the launch of Apollo 13 is after World War II, etc. This permanence is reflected in a scientific image of time, sometimes called the block universe model, whereby time is an extended and unchanging dimension alongside the three spatial dimensions. These two images of time appear to be incompatible and since experience has been taken to lend itself more readily to an image of time passing, the onus has been on proponents of the block universe to account for the experience of change in an unchanging universe.

In my dissertation, I look at various elements of our experience of change and attempt to defend the block universe model of time as being capable of accounting for an experience of dynamic change despite its own unchanging character. In accounting for our experience without embracing the reality of temporal passage, I investigate how assumptions about our own consciousness inform our view of time. I argue that the experiences typically taken to be indicative of temporal passage are often metaphorically described. Because of the metaphorical language used, I attempt a more careful analysis of the content of our experience and alternative ways of understanding how the time of

experience fits into the external time of the world. I consider a model of consciousness that allows for the represented temporal properties to be structurally dissimilar to the external time of the world, thus allowing a dynamic experience without time's literal passage.

Next, I lay out how we can come to have the kind of temporal experience we do under such a model. I look at various aspects of experience including dynamic motion detection, motion blindness, change blindness, and temporal and spatial mapping. In doing so, I attempt to provide an account of our experience that makes the belief in time's passage based in part on the perspectival character of our experience in time, but also contributed to by certain beliefs we have regarding our own consciousness. I conclude by attending to various tangential issues involving time such as free will and personal identity.

## CHAPTER 1: Introduction

“The verb 'to be' must be totally abolished – though indeed we have been led by habit and ignorance into using it ourselves more than once, even in what we have just been saying. That is wrong, these wise men tell us, nor should we allow the use of such words as 'something', 'of something', or 'mine', 'this' or 'that', or any other name that make things stand still. We ought, rather, to speak according to nature and refer to things as 'becoming', 'being produced', 'passing away', 'changing'; for if you speak in such a way as to make things stand still, you will easily be refuted (157b)...there are other thinkers who have announced the opposite view; who tell us that 'Unmoved is the Universe', and other similar statements...These philosophers insist that all things are One, and that this One stands still, itself within itself, having no place in which to move...if those who make their stand for the whole appear to be nearer the truth, we will take refuge with them from the men who 'move what should not be moved'(180e-181b)” (Plato 1992).

### §1 McTaggart's Paradox

Our experience of time flowing, the past getting further away and the future rushing towards us into the present, gives us a dynamic picture of time. However, our best science treats time as a static dimension much like space. These two pictures attribute incompatible characteristics to time (that of being dynamic and that of being static) and as such the pictures themselves have been regarded as incompatible. And while the static image of time is supported by our best scientific theories, the dynamic image gains its support from something undeniable about our experience. For the most part, the debate has focused on the philosophical arguments that give privilege to experience and leave the burden of proof on the proponents of the static image. However, I will argue that this question is misplaced. The main question should not be about whether a static image of time and a dynamic image of time are incompatible, and if they are, which one is the *real* image of time. Rather, the question should be whether a static image of time and a dynamic *experience* are compatible, and if so, how we explain our particular experience in such a world.



Much of the contemporary debate over the nature of time has focused on the argument against the existence of time found in the paper, “The Unreality of Time” by J.M.E. McTaggart (1908). While many have abandoned the conclusion of his paper (the non-reality of time), his initial dichotomy of time series has remained influential. In his paper, McTaggart presents two essential aspects of time that make time, itself, an inconsistent concept. These two aspects have engendered the two main opposing theories of time currently in debate, the A-theory and the B-theory. However, as presented in his paper, the two aspects are vague, as is the line between the two theories. Although his vagueness is not by itself a flaw, it has allowed bold conclusions to be drawn where only mild concessions have been made.

McTaggart's major concluding claim is the bold assertion that time is an inconsistent concept and thus unreal. However, the more interesting points are in the relatively minimal metaphysical assumptions he makes and the subsequent steps he takes in getting to this conclusion. McTaggart begins by pointing out that there are two types of series essential to time. The first is the A-series, which McTaggart claims is 'that series of positions which runs from the far past through the near past to the present, and then from the present through the near future to the far future, or conversely' (McTaggart 1921, 10). That is, the dynamic flow of time is essential to the notion of time and thus, the properties of *being past*, *being present*, and *being future* are essential to the events in time, although changing as the series itself changes. The B-series, however, encapsulates a rather different aspect of time, that of a permanent ordering of all events. As McTaggart puts it, the B-series is just “[t]he series of positions which runs from earlier to later, or conversely” (McTaggart 1921, 10). Given the nature of these relations, “[t]he distinctions

of the [B-series] are permanent, while those of the [A-series] are not” (McTaggart 1908, 458). Time, then, imposes two properties on events, (a) that they are either past, present, or future and (b) that for any two events, one is earlier, later, or simultaneous with the other. The A-series properties are monadic and hold of an event regardless of its relation to other events. That is to say, it makes perfectly good sense to say of an event that it is past; it is unnecessary to say further that it is in the past of another particular event, and it is in this sense that the A-series properties are monadic. The B-series properties, however, are purely relational and as such require reference times in order to be ascribed to events. For instance, I cannot say simply that my birth is earlier, I must specify that it is earlier than my death or earlier than the writing of this sentence, for example. It may seem possible at times that an event is earlier without reference to a second event. For instance, I may say “I went to the store earlier and picked up some eggs.” However, in such cases we are always implicitly presupposing a second moment as a reference, usually the present, or the moment of the utterance.

He also proposes a third type of series, the C-series, which is an atemporal series of what he calls ‘realities’, a term he assigns to non-temporal events ordered by the *between* relation. The C-series existing along with the A-series creates the B-series, ordered by the earlier than/ later than relationship. For McTaggart, the A-series provides not only the dynamic character needed for change, but also the *direction* of the change, and thus the direction of time. The A-series and C-series are both fundamental, while the B-series is not. However, while the C-series alone is consistent and so possibly applicable to reality, according to McTaggart it is an atemporal series, and so it cannot be said to be applicable to the reality of *time*.

Once McTaggart lays out the difference between the A- and B-series, he argues that each is essential to time. He bases this essentiality on our experience of the present and our permanent ordering of events based on the present. He states “[w]e perceive events in time as being present, and those are the only events which we perceive directly. And all other events in time, which by memory or inference, we believe to be real, are regarded as past or future - those earlier than the present being past and those later than the present being future. Thus the events of time, as observed by us, form an A-series as well as a B-series” (McTaggart 1908, 458). Experience stands as a compelling reason for McTaggart and others for accepting the inseparability of either series from time, for “...time, as we perceive it, always presents these distinctions. And it has generally been held that this is a real characteristic of time and not an illusion due to the way in which we perceive it.”<sup>1</sup> (McTaggart 1908, 464). In the following chapters, I will examine this conception of our present experience as well as our experience of change in order to determine whether it does warrant McTaggart's next move of attributing these properties to time, itself. Part of my criticism will rest on the above assumed dichotomy that either our experience correctly captures characteristics of reality in a simple and direct manner, untainted by the way in which it is perceived, or our experience of certain characteristics of reality is effected by the way in which we perceive it, and thus it is illusory. I will

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<sup>1</sup> This, by itself, is not the most compelling argument. There are many qualities that are considered dependent on the way in which we perceive them and McTaggart does not argue for why temporal properties, in particular, could not be understood in the same manner. Later, in chapter two, I look at arguments that do attempt to argue that the temporal properties *being past*, *being present*, and *being future* cannot be merely subjective.

argue that this is a false dichotomy that has been abandoned with regards to most other characteristics of reality, yet unjustifiably remains in tact regarding the subject of time.

The experience that McTaggart ties to the A-series is the experience of change. He holds that change is essential to time, that is, a world in which no change occurs would be a world in which there was no time and not merely a world in which time does not pass, or flow, or have a direction. Further, he claims that the B-series alone cannot explain change. McTaggart argues that, while the kind of change we experience involves one event ceasing to be while another comes into existence, a change in an event or moment from one into another or out of existence is not possible in the B-series which is only a permanent ordering of events with nothing to privilege any particular event's existence. His reasoning behind this claim is as follows. Suppose that we take the change from one state of affairs to another. To describe the change in terms of a change in the internal properties of the state would be to describe a different state of affairs, one that would already be described and contained in the B-series. However, this is merely difference or variation, not what McTaggart calls *genuine change*. Because the B-series is a permanent ordering of events, the event's occurrence is permanently existent and statically ordered in the B-series. McTaggart proposes that the only way to get genuine change while preserving the identity of the events is if they do not change with regards to their essential internal properties, but in some other way. He states that the only non-essential, non-internal characteristic that is a candidate for such a role is the event's position in the A-series and genuine change must be the change in whether the event is past, present or future; the A-series must be essential to time.

The A-series is able to explain this change because the A-series, itself, changes. The A-series last week is not the same as the A-series today because today all of the intermediary days' events are included in the past side of the series, whereas last week all of those events were included in the future side of the series. But whether what McTaggart has in mind here is a single A-series that changes or a "meta" series of different A-series is unclear, and in either case, it is questionable that I experience a change in what A-series holds or in the character of the A-series, rather than experiencing *things* changing, or that things are different at different times. Certainly I experience something different today than I did last week, but it is not clear that this kind of experience of change requires an experience of a changing A-series. It seems that there is no more obvious candidate for change than the change in the present state of affairs (as opposed to which states of affairs are present) and although McTaggart has difficulties fitting change of this type into his theory, if he is going to motivate the existence of the A-series by appealing to our experience, a further analysis of this experience is required.

But the A-series presents other problems for McTaggart. McTaggart's paradox of time comes about from the incompatibility of the A-series properties, given the permanence of the B-series. Take any moment, let us suppose the moment twenty-four hours later than the one you are currently experiencing, it is certainly true of this moment that it *is future* and it *will be present* and it *will be past*. It is also true that tomorrow when I reflect on one and the same moment that it *was future*, but *is present* and *will soon be past*. And again, when I reflect on that same moment the next day, it *is past* and *it was present and future*. Each moment being future, or becoming present, or becoming past is an event, itself. And since the B-series contains all events, it must contain these events as

well. So, what we find is that since the properties of the A-series are applied dynamically, that is, they in some way change according to which moment is present, and yet are themselves non-relational, they engender a contradiction when coupled with the permanence that the B-series imposes on the events. It may be that regardless of whether or not the A-series is coupled with the B-series, we will still be faced with a contradiction, but I will, here, suppose that the contradiction is contributed to by both series. What we see is that if these two series are both essential to time, we are faced with any moment permanently having properties of *being present* and *not being present* (i.e. *being past* or *future*), which are clearly contradictory. McTaggart holds that since the A-series and the B-series are both essential to time, time itself is an inherently inconsistent notion and as such cannot be part of reality.

Since the characteristics of the A-series are monadic predicates, the characteristics of being past, present, or future are incompatible with one another, yet every event holds each. Generally, the initial reaction to such a conclusion is to resort to relativizing the A-series properties to different times. Surely, while it is true that all events hold all three incompatible characteristics, they do not have them *at the same time*. The intuition behind this move is that just as I can hold the incompatible characteristics of 'being in Maryland' and 'being in Illinois' at different times, the characteristics of the A-series can be relativized to a particular time. This relativization can be done in two ways. However, I will show that both result in undesirable consequences.

The first way we may relativize the A-series properties is to give them B-series reference times. Since the B-series is an ordering based on the *earlier than* relation, we can name moments in the B-series numerically. Then, we end up with statements of the

sort “Event *e* is future at *t*<sub>1</sub>, present at *t*<sub>2</sub>, and past at *t*<sub>3</sub>.” This way of relativizing the A-series properties does avoid contradiction, but at the cost of the A-series itself. As other B-theorists such as Robin LePoidevin have commented, statements of this sort still express eternal, unchanging truths and “if the expressions ... were genuine A-series expressions, then they should express changing states of affairs, and it should be possible to deduce which time was present. But they do not express changing states of affairs.” (LePoidevin 2005, 133) So in this case, in an attempt to get rid of the problems of the A-series, we get rid of the A-series altogether.

The second way one may avoid contradiction, which McTaggart himself considers and LePoidevin also discusses, is to relativize the A-series to the A-series itself<sup>2</sup>. In this way, one may be able to maintain the A-series properties, without the eliminative reduction to B-series properties laid out above. Using this method, the expression “E is present” can be understood as “E is present in the present.” This statement expresses a present fact and as such avoids contradiction. Also included, would be the statements “D is past in the present” and “F is future in the present.” So we start off with the following list of statements expressing A-series facts:

- a. D is past in the present.
- b. E is present in the present.
- c. F is future in the present.

However, since again McTaggart does not deny the reality of times other than the present, we must also include past facts such as:

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<sup>2</sup> A similar discussion of the paradox is found in Dummett, M., “A Defense of McTaggart’s Proof of the Unreality of Time,” *Philosophical Review*, Oct (1960) 1xix.

- d. D is present in the present.
- e. E is future in the present.
- f. F is future in the present.

And future facts such as:

- g. D is past in the present.
- h. E is past in the present.
- i. F is present in the present.

These statements of past and future fact contradict each other as well as our previous statement of present fact. Although we are now looking at nine as opposed to the original three facts about A-series properties, the initial problem is not avoided and the contradiction remains, even if shifted. This exercise can be done again, this time relativizing the above facts, (a) – (i), to the A-series. Once again we will multiply the number of A-series facts, and once again we will face contradiction. Any attempt to account for the change in A-series properties with appeal to another A-series would also involve the inconsistencies of the A-series. And for McTaggart, if we cannot explain one A-series, there is no reason to think that we can explain a second.

Either way of relativizing the A-series, either to the B-series or the A-series itself, will produce undesirable results for someone who maintains the essentiality of the A-series to time. Under their view, the static B-series cannot explain the change in the A-series properties anymore than it can explain the change from one state of affairs to another. A picture where we talk of different stages of the A-series, with different events included in the past, present, and future, and relativize them to the B-series leaves us with a seemingly trivial conclusion that every event is present when it occurs and reduces the



A-series to a thing that changes *in* time, not a part of time, itself. In this case, we effectively eliminate the A-series altogether. In the second case, where we relativize the A-series to the A-series, we fall into the same contradictions faced in the beginning. If the A-series is essential to time, then any way of talking about time forces us to abandon time, either by risk of contradiction or by eliminating the essential character of time captured by the A-series, change.

However, instead of McTaggart's argument actually causing the abandonment of time, various routes have been taken in order to resolve the paradox. The result has been two main camps, the A-theory and the B-theory, each with their own set of nuanced variations on the theory. A-theorists generally hold that the properties of *being past*, *being present*, and *being future* are objective, absolute, non-relational properties and thus the A-series is essential to time. B-theorists hold that these properties are not objective, absolute, non-relational properties, and that the A-series is inessential to time. Many refer to the B-theoretic universe as the block universe because the arena in which events exist consists of three extended dimensions of space and one extended dimension of time, creating a four dimensional block. Each camp is faced with their own set of challenges. For the A-theorist, they must first find a way to avoid the contradictions found above. For the B-theorist, they must find a way to explain change without the A-series.

Proponents of the A-theory generally hold it to be the more common sense view of time since it most clearly and directly captures our experience of change. Within the A-theory, there are three variations that I would like to discuss. I think that these three general variations exhaust the possibilities within the A-theory, but I do not argue that here. The three forms of A-theory are the *Eternal A-theory*, the *Growing Block Theory*,

and *Presentism*. In the Eternal A-theory, there is an extended, permanent B-series, or block universe, but something else is added in order to preserve the A-series properties and therefore, change. Although, he does not use this label, C.D. Broad (1923) describes this kind of view as a police spotlight traversing all the moments and “lighting them up” into a state of *being present*, the “darkened” moments are then *past* or *future* depending on whether or not they have been “lit up” (*are past*) or have yet to be “lit up” (*are future*). This view, also criticized by Broad, is rather incoherent. If we recall that the block universe contains all events, then imposing a moving present over the block produces a series of additional events (that of the moments becoming present), which by the above description are not included in the block universe. In the Growing Block Theory, the block universe is restricted to past and present events, in which case, the *present* stands as the cusp of reality and all moments already included are past. This move has largely been made in order to leave the future open and undetermined. The growing nature of the block universe is what captures change and thus produces the A-series properties.

However, in whatever way an objective moving present is imposed on the block, either as a traversing spotlight of reality or the cusp of reality, a view that includes both the permanent order of the B-series (even if only the permanent past) and the absolute, yet dynamic properties of the A-series will result in the same paradox described by McTaggart. Since there are problems with any moment holding two or more of the monadic properties of the A-series, it seems that a consistent theory would have to admit that only one of these monadic A-series properties is objective. Presentists hold that the most compelling candidate for an objective A-series property of time is that of *being present*. Their claim is that if we reflect upon our experiences, it is clear that they occur

in the present. Although it is certainly true that my memories of past events and my anticipations of future events affect my current experience, the effects of past experiences and anticipations of the future ones are not the same as those experiences themselves. There is no sense in which I can experience pastly or futurely, in the same way that I experience presently. Given that the three properties of the A-series cannot all apply to reality and experience is tied to the present, it seems only reasonable to conclude that past and future moments are not part of reality; the only moment that we have any reason to think exists is the present. Upon denying that there is a permanence to the temporal order of the world, the A-theorist is able to rid himself of the contradictions that occur when a moment is said to be *past*, *present*, and *future*; all events are either *present* or they simply do not exist. It is because of this abandonment of all moments other than the present that I hold presentism is the only viable version of the A-theory, however, I will examine the A-theory, in general, throughout the following chapters.

The other path one can take in order to avoid McTaggart's paradox is to deny that the A-series is essential to time. That is, one can deny there are independent monadic properties of *being past*, *being present*, or *being future* and simply understand these properties as holding relative to a moment or event. If you then deem an event as *present* that simply means that it is concurrent with your current experience and the facts about an event *being past* or *being future* are reduced to B-series facts about them being *earlier than* or *later than* the present moment, respectively. If we no longer understand the properties of the A-series as being absolute, but only relative to a certain moment, then McTaggart's paradox is avoided. After all, it is certainly not a contradiction for something to have a property in relation to one thing, but a contrary property in relation to another.

When I am both to the left of the train and to the right of the stairs leading up to the platform, I do not renounce my belief in the reality of myself or space because I have these properties in relation to different things. We should likewise see no contradiction in an event being future at some time,  $t_1$ , but present at  $t_2$  and past at  $t_3$  since the moments have these properties in relation to different times. This is the very move one is first compelled to take when presented with McTaggart's paradox, but stopped short of pursuing once the problems of accounting for change arise.

The B-theory and presentism both have much in their favor, but also run into problems. One of the more obvious problems for the presentist view comes when presented with Einstein's Special Theory of Relativity, which has as a result that there is no such thing as absolute simultaneity, but only simultaneity relative to a reference frame. Without absolute simultaneity one cannot have the notion of absolute present. Under the presentist view, this consequence makes not only what is present a relative matter, but also what exists, a view that most presentists would not accept. I discuss this problem further in chapter two, so I will put it aside for now. At this point, I will turn to three other problems faced by the presentist<sup>3</sup>.

While, proponents of the presentist view claim that it is a more common sense view and one that experience supports, they are often presented with the challenge of explaining how we are to understand sentences about past facts, such as "Dinosaurs existed," "It rained yesterday," or "It is sunnier today than it was yesterday," as being true, since they are not true *of* anything. The intuitive truthmakers of these sentences,

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<sup>3</sup> These problems and various solutions are discussed in Markosian, N. "A Defense of Presentism," Oxford Studies in Metaphysics, Vol 1. ed. D. Zimmerman. 47-79.

dinosaurs, yesterday's rain, and yesterday, do not exist under the presentist account.

While one may be fine conceding that statements about the future have no definite truth-value, it is more difficult to deny that statements about the past do. Three problems come up with statements like the above three. Most would agree that the truth of a sentence depends on what exists (Keller 2004), there must be an object, event, relation, property, moment, etc. that is the truthmaker for the sentence. Since, existence is restricted to the present, however, non-present objects, events, relations, properties, moments, etc. do not exist to make these sentences true. In the first case, we appear not to have truthmakers for sentences that are seemingly simply about the past, that is, there are no dinosaurs to make the sentence "Dinosaurs existed" true. And while the sentence does indeed say that dinosaurs *did* exist, not *do* exist, there must be something that makes that sentence true. If dinosaurs do not exist in anyway under the presentist view, then they seem to be relegated to the realm of unicorns and dragons, other things that also do not exist.

The second problem comes from having something that does exist (today's weather) standing in relation to something that no longer exists (yesterday's weather). It seems that when I say things such as "It is clearer today than it was yesterday," I am making a comparison between two states of affairs that are both part of reality. Again, however, the presentist does not seem to have enough objects in his ontology to account for such relations, or at least account for them in such a way that makes them true in a way that "I am shorter than a Sherlock Holmes," a sentence comparing an existent object (myself) with a non-existent object (Sherlock Holmes), is not.

Lastly, sentences that most obviously fall beyond the realm of the presentist's ontology are sentences referring to moments other than the present as in the sentence "It

rained yesterday.” If yesterday does not exist, then what the sentence was thought to be about cannot be what it is about, after all. Not only does yesterday's rain not exist, but also yesterday does not exist.

What a presentist needs in this case is an extensive semantic theory that provides truthmakers for these sentences, but also restricts these truthmakers to only those presently existing objects, event, moments, etc. Various attempts have been made to provide such a theory. Many of these attempts acknowledge that the truth of a sentence depends on what exists, but makes use of only those things in the present, only those things that exist under their view, to confer truth onto sentence such as those above. One way this is done is to appeal to the causal traces of the past on the present for their truthmakers. Under this view, the sentence “Dinosaurs existed,” while about those non-existent dinosaurs in the past, is made true by a current state of affairs regarding fossils, bones, etc., and the sentence “It rained yesterday” is made true by the current state of affairs regarding memory, soil moisture content, puddles, etc. This kind of model may initially rub one the wrong way since, while it is true that we only *know* about dinosaurs because of the traces on the present, what we intuitively want to make that kind of statement true is the existence of some actual dinosaurs in the past. However, it is not outright wrong; if the presentist is willing to give up that kind of intuition about truth to maintain stronger intuitions about time, they can remain consistent. It is up to them, however, to argue that maintaining their intuitions about time is worth the compromise regarding intuitions about truthmakers.

The B-theorist is also faced with problems within the realm of philosophy of language. Within the past fifty years or so, much debate has centering around 'taking

tense seriously'. Those who hold that one should 'take tense seriously' (tensors) believe that our tensed language expresses facts that cannot be explained away by relativizing facts to moments in time, such as the B-theory would do. For instance, if one takes tense seriously, then there is a difference between the propositions

(1) "There is a meeting at 10am on Tuesday, March 17<sup>th</sup>,"

and the proposition

(2) "There is a meeting in progress *now*" when uttered at 10am on Tuesday March 17<sup>th</sup>.

Many of these issues come about from a seeming inconsistency in the B-theorist's view of time. On the one hand, the B-theorist holds that the events of the world exist eternally and that there is no extra fact of the matter about a moment being past, present, or future. On the other hand, there seem to be facts of the world that can only be expressed by a tensed language that presupposes a real distinction between past, present and future. The tensor argues that the second sentence expresses a fact that is not captured in the first, namely the facts of the A-series. However, as Dean Zimmerman points out in "A-theory B-theory and 'Taking Tense Seriously'," the facts that the tensor is taking seriously can be either facts of the A-series or facts about one's position in the B-series that rely solely on a subjective, mind-dependent present. So for the A-theorist, statement (2) when uttered at 10am on March 17<sup>th</sup> is different than statement (1) because the second sentence expresses a fact about an absolute present. For the B-theorist who takes tense seriously, the two statements also express distinct facts, but the difference rests in our position in the B-series, not an objective distinction between past, present and future.

Zimmerman (2005, 413) points out that many serious tensing B-theorists (including David Lewis and D.H. Mellor) “insist that the source of the ineliminability of tensed propositions is simply the fact that much of what we believe is 'perspectival'. And this reason for taking tense seriously does not imply that one time is special ... It also provides no reason to think that tense logic is *metaphysically* significant.” If one can explain the difference between the above statements without appeal to an objective A-series, the B-theorist can, at least in principle, solve any of the problems regarding tense. Thus, Zimmerman concludes that the real issue at the center of the debate is a metaphysical one regarding a *real* distinction between past, present and future. He states “[w]hat the A-theorist needs to find is not a thesis about *language*, but a thesis about *the world*; she needs to say that tensed sentences describe some non-linguistic fact that is important to the A-theorist, but anathema to B-theorists.” (Zimmerman 2005, 432)

Certainly, there are issues in the philosophy of language, but time cannot be reduced to these issues. I agree with Zimmerman that the debate between the A-theorist and the B-theorist is ultimately a metaphysical one. Although, the common sense intuitions of the A-theory are initially attractive, I find the view that abandons the absolute determinations of the A-series to be more compelling. I acknowledge, however, that the experience of change demands an account. To understand the B-series independent of the A-series, one must posit or discover an *earlier than/later than* ordering that is not based on the order in which an event traverses the properties of *being future, present, or past* or admit that the C-series is a temporal series, albeit one that does not resemble time as it is so often thought to be. In chapter five, I briefly discuss the



possibility that a directionless C-series could be the correct model of time, however, nothing in my main argument depends on that view.

Upon denying the absolute properties of *past*, *present*, and *future*, we are left with time as the temporal analogue of the three spatial dimensions, that is, we are left with the four dimensions of the block universe. Since the block universe initially seems to have no “flowing” characteristic-- nothing like an objectively moving present that propels us through our experiences-- it is often criticized as being unable to explain change and motion. The A-theorist attacks on the block theory appealed to its failure to properly account for the dynamism of time. However, if presentism turns out to be the only consistent A-theory available, the presentist, himself, is no better equipped to explain this aspect of our experience. With only a single moment, the presentist cannot explain change and dynamism any better than the block universe theory with its entirety of moments, each unchanging. It is possible for the presentist to take on a radically different metaphysics and find a way for change to be explained in the view, but this is the task of the presentist and will not be taken up here. Although I do have suggestions for a kind of metaphysics that would be interesting and perhaps fruitful for the presentist to take up, I myself hold that the block universe theory is the most coherent theory of space and time. For this reason, in the following chapters, I attempt to reconcile the “unchanging” nature of the block universe with our experience of change.

The B-theory, or block universe account of time, is commonly used to describe the scientific image of time. The scientific image of time that I will be discussing here describes time as a single dimension much like the three spatial dimensions, thus it holds reality to be comprised of a four dimensional block which contains all places and

moments, and therefore all events. Past, present and future events are all coexistent just as all spatial points, whether here or far away, are coexistent. It is in this sense that the scientific image of time appears to be static like space rather than dynamic as our experience suggests. And just like the spatial properties of *being to the right of* or *being to the left of*, the temporal properties of *being in the past* or *being in the future* are wholly ignored by science and instead spatial and temporal quantities are utilized (that is, our laws are written in terms of spatial location and distance, and temporal location and duration). This minimal picture of time comes from classical Newtonian mechanics, which not only ignores any objective distinction between past, present, and future, but also makes no distinction between a system evolving in a past-to-future direction or a future-to-past direction. Finally, along with Einstein's Special Theory of Relativity comes a reconsideration of the traditional idea of simultaneity found in the Newtonian picture and reveals time and space to be intertwined in a way that suggests they are two of the same kind. While they are not treated as completely interchangeable in the scientific image, they do both have the characteristic of being extended dimensions.

Although there are variations in each individual's experience of change, there seem to be three common intuitions about time informed by our experience of change. These are that time is dynamic, directed, and that our experiences are unified by an objective present. Since these intuitions about time are based on elements of our experience, my intent here, is not to dispel these intuitions completely, but rather to reconcile those element of experience that inform these intuitions with the B-theory of time. In order to show that the B-theory is better equip than the A-series one must save the good parts about the B-theory and succeed in capturing those elements of our

experience that the A-theory seems at first to be most apt to explain. There are three elements of experience that the A-series supposedly captures:

1. The intersubjective presence of experience,
2. The dynamic character of our experience of change, and
3. The unidirectionality of our experience with regards to change.

The scientific image of time seems to undermine all three of our common intuitions. Our concept of time is stripped down to the bare necessities required by science to describe the world, and the result is a concept that does not quite seem to describe our experience of the world. The experience that compelled McTaggart to believe in the essentiality of the A-series was that of change and it was the failure of a permanent ordering like the B-series to explain change which led him to believe that time itself must have a changing characteristic. In the following chapters I will argue that there is nothing left out of the block universe picture of time that would be needed to explain our experience of change. To do so, I will examine those experiences being appealed to by critics of the block theory and attempt to provide explanations for such experiences without attributing to time anything beyond its scientific description.

In looking for an explanation of our experience of change in the block universe, I will examine the intuitions that we have about time mentioned above. All three of these intuitions are contributed to by our experience of change. The intersubjective presence of experience lead us to the intuition that there is a single, objective moving present unifying our collective experiences of change as well as explaining why things undergo change. The root of this connection seems to be the idea that what is present is constantly, uncontrollably, and unavoidably changing and changing in a way that is not the same as

the variations across space. Since, I communicate and agree with those around me about the current state of affairs, the present must be shared and objective. The experience of the dynamic change of objects in the world, coupled with the experience of a constantly changing and seemingly shared present leads us to the intuition that time, itself, must dynamically flow. The intuition that there is a direction of time seems to be grounded by the sequential nature of our experiences, one thing experience after another, with memories of the past being accumulated and uncertainties of the future being taken away.

In the following chapters, I will attempt to provide a block universe account of time that can fully explain our experience. To do so, I will examine each of the three intuitions, that time is dynamic, directed, and there is a unique and shared present, and look at the elements of experiences that lead us to hold such beliefs. I begin in chapter two by looking at the intuition that there is a unique and shared present. First, I lay out the problems with holding such a view given current scientific theory. Next, I examine the experience that leads us to this intuition. For this section, I appeal to the works of Jeremy Butterfield and Craig Callender, as well as contemporary cognitive science studies to make two general points: (a) the intuition of a shared present can be explained without there being an actual shared present, and (b) if we thoroughly examine our experience, we find that even those things we take to be included in our own present experience is relative across people and across our lives. The abandonment of a unique, shared, and absolute present and with it the absolute past and future, hopefully, will allow us to begin to step away from the A-series in an explanation of our temporal experience.

In chapter three, I begin to examine the experience of dynamic change and with it the intuition that time flows. I start by showing how hostile the B-theory is to any kind of

moving present. For this purpose, I look at both McTaggart's paradox and Zeno's Arrow paradox. I also briefly examine an argument by Simon Prosser who argues that the experience of temporal flow or passage is inconsistent and thus illusory. It is here that I further define my position in the debate by responding to a common mistake that Prosser and others make when considering experience. This mistake is that time is its own representation. I argue that once we move away from thinking about our temporal experience as being structurally equivalent to external time, then we may come to understand the nature of our experience and that we do have a veridical experience of the world.

Moving away from a view of temporal experience that maps directly onto external time requires a further look at our conscious experience. In chapter four, I examine an alternative account of consciousness whereby time is not its own representation. I consider Daniel Dennett's Multiple Drafts model of consciousness. In this chapter, I investigate problems that arise with regards to our judgments about our experiences of temporal properties. I do not argue that we are wrong about what our experiences are, but more so that we must abandon certain beliefs about how those experiences form our conscious experience. Utilizing this model enables me to step away from a kind of naïve realism about temporal properties and further explain how we can have an experience of dynamic change without time literally flowing.

In the fifth and final chapter, I look at the sequential nature of our experience and how it informs beliefs about temporal flow and direction. Here, I sketch out a view of temporal experience that allows for them to be veridical and yet still not commit one to the view that time passes in a way represented by the A-series. I argue that the B-theory

of time is capable of handling the problem of accounting for McTaggart's *genuine change*. I also investigate a few metaphysically related issues, such as personal identity and free will, in order to show that there are no glaringly irreconcilable problems in these fields that remain for the B-theorist.

## CHAPTER 2: The Objective Present

### §1 Einstein's Special Theory of Relativity and The Block Universe

The scientific images of time include many characteristics that are seemingly contrary to our experience of time. The non-directedness of time found in statistical mechanics is one such aspect found in the scientific images of time, which I will discuss briefly in chapter five. Related to the non-directed aspect is the lack of temporal flow in scientific images of time, which I will return to in chapter three. The absence of an objective present, and indeed an objective foliation altogether, found in Einstein's Special Theory of Relativity (STR), is another such aspect. Einstein's theory undermines many of the traditional views about space and time. Prior to the introduction of STR, the working images of space and time were those inherent to Newtonian physics. Under this view, space is a rigid, three dimensional manifold described by Euclidean geometry, while time is an absolute, single dimension with the structure of the real numbers. Both space and time, in the traditional view, exist independently of each other and the objects and events within them. With the introduction of STR, however, space and time were no longer able to fit into the Newtonian picture as separate entities and, instead, were replaced with a single malleable space-time. With the introduction of Einstein's General Theory of Relativity (GTR), space and time are no longer viewed as being independent of the objects within them. Although GTR brings with it further profound implications for an understanding of time, for my purposes here, it will be enough to confine the discussion to STR.

STR is based on two main postulates.

1. Although the physical quantities measured may vary, there are frames in which the physical laws, themselves, are experimentally indistinguishable. Collectively, these are the inertial frames. The laws do not privilege one reference frame over any other.
2. There is an inertial frame where the speed of light in a vacuum measures the same regardless of the source or direction of the light.

By (1) and (2), we may further conclude that the speed of light is the same in all inertial reference frames regardless of the source or direction of the light. The first of these postulates is not specific to STR and Galileo held a version restricted to mechanics, as opposed to all laws of physics. In the past, some have held that there is, in fact, a privileged reference frame whereby one who is at rest relative to such a frame would measure the “true” or “absolute” value of physical quantities. For instance, for Newton, one is at absolute rest when one is at rest relative to absolute space and, in general, one’s motion relative to absolute space would determine one’s absolute velocity. Prior to the discovery that the first postulate applies to the speed of light, one may think it experimentally possible to distinguish between this privileged inertial frame and all those moving relative to such a frame; one would merely have to find the inertial frame where the speed of light was the same in all directions. However, the failure to find a unique such frame, along with the universal application of the current physical laws to *all* reference frames, have led this view to be abandoned by most, if not all<sup>4</sup>. The second postulate regarding the speed of light is a novel addition of STR. In classical mechanics,

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<sup>4</sup> For instance, the Bohmian interpretation of quantum mechanics requires a preferred reference frame.

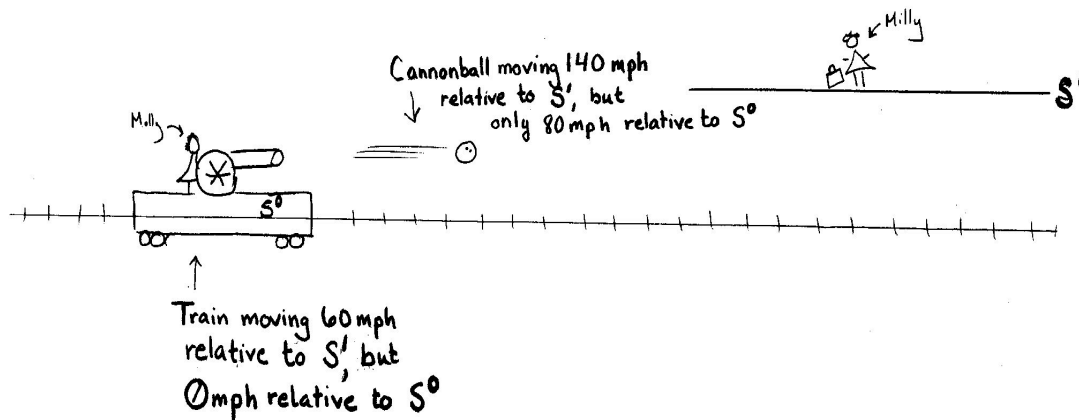


a reference frame is needed to specify the velocity of an object. For instance, suppose a bus is running its morning route at 30 miles per hour. Odometers measure the speed of the vehicle relative to the road, but relative to the bus driver and passengers, the bus is at rest. If there were a car passing the bus at 40 miles per hour, the bus would be moving 10mph in the opposite direction relative to that car since we take the car to be at rest in its inertial frame and measure how fast the bus is moving away from it. However, a startling consequence of Einstein's theory is that light behaves differently than buses and cars and other such objects. He postulated that the reference frame of the observer does not matter in determining the velocity of light in free space, and in fact the velocity of light would be measured the same in all directions for all inertial reference frames. It should be noted, however, that the speed of light is the same in all directions, regardless of its source even in the absence of an observer; the measured speed is not tied up with the way humans perceive light, and would be the same even if measured by a machine, or not measured at all.

To look at a more concrete example to contrast the classical Newtonian picture with the Relativistic picture, suppose there are two observers, Molly and Milly, whose names' differing vowels will reflect the superscripts for the reference frames (o for 0 and i for 1). Molly is on a train moving down a track at a constant velocity relative to Milly who is standing on the platform at the station. On the train, Molly and all of the objects will behave according to the laws of physics; billiard balls will bump and collide according to the laws, water will flow according to the laws, etc. The same will hold of Milly and the objects on the platform. As the laws hold in these two frames, they are

both inertial reference frames. Molly's frame we will call  $S^0$  and Milly's we will call  $S^1$  (fig.1).

Figure 1:



Suppose that the Molly's train,  $S^0$  is traveling at 60mph relative to Milly's platform,  $S^1$ . On Molly's train, she has a cannon pointed to shoot down the train tracks ahead of her. Once the cannon shoots the ball, Molly measures a positive velocity for the cannonball, suppose 80 mph. Even according to classical mechanics, Milly's measurements will be rather different. Since the train is moving 60mph relative to the platform, the velocity of the train is added to the velocity of the ball in order to determine the ball's velocity relative to the platform. So, Milly will measure the cannonball at a velocity greater than the 80mph measured by Molly; she will measure the speed of the

cannonball to be 140mph, that is, the speed of the cannonball (80mph), plus the relative velocity of the train (60mph)<sup>5</sup>.

A similar example may be given with a light source as opposed to a cannon, but with dramatically different results. When Molly sends the beam of light, she measures the velocity to be 186,000 miles per second, or roughly  $3 \times 10^8$  meters per second. The traditional conception of velocity would suggest that Milly must consider the velocity of the train relative to the platform in order to determine the speed of the light relative to the platform, that is, again since the train is moving towards the platform, we must add the velocity of the train to the velocity of the light. This would then put the speed of light at a value greater than 186,000 miles per second. So, if the train were rushing towards Milly at 185,999.999 miles per second, the relative velocity of the train (185,999.999 miles/second) would be added to the velocity of the light moving towards Milly, which would mean that the velocity of the light relative to Milly would be almost twice the speed at which Molly measures the light. This is simply not the case, though. Instead, the velocity of the light relative to the platform, is 186,000 miles per second, the same as what Molly measures on the train. And in fact, even if Molly and Milly were accelerating, the instantaneous velocity would give us an inertial reference frame in which the speed of light has the same value in all directions. The velocity of the source (as well as the direction of the source) turns out to be irrelevant in determining the speed of light. So, Milly on the platform, whose measurement of the cannonball's velocity was

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<sup>5</sup> These results, however, would not be exact since relativistic laws apply to all objects, not just light. The difference would be negligible for such slow speeds, however.

rather different than Molly's, will measure the light to be traveling at 186,000 miles per second, the same as Molly, regardless of her speed relative to Molly.

From the above two postulates, we find some interesting consequences with great bearing on how we think about space and time. The repercussions of the constancy of light extend to the behavior of *all* objects and events. One such consequence is the relativity of simultaneity. In classical physics, if two events occur simultaneously in one inertial frame, they are simultaneous in *all* inertial frames, after all, time was considered to be a single, absolute dimension, shared by all and independent of the three spatial dimensions. *Being simultaneous with* then was an equivalence relation, that is, it was a transitive, reflexive, and symmetric relation. However, according to STR, whether or not two events occur simultaneously depends on the inertial reference frame. And more fully, just because two events are simultaneous in one inertial reference frame does not mean that they will be simultaneous in any other inertial reference frame (in fact, in general, they will not be simultaneous in any other inertial reference frame). *Being simultaneous with* must be understood as a three-place relation, rather than a two-place relation, which includes a specification of the inertial reference frame in addition to the specification of the two events. It is only once an inertial frame is specified that an equivalence relation of *being simultaneous with* is induced.

But how do we come to this way of thinking about simultaneity just from the fact that the velocity of light is the same in all directions, regardless of the source? Well, we must ask ourselves, what does it mean for two events, which are spatially separated, to be simultaneous? A nice operational answer would be simply that the two events occur at the same time, that is, a clock at the one event will read the same time as a synchronized

clock at the second location. But now we must ask a new question: how do we synchronize two clocks at two spatially separated locations? We might think that we could simply set our first clock, go over to our second clock, look at the first clock and set the second one to the same time as the first, much the way that I might synchronize my kitchen clock with my desk clock. This may work just fine when I am dealing with clocks that are pretty close to one another and dealing with a schedule that does not require I pay attention to any length of time less than, say, one second. But it only works just fine because I cannot notice the discrepancies in my everyday life. If we really want to know whether or not two events are simultaneous, we must realize that the light from the first clock will take a finite amount of time to travel to me, so the time that I read on the first clock will be slightly outdated and, thus inaccurate.

As a second try, we might think that synchronizing the clocks could be as easy as setting the two clocks to the same time at the same place (avoiding the trouble associated with the finite speed of light) and then moving one of the clocks to the location of the second event. However, as I will explain below, the rate at which a clock ticks along will vary when moving relative to the first inertial reference frame, so this will not work either<sup>6</sup>. We must, instead, place the clocks at the two different locations and then synchronize them as originally suggested. But, since it will take a certain amount of time for that light signal to reach the second clock, we cannot simply read the time off of the first clock and send a light signal to the second clock. What we can do, however, is place the clocks in their distinct locations, then send a light signal round-trip between the two.

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<sup>6</sup> This is possible, in some sense, however. Practically, if we move the clock away with a slow enough acceleration, the difference between the two clocks will be negligible. Ideally, we can take the limit of ever-slower accelerations, which will create no difference in the two clocks.

Once we have the time it takes the light signal to go the entire round trip, we can divide that time in half and that will give us the time it takes for the light to travel from one to the other. We can then set the two clocks by taking into consideration the time it takes for the signal to reach the second clock and set the second clock to read the time of the original clock plus the time it took the light signal to reach the second location  $(\text{distance}/c)^7$ . In order to determine the spatial distance between the two clocks, we can imagine a series of parallel, rigid, measuring rods in each of the three spatial dimensions. We could, in fact, build a whole lattice of rigid rods and clocks for the inertial reference frame, which would give us the space and time coordinates for that frame.

Once we have a coordinate system for the inertial frame, we can then determine whether or not two events occur simultaneously. If the two spatially distance events have the same reading on their clocks, then they can be considered simultaneous. Now, for a specified inertial reference frame, the simultaneity relation remains an equivalence relation, however, different inertial frames will have different space-time coordinatizations.

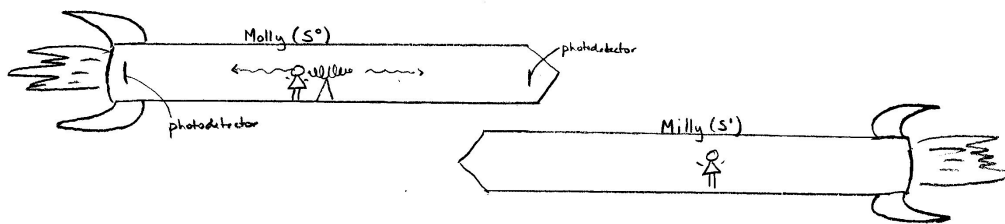
To see this, suppose that we take Molly and Milly off of the train and platform, off of Earth entirely, and place them, instead on two very long spaceships heading towards one another. The two spaceships are in two different inertial reference frames, again, with Molly at rest with respect to  $S^0$  and Milly at rest with respect to  $S^1$ . We will again equip Molly with a cannon. In fact, we will give her a double-barreled cannon at

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<sup>7</sup> One may wonder whether we have introduced circularity here by synchronizing the clocks utilizing the constancy of the speed of light, and determining the speed of light by utilizing those very clocks in our measurements. However, since we are using the round trip of the light, the only thing that we are assuming is the isotropy of the speed of light.

the center of her ship, each barrel pointed at an end of the ship. Instead of cannonballs, though, this cannon will emit light signals. At either end of the ship, the light signals will hit a kind of photodetector that will allow the light reaching the end of the train to be observed. Molly launches the light signals.

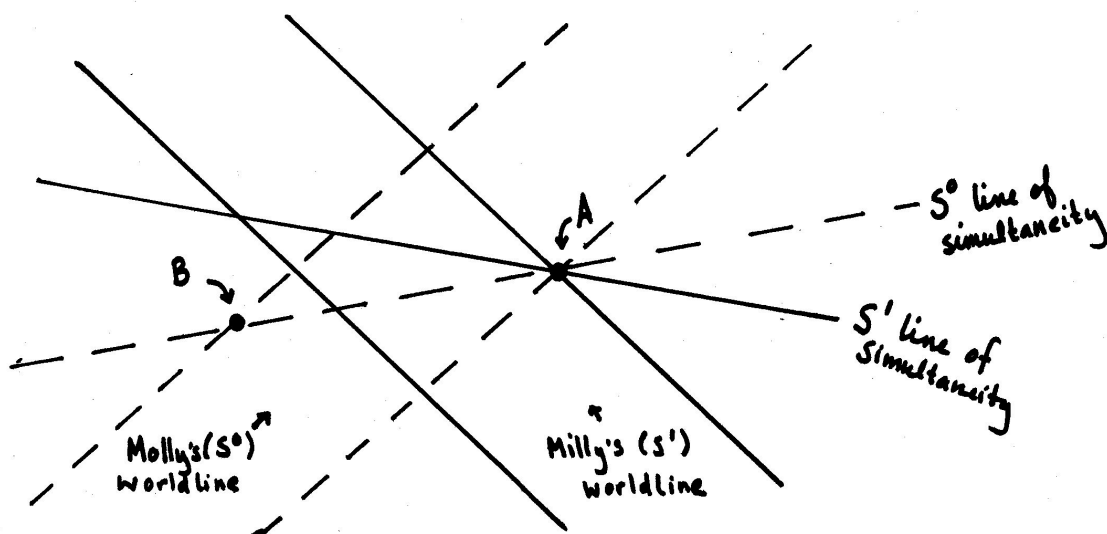
Figure 2



At the moment that the front photodetector goes off, the front of Molly's ship is lined up with the rear of Milly's ship. Because of the constancy of the speed of light, the two observers will differ in their reports of when the photodetectors went off. Let's call the event of the front photodetector going off A and the event of the rear photodetector going off B. Recall that the light that is emitted is the same speed no matter whether you are rushing towards the source or away, or at rest relative to the source. Since on Molly's ship the photodetectors are equidistant from the middle of the car and the speed of light is the same in both directions, the light will hit the photodetectors at the same time. Since Milly is moving towards Molly, though, for Milly, the front photodetector is moving away from the light signal once it leaves the cannon, creating an increasing distance for the light signal to traverse. Also, as Molly's ship moves towards Milly, the rear photodetector will

be moving closer to the source of the light signal, thus creating a shorter distance for the light signal to traverse before hitting it. Unlike in the previous case of cannonballs, the speed of the front light signal leaving the cannon does not increase with the addition of the source's velocity and the speed of the rear light signal leaving the cannon does not decrease with the subtractions of the ship's speed in the opposite direction; their velocities remain constant relative to Milly ( $S^1$ ). Since, in  $S^1$ , the distance that the front light signal has to traverse is greater than the distance that the rear light signal has to traverse, and yet the speed of both light signals is the same, in  $S^1$  the rear light signal will hit *before* the front light signal. Unless the first postulate is incorrect and the laws of physics apply only to a privileged inertial frame, the fact that the two reports disagree must be taken as evidence that there is no fact of the matter as to whether the two events were simultaneous or not.

Figure 3





A further repercussion of the second postulate, related to the relativity of simultaneity, is the relativity of time intervals. The above example illustrates the relativity of time intervals as well as the relativity of simultaneity. Molly, in  $S^0$ , measures the time interval between A and B to be zero, while Milly, in  $S^1$ , measures a positive interval between the two events. Because Milly is moving relative to  $S^0$ , the distance between her and B is increasing and the light has a larger distance to traverse, but light travels at the same speed in  $S^1$  as it does in  $S^0$ , so the time interval between the two events is dilated.

The relativity of simultaneity and the time dilation effect are very real effects and not merely consequences of the particulars of the different observers. Insofar as it makes sense to talk about a fact of the matter, A and B are *really* occurring at the same time relative to  $S^0$  and they are *really* occurring sequentially relative to  $S^1$ . The consequences of STR play an important role in the block universe theory. In Minkowski space-time, the standard structure used to represent space-time in STR, the simultaneity relation does not pick out a unique set of points, and the traditional idea of simultaneity must be abandoned. As Sklar points out “[i]n pre-Einsteinian thought, we just assume that if two events occur at the same time for one observer, they will occur at the same time for all observers. It is a challenge to this last notion that provides the main difference between space and time as earlier understood and space-time as understood in Einstein's so-called special theory of relativity.” (Sklar, p. 28) In special theory of relativity, which events are simultaneous depends on the inertial frame of the observer. Different observers in different inertial frames will disagree over which events are simultaneous and which are

not. However, again, this effect has nothing to do with the observers, but is a real consequence of the upper limit on the speed of light. The equal claim of these individual presents is articulated by Sklar when he points out that “there is no such thing as 'occurring at the same time,' only occurring at the same time *relative* to a particular state of uniform motion.” (Sklar, p. 29). Kurt Godel points out that an objective passage of time would be equivalent to a unique foliation of space time, however given the relativity of simultaneity, a unique foliation is not available since “[e]ach observer has his own set of 'nows,' and none of these various systems of layers can claim the prerogative of representing the objective lapse of time.” (Godel, p. 558)

The relativistic space-time picture not only lacks an objective foliation or an objective present slice picked out of the objective foliation, but it is hostile towards such things. Without absolute simultaneity, is it even possible for one to hold any view of time other than the block universe theory? Is it possible for a theory of time that privileges the present to be reconciled with a relativistic image of time? I will address these questions below.

## **§2 Repercussions of STR on the A-theory and B-theory (Block Universe)**

Given the special theory of relativity, there seems to be good reason to accept a block universe picture of time, which includes all moments (and really all of space-time), rather than a presentist picture. Recall that the presentist is motivated by the difference between the present and other moments, the main difference being that our experience is only ever in the present and we do not have any direct experience of past or future moments. Our memories and anticipations, while *of* the past and the future, are still

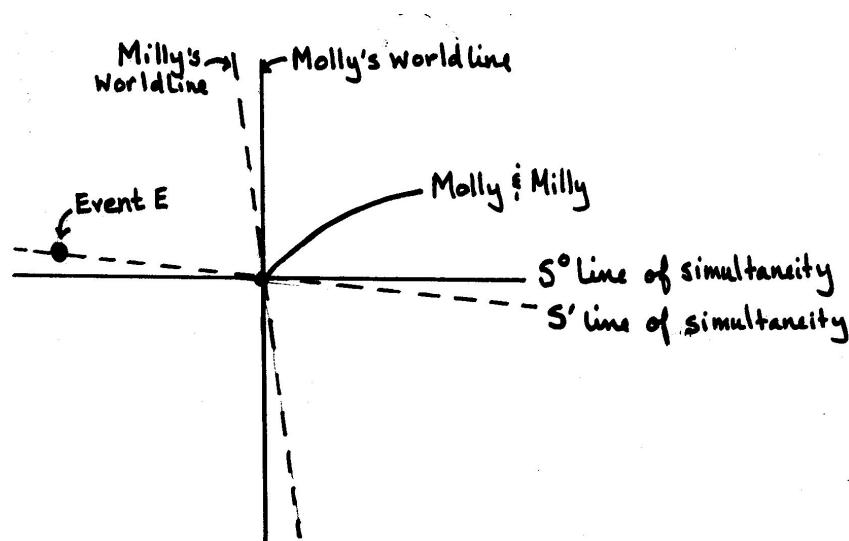
present experiences. The absence of an experience of any moments other than the present is what motivates the presentist to deny their existence and include only a single moment, the present, in their ontology. However, it is difficult to pinpoint how to restrict existence to *the* present. Since the essential difference between the block theorist and the presentist seems to be a matter of what exists, or is real, it would benefit us to examine the possible ways to confine existence to the present in light of STR. In doing so, I hope that it will be clear how STR suggests a block universe picture and more importantly, how STR is hostile towards a presentist's picture of time.

In some debates between the presentist and the block theorist, there is a tendency to use the predicates “is real” and “exists” to point to two different modes of being. Sometimes it is claimed that the presentist holds that all moments exist, but that the present is just that much more real than all those other moments. The distinction between reality and existence, here, seems to be superficial. If one is a true presentist, then there is only one real and existent moment. To admit that past and future moments exist, but that the present is somehow privileged with reality, is essentially to believe in a moving present view of time, a view that I have argued is incoherent in principle. The “presentist” who ascribes to this kind of distinction seems to be making no real distinction at all, and as such, ends up including in their ontology both the entirety of moments, and a special present that in some way glides across the whole history. I take for granted that the world is consistent and as such does not contain contradictions whether they *really* exist in the world or merely exist in the world, so for the purposes here, I will be treating “is real” and “exists” as amounting to the same thing. Further, I

will be looking only at the “true” presentist picture here, one that maintains that all and only present events are real, and I will be contrasting it with the block universe picture. In what follows, I will present an argument against the compatibility of the presentist image of time and the relativistic image of space-time which follows that of Hilary Putman, in “Time and Physical Geometry” (1967).

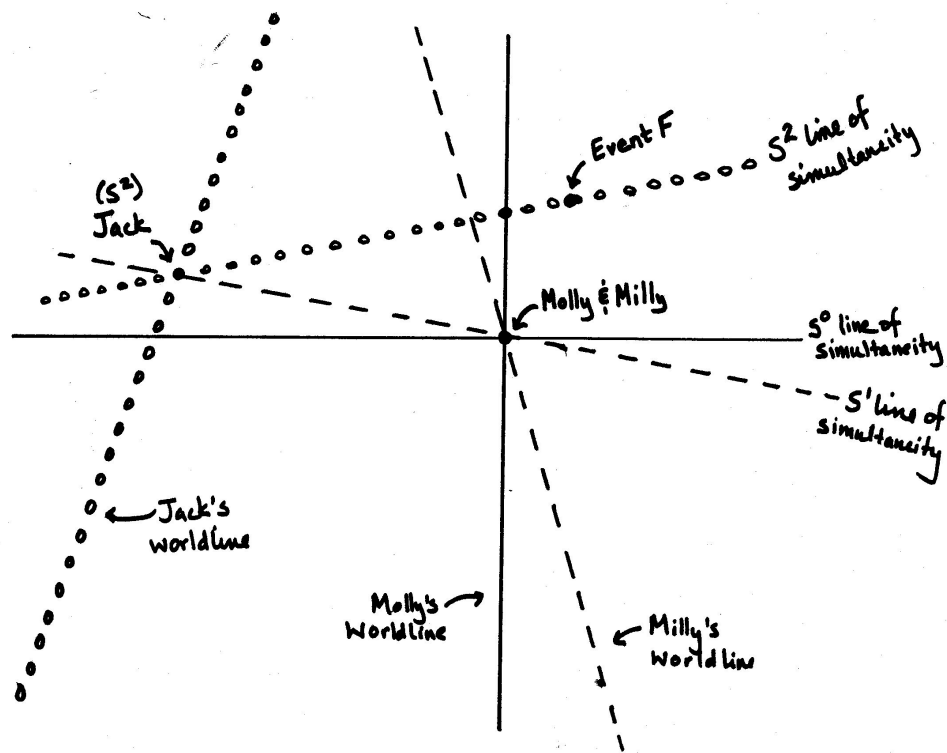
The presentist holds that all and only present things are real. This being the case, he would admit that if two observers, Molly and Milly, were presently in the same place, then they both exist. Now, it is perfectly possible for the two to be moving at a constant velocity relative to each other, in which case they will each lie in a different inertial reference frame, and a different coordinatization of space-time. Suppose some event, E, lies in the future of Molly's frame of reference when they presently cross paths. E is not present for Molly and thus is not real. However, so long as the event is space-like separated from Molly, it is possible for Milly to be traveling relative to Molly such that E is simultaneous with their intersection in Milly's inertial reference frame (fig 4).

Figure 4:



That event, being present for Milly, must in turn be *real* for Milly. Again, since both Molly and Milly are presently in the same place, they are both real to each other. Further, unless we want to admit that different things exist for different people, *being real for* must be an equivalence relation. So, since E is real for Milly, and Milly is real for Molly, then E must be real for Molly. But, by the presentist's own claim, E is not real for Molly because it lies in her future! And so the presentist is faced with a contradiction. In fact, even if an event were future *time-like* separated from Molly, we could show that it would be both real and not real for Molly. There could be another observer, Jack, moving relative to both Molly and Milly, but not coincident with them, such that when Molly and Milly cross paths, Jack lies along Milly's line of simultaneity, and hence is real for Milly.

Figure 5:



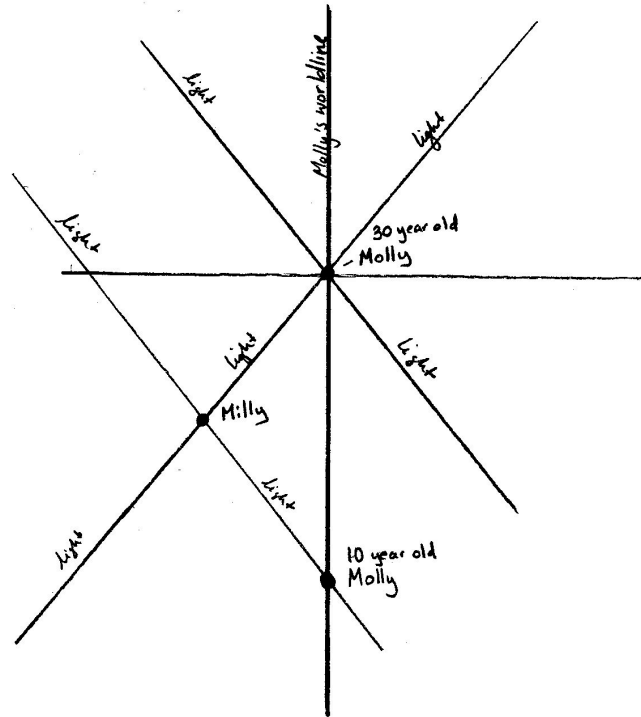
Any event lying along Jack's line of simultaneity would be real for him and thus real for everyone else. Along Jack's line of simultaneity could be an event, F, in the future light cone of Molly. Since F is real for Jack, Jack is real for Milly, and Milly is real for Molly, F must also be real for Molly. But again, F is in the future of Molly and so not real for Molly. Again, the presentist is faced with a contradiction.

But the presentist is not so easily defeated. The above argument rests on two assumptions. The first is that *being real for* is a transitive property. Perhaps, since our intuitions about the transitivity of simultaneity have been abandoned, we should question this assumption as well. The second assumption being made is that the presentist must maintain that it is the line of simultaneity that defines the present, and hence what is real. Some presentists choose to solve the problems of relative simultaneity by identifying the present with something other than a line of simultaneity. Mark Hinchliff (2000) presents a defense of presentism against arguments such as Putnam's and points out that the presentist has taken on a few different options in response. Some have proposed that we take the spatio-temporal point that is the here and now to be the present (Harrington 2005), although Hinchliff, himself admits that this is as unappealing a philosophical move as solipsism. The two proposals he finds to be more promising are the cone model, which Hinchliff identifies with a theory proposed by William Godfrey-Smith, and the surface model, which Hinchliff identifies with a view held by Arthur Prior. Under the cone model, the surface of the past light cone is taken to be the present. The surface model denies that relativistic theories are able to describe how the world really is, but only how it appears to be, that is the surface reality is described by the relativistic theories, but not the deeper reality. The latter view would, thus, deny that the line of simultaneity picked out by STR

is the *real* present. Whether the presentist is truly defeated by STR will be left open, however the intuitive pull of presentism seems to be compromised by attempts to save the theory in light of relativistic physics.

In the case of the cone model, one's past light cone is considered the present. Under this account, the presentist still maintains the intuitive pull of experience since not only is experience confined to the present, but also the content of the visual experience is present. This model seems to be prone to the same problems as Putnam's original argument. First, we take what is present to be real. So, under the cone model, we take the surface of the past light cone to be real. I will assume that the transitivity of *being real for* is also maintained since there is no advantage to abandoning this assumption under the cone model, but not under the model that identifies the line of simultaneity with the present. Consider the following scenario. Suppose that we begin with 30-year-old Molly and her light cone, and suppose that Milly lies at some other point along the surface of Molly's past light cone. Milly is real for Molly. Milly has her own light cone, however, and one that does not entirely overlap with Molly's. In fact, the surface of Milly's past light cone will include events that lie *within* the confines of the surface of Molly's light cone, for instance Molly's 10-year-old self, and so are included in her proper past. But again, since *being real for* is a transitive and symmetric relation, those events that are real for Milly, must also be considered real for Molly. What is in the proper past of Molly is unreal by the presentist's original assumption, but is also real for Molly due to the transitivity of the *is real for* relation.

Figure 6:



The cone model is vulnerable to the same criticisms as one that identifies the present with one's line of simultaneity. On the one hand, one could admit that what is in one's proper past is real in addition to those things in one's present. However, this is just to deny presentism. On the other hand, one could give up that *being real for* is a transitive property in order to prevent what is in the proper past from being real. However this option would require either relativizing reality or privileging one observer over all others. Neither of these options would be favorable for the presentist.

In the surface model account of presentism, all of the initial intuitions that led one to presentism are maintained, the present is all and only what is real, the present is identified with a plane of simultaneity, and *being real for* is transitive. However, the



source of these intuitions, our experience, is disconnected from the reality of the world they were supposed to be about. So, physics describes the world as it appears to us, but not the real world. It describes how events will appear to be simultaneous in some reference frames and not in others, but it will fail to describe which events are *really* simultaneous and present. I fail to see the motivation for being a presentist other than perhaps that some aspect of our experience is not captured by a static image of time. So if the only thing that physics is able to describe is how things appear to us, what is the motivation for thinking that there is some *real* way the world is that is only properly described by the presentist's theory? If presentism does not explain how things appear to us, what is it explaining?

These alternative models of presentism seem fallacious or unable to do the explanatory work that presentism aims to do, namely to explain a certain aspect of our experience in time. In what follows, I hope to show that the block universe can accommodate these aspects of our experience as well as represent the best scientific model of time. I turn now to the intuition that the present is shared and objective and the experiences that lead to such intuitions.

### **§3 Our Experience of a Unique Present**

The idea that there is a unique and objective present propelling us through the various events of our lives and unifying all of our experience is very powerful. As we saw earlier in the discussion of McTaggart, there is a very fundamental way in which the idea of a moving present, objective and unique or not, is contradictory in the block

universe. An explanation of the dynamism of our experience will come in subsequent chapters, but here I will be focusing on the idea that the present is objective.

Since within the block universe time is simply another dimension much like that of space, uprooting the intuition that there is an objective present would require an explanation of why we do not experience the spatial analogue of the present, *here*, as objective in the same way we do *now*. Jeremy Butterfield explores an explanation for an image of time that preserves the experienced asymmetries between time and space. He states that there are three intuitions that underlie the belief in an objective moving present. These are:

1. Presently existing objects, no matter their location, are more “real” than local objects at any other time.
2. People are more apt to give sentences time-varying truth values rather than space-variable ones.
3. We all share a 'now', but we do not share a 'here.'

While these three intuitions differ from the intuitions that I have been working with, they do reflect similar sentiments. The first of Butterfield's intuitions reflects the presentist's belief that only present objects and events exist. Of course something that exists is more real than something that does not and so everything that exists in the present is real, while things that used to exist and things that will exist in the future are less so. In fact, unless we are ready to admit to different degrees of existence, we should not be ready to admit to different degrees of reality and so things past and future become completely unreal, while present objects stand as the exclusive bearers of reality. Butterfield's second and

third intuitions reflect not only the sentiment that is the present objective while the local is not, but also that the “movement” of the present is objective.

Butterfield claims that these three intuitions can be dispelled by a single explanation that rests on the idea that time-lags between an event and our experience of the event, in any practical way of talking, are short enough to be ignored. If it is found that the idea of an objective present should be replaced with a relational, non-objective understanding of *now* similar to the relational, non-objective understanding we have of *here*, then the properties of *being in the past* or *being in the future* are analogous to the relational spatial properties of *being to the right of* or *being to the left of*. These relational, non-objective properties are fully compatible with STR and the block universe.

Upon closer examination of our experience, we note that there is a delay between when an event occurs and when we experience it, and in fact, the farther away the event is, the longer the delay. The realization that light does not propagate instantaneously has only come in the last century, however the delay in sound waves' arrival is a fairly common phenomenon, for instance, the case of thunder following lightening. Further, even once signals from the event reach our sense organs, it takes a certain amount of time for these signals to reach the brain, so it is almost never the case that we experience events at the exact moment they occur. Thus, those who claim that we are only ever experiencing the present are mistaken (rather than the milder claim that our experience is always present), for we are always experiencing things in the near past of our temporal position. At first, this may seem to stand as powerful evidence against the presentist stance. In what sense can the present be a unique and special moment when my present experience is always of events in the near past? Surprisingly enough, this fact has little

effect on our ability to form true beliefs about those events that are slightly past and it is perhaps this ability of ours that gives the presentist the support of his theory. There is nothing that precludes the present from being of finite duration rather than a dimensionless moment and so perhaps the time lag between the event's occurrence and my experience of the event is evidence that the present exists because it is what is unifying the two and making it possible to experience events when they are present.

However, there is no need for any additional mechanism like an objective present to explain why our present experience can inform us of the present state of affairs despite the experience being of past events. As Jeremy Butterfield argues, the time lag between an event and our experience of it is short enough for us to ignore and not have our belief falsified, or needing qualification that the belief is of a past state of affairs rather than the present state of affairs.

All of our experiences of external objects and events involve a signal being sent from the object to our sensory organs and into the brain. This, of course, takes a certain amount of time. However, while there is always a time-lag in our experience of events, we are still able to treat them as the present state of affairs. Our ability to do this depends on a few factors. One is the time it takes the signals to leave the object and reach the person. In the case of visual experiences, the time it takes the light from the object to reach one's eye is based on the speed of light and the distance between the object and the observer, as well as the medium through which the light is passing.. The second factor is the processing time for the signal, and the final factor is the rate at which the object changes. Since most objects are resilient and stable, the rate at which an object changes is fairly slow. Further, since the speed of light is quite fast ( $3 \times 10^8$  m/sec or 186, 0000

mi/sec) and most objects that can be seen are within 1000m of the observer, the light arrives at our eyes virtually instantaneously. It only takes about half a second for the brain to process the signal and so the judgment is not only of the object's state when the signal was first emitted, but also of the state of the object when the observer judges the object to be that way. For instance, if I am looking at a blade of grass that I judge to be four inches long and a particular shade of green, I can be fairly sure that while some time has passed since the blade sent its signal, I am observing it as it is when I judge it to be so. The grass cannot grow or change colors fast enough that I would be getting data I cannot ascribe to the present blade given the speed of light and the speed in which the signal gets sent to my brain. While the grass growing and changing its color is an especially slow process, macroscopic objects, in general, change their macroscopic properties relatively slowly, if at all. So, I can say of most of things that the time-lag in observation does not falsify my beliefs about them and I can act in response to my beliefs about the present state of affairs effectively. And although my experience is always of the recent past, I treat it as being the present because of these abilities.

Aside from the case of visual experiences, we can extend our ability to ignore the time lag in observation to communication. In the case of sound, we can ignore the time lag between the time the signal was sent and the experience of the sound in most relevant circumstances. Specifically in the case of belief reports, we can assume that the time-lag between the reported belief and our experience of the report can be ignored. Suppose I was standing with a friend at the train station and upon hearing the train whistle, he says, "There is the train." I, too, hear the train and since his report of the train came within such a short time after I hear the whistle, the lag in observation and communication is

ignored. I am left with the impression that our shared experience was some how forced upon us by the event of *the train blowing its whistle* suddenly becoming present.

My ability to ignore the time-lag in observation, along with my evidence that other people are like me, and the reliability of our communication, allows me to extend my locally shared “now” into a global “now”. And although I cannot experience distant events any better than I can past and future events, I am still compelled to think that presently existing objects everywhere are more real than locally existing objects at every time. Why is it that we are compelled to extend our individual presents to an objective present, but we are not compelled to extend our individual 'heres' to an objective 'here'? As Butterfield points out, there are two senses in which we can talk about existence. The first, looser sense of existence rules out things like ogres, unicorns, and Sherlock Holmes and includes all things that exist anywhere, at any time, such as cats, dogs, John F. Kennedy and George W. Bush. The second sense leaves out all past and future things and is restricted to only those presently existing objects. However, there is no sense of existence that applies exclusively to objects here (right here!) at some time. How might our ability to ignore the time lag in observation and communication explain this asymmetry?

I am able to ignore the time lag in communication and I do not notice that the reports I receive are of past times and events, that is, I do not notice the difference between what you state the present state of affairs is and what I judge the present state of affairs to be. However, the difference between my 'here' and your 'here' is noticeable—in fact, I can measure it if I so choose – and I cannot ignore the “lag” between my location and yours. Because I only experience events in the present, but spatially all at once, I can

clearly see that the differences or similarities in what I subscribe to my 'here' and what you subscribe to your 'here' is a product of us being in different spatial locations and I do not think that distant objects that are hard to see or cannot be seen at all are any less real because they are not here for me. In fact, I have good reason to think that things at other places presently exist because ignoring the time lag in communication enables me to trust reports of distant events.

Further, in ignoring the time lag in observation, we are left with the feeling of having no direct access to past or future events, only to present events. And because we ignore the time lag in communication, we believe that no one has direct access to past or future events and all reports, unless otherwise stated, are understood as being of events simultaneous with my current experience. Without evidence that anyone has direct access to past or future events, we have no reason to suppose that they exist. In the case of spatial location, however, it is clear that other people have access to places other than 'here', for instance, someone standing on the side of a building can see and report on details of the building that differ from my observations and reports of, say, the front of the building. This type of understanding of our ability to ignore the time lag in observation and communication serves as an explanation for our intuition that present objects at all places are in some sense more real than local objects at all times, without actually admitting an objective present into our theory.

The explanations for the second and third intuitions also draw from the idea that we have a local present that we extended to a global one because of inter-subjective agreement. With regards to the second intuition, there are two main reasons that people tend to give sentences time-variable truth-values rather than space-variable truth-values.

The first reason rests on issues within the philosophy of language having to do with the compulsory nature of time-variable truth-values in English and other languages. I will not go into these issues here, mostly because I feel that there is probably an underlying reason for this outside the language, most likely, the second reason, which is based on the idea that, while we can usually specify an object without the use of spatial indexicals, we are not usually able to specify the time at which the object had certain properties and relations without the use of temporal indexicals. This seems to rely on two things: (1) that our experience gives us a large expanse of all the spatial dimensions simultaneously and (2) that most of the objects we observe are relatively large and stable. As we saw earlier, large and stable objects change their properties relatively slowly, so we would naturally be able to describe an object in terms of the properties and relations it has at a time and have this hold for a period of time.

In speaking of Butterfield's explanations, Callender says: "Regarding the second [intuition], the claim is that we more readily accept truth values changing with time than with space. I admit that I am dubious of this claim. I think that we're equally happy with indexing, for instance, "It's raining" to changing locations at changing times" (Callender 2008, 7). However, I think that what Butterfield is claiming here is not that spatial indexicals are absent from our languages; after all he provides an example of a language fairly rich with spatial indexicals, Kwakiutl. Butterfield only claims "[t]he reason why we can usually avoid spatial indexicals is that there is usually enough qualitative variation across space...On the other hand, watches etc. aside, we usually cannot specify the time non-indexically because the natural 'watches' provided by daily and seasonal variations are too crude" (Butterfield 1984, 172), which seems to be a claim about our inability to



do away with our temporally indexed language, while our spatially indexed ascriptions can usually be expressed without the use of such indexicals.

The explanation for the final intuition, that we all share a 'now', but we do not all share a 'here' comes in part out of our explanation of the first intuition. Our ability to ignore the time lag in communication allows us to ignore any difference between the time of utterance and the time of reception. Further, the time lag in observation is roughly the same from individual to individual, which allows me to infer that other people's reports of presently existing objects are as accurate for them as mine are for me. Now, let's look again at the two commuters waiting for the train. If I see the train coming down the tracks and I hear you say "Here comes the train," I can take your report of the train to be a report of what you are presently observing, and infer that you and I have a shared present experience. It is from these little patches of locally shared 'nows' that we infer a globally shared 'now'. Butterfield claims that we are not, however, equally inclined to think that there is an objective sense in which we all share a 'here'.

That is not to say there is no sense in which we are all 'here', but that sort of notion tends to be spiritual in nature and includes all people presently in the universe as well as those who have yet to be born and who have already passed away. This kind of usage makes 'here' no more objective than it does 'now'. It would be quite odd for me to come to believe that the local area that I occupy is in some way shared by all moments in the same way that 'now' is thought to be shared by all places. Why would this belief be so odd, though?

Butterfield begins by analyzing the idea of sharing a present and shows that it is analogous to sharing a here. He then moves on to present reasons why, despite the

symmetry of the two, we are inclined to believe in an objective present, but not an objective here. He points out that we infer a globally shared 'now' in large part because of the rapidity of oral communication. That is, what I observe to be the present state of affairs accords with what you communicate to me as being the current state of affairs for all mutually observable objects and events. Thus, I am led to believe that you and I are both experiencing these events at the same time, namely in the present. To make this inference, he states tentatively, “the two people share a now if they agree in judgments about what is now the case”(Butterfield 1984, 174). However, even if the time lag in communication were noticeable, Butterfield holds that we would still infer a commonly shared present. If there were a noticeable time lag in communication, present tensed judgments made at different times would not necessarily agree, especially if a long enough period of time has passed between judgments. Further, what is now the case for many subjects may differ because of theoretical, ideological, or positional differences. So, he states that agreement about what is now the case is too restrictive for sharing a now and instead he proposes: “two people share a now at a time if they then make the same ascriptions of such predicates to such objects,”(Butterfield 1984, 174) such predicates and such objects being those observational predicates, aside from spatially indexed predicates, and those objects observable by both parties. This is, in fact, the case for us since the time it takes signals to arrive at different people and be processed is roughly the same.

However, Butterfield argues that if this is the sense in which we mean we share a now, then we share a 'here' in this very same sense. The spatial analogue would go as follows: two people share a here if they there make the same ascriptions of non-

temporally indexed observation predicates to objects observable to both parties. Put this way, we can see that people do share a here in the same sense that they share a now. Take, for instance, sitting inside my apartment. I will make certain ascriptions such as 'the walls are here white on January 5<sup>th</sup>, 2008' or "the kitchen here has such and such a layout on January 5<sup>th</sup>, 2008" and others who enter my apartment around the same time or subsequent renters will make the same ascriptions about the wall and kitchen regardless of when exactly they see them within a certain range, and in this sense we will share a here. Note, however, that if someone were to later make the true ascription that 'the walls are here gray on May 31<sup>st</sup>, 2008' they could still share a here so long as they agreed about the objects that were observable to both, such as the overall size, shape and location of the apartment containing the walls. So, people at different times share a 'here' if they make the same ascriptions to objects observable by both parties.

Analogously, we would be inclined to think that two people who were spatially separated by some distance would not be able to make the same ascriptions now about all the same objects since different objects and different parts of the objects may or may not be observable by everyone. That is, if I am on the North-side of Chicago and my friend is on the South-side of Chicago, I may make the ascription that the sky is cloudy, while he may make the ascription that the sky is clear. But we may also both be watching a local baseball game on television and make the same ascriptions to the objects and players that we are both observing. In this case, our ascriptions agree in the case of objects and parts of objects that we are both observing of the local Chicago broadcast, while our ascriptions do not agree where we are observing two different parts of the same sky, so we can still say that we share a now. So, as we can share a now even though our

ascriptions of different spatial parts of the sky differ, we also share the here of my apartment even though our ascriptions of different temporal parts of the wall differ. Just like the sky over South Chicago is now clear while the sky over North Chicago is now cloudy, the wall during January is here white, while the wall during May is here gray.

If the sense in which we share a now is the same sense in which we share a here, why are we inclined to think that there is an objectivity to the shared now, but not to our shared here? Butterfield suggests three reasons that we do not ordinarily see the analogy between the two. The first reason is that, given our tensed language, when we talk about people sharing a here, we usually mean that they are now sharing a here. In this way of speaking, the analogy would not hold. Suppose you and I are both here in the café talking and that is taken to mean that you and I are both in the café at the same time, but what we mean by 'here' in this case is a little lax, since obviously we could not both occupy the same exact spatial location at the same time. But the lax way of speaking of here is not analogous to the sense in which we mean we share a now, but rather more similar to our usage of 'nowadays'. If we limit ourselves to the strict sense of 'here', we will see that since no two people can occupy the same place at the same time, no two people will ever share a here, now (and consequently, no two people will ever share a now, here). So the sense in which we are both here at the cafe now, is that we are both in roughly the same spatial area (generally determined by the situation – here in Chicago, here in the neighborhood, here in the cafe, etc.), but in the exact same temporal location, perhaps 10:30AM, May 31<sup>st</sup>, 2008.

The second reason we do not normally acknowledge the analogy between 'here' and 'now' is that temporal indexicals are less easily done away with than spatial

indexicals, as mentioned above. Sharing a here involves agreement of observational predicates utilizing spatial, but not temporal indexicals, while sharing a here involves agreement of observational predicates utilizing temporal, but not spatial indexicals. We are better able to do without spatial indexicals than we are to do without temporal indexicals. This is perhaps due to the fact that specifying an object without spatial indexicals usually involves describing the object as it differs from other objects in the observable range. Since the time-lag in observation is ignored, we experience space all at once, thus we are able to compare other objects and parts of objects in order to pick the object out, definitively.

The third reason that we ignore the analogy is that, in ignoring the time-lag in communication, we are presented with practical reasons for treating reports of others' present ascriptions *as* their present ascriptions. Since the time-lag in communication is ignored, others' reported ascriptions of objects are immediately judged against all objects currently being observed by myself and others. The same is not as easily done for temporally indexed ascriptions. Since our experiences of objects at different times are mutually exclusive, it is much more difficult to maintain the differences between moments in our minds and, indeed, sometimes the only noticeable difference from one moment to the next is the position of my watch hands or my changing thoughts. Working with a non-temporally indexed description of a moment does not usually pick out a moment definitely for a person, except for those moments that are especially memorable. However, even in those cases, the moment picked out tends to be of a much longer duration than the now we usually think we share with one another. For the most part we take for granted that our present ascriptions and others' reports of present ascriptions are

of the present state of affairs, unless the reports are past or future tensed or temporally indexed in some other way.

Butterfield's explanation of the three intuitions above – (1) presently existing objects, no matter their location are in some sense more real than local objects at past and future times (2) people are more apt to give sentences time-varying truth values than space-variable ones (3) we all share a 'now', but we do not share a 'here' – is based on two ideas. First, because the time-lag in observation can be ignored, I take my present experience to be of the present state of affairs. That is, what I ascribe to the present state of affairs is actually (barring any hallucinations or other such errors) the present state of affairs. Second, because the time lag in communication can also be ignored, I can take reports of your present experience that agree with my present experience to be of a unique present state of affairs. Ignoring both the time lag in observation and the time lag in communication, and seeing that we agree in our ascriptions of the observable state of affairs puts us in a position to hold that the present state of affairs is both the same for you and me and that this moment is in some sense unique (after all I am only ever experiencing one moment – the present – and everyone else around me only ever seems to be sharing that same present moment with me). But the idea that I am only ever experiencing one moment and further that I can extend this moment to other people in other places has yet to be explained. This seems to be related to the question of whether our concept of simultaneity is based on the intuition that there is a common now, or if the intuition that there is a common now is based on our concept of simultaneity. When patching together the little local nows into one big global now, it seems we must have a particular notion of simultaneity in mind, which is, most importantly, transitive.

However, just because we have a positive story about how we patch together these individual ‘nows’ into a global ‘now’ does not refute the possibility of an objectively shared now. After all, since in ordinary discourse we almost always agree in what we ascribe to presently existing objects, we could take our ability to patch together a global now as evidence that we have patched together a global now that coincides with an objective present. However, while the arguments above do not touch on the subject, the intersubjective agreement between people about what is now the case only exists down to a smallest duration of time (one that is ignorable in going about our daily lives). This also occurs with regards to the order in which people ascribe events as occurring, especially in fast paced events such as sports games; I will return to a discussion of this point later on. In what follows, though, I will look at two ways in which our traditional idea of simultaneity fails and how any reconceptualization of it would be hostile towards an objective present.

Callender points out that what we commonly mean when we say that two visual events are simultaneous is that they are seen together. Analogously, we treat two aural events as simultaneous if they are heard together. In the case of visual experience, the idea is referred to as the visual simultaneity hypothesis, a term he credits to Jammer. Our idea of simultaneity may be undermined by an investigation of our experiences over very short periods of time, looking at our windows of simultaneity.

If we look closely at the experience of the present moment, we find some surprising results. Callender considers various experiments regarding the window of simultaneity<sup>8</sup>. In one experiment, subjects wore headphones while a tone, lasting 1ms,

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<sup>8</sup> Hirsh and Sherrick 1961, Poppell 1988, and Euler 1997 discussed in Callender, 2008.

was played into each ear. When the tones were played simultaneously, the subjects heard the two tones as a single tone. However, even when the second tone was delayed slightly (by 3-4ms), the subjects *still* heard the tone as one. Delaying the second tone much more would result in the two tones being heard as two distinct tones. And while the conflating of events over time was seen earlier in the explanation of how we are able to ignore the time lag in observation, what is interesting is that how long the delay can be before a subject reports hearing two tones differs from subjects to subject. Older subjects tend to report the tones as simultaneous over a longer time interval than younger people, although there is still variation from person to person within these two groups. For each person there is a minimum delay in order to hear the two tones as simultaneous, but what that minimum is varies from person to person. This suggests that while it may seem to me that what events I see as presently simultaneous would appear presently simultaneously for all others, they are not necessarily so. In the case above, if you and I were both listening to the tones, then it is perfectly possible for me to hear two distinct tones only after they are separated by 4ms, while you hear them distinct after only 3ms. In this case, two tones separated by 3ms would appear to me to be simultaneous with one another, while for you the two tones appear to occur one after the other. Within those 3ms, my experience is of a single moment and with that information alone I conclude that you, too, are experiencing a single moment. However, your experience in those 3ms is of two distinct moments and with that information alone, you conclude that my experience during that time is also of two distinct moments, which I am unavoidably propelled through. So we are both left with a feeling of an objective present even though we



disagree in which events are present and which are past or future, and further we disagree about which events are simultaneous with the present and which are earlier or later than it. Of course, our disagreement here is not noticeable in normal everyday interaction. Recall that the time-lag in observation and communication, which we are able to ignore, occurs over a couple hundred milliseconds and a 1-2 msec discrepancy between two people's present will hardly find its way into everyday discourse.

What allows one to infer that there is no objective present from evidence of variation across subjects is the belief that if the present is objective, then there should be no variation in which events different people observe as simultaneous. For if I observe an event as present, then all events simultaneous with that event will also be present. In the case of the tones, a subject who hears one tone even though there is a 4ms delay will include both the first tone and the second tone ('first' and 'second' as known by the experimenter, but not the subject) in the present. A subject who hears the tones as distinct when they are staggered 4ms apart will not include the first tone in the present with the second tone. Therefore, what is present differs from person to person which should not be the case if there were a unique objective present.

This intuition can perhaps be dissolved by pointing out that, as in the case of color blindness, variation in perceptual experience does not mean that no one, in a sense, gets it right. It is perfectly reasonable to think that just like in the case of color blindness, we do recognize that the person who perceives all colors is getting it right when they distinguish between red and green and the color blind person is getting it wrong when he cannot.

However, as in the case of color perception, temporal perception is mind dependent. And as we will see below, not only does what we consider present vary from

person to person, but there is also evidence that for any given person there is a discrepancy between the objective order of events as known by an experimenter and the perceived order of events. In the case of color perception, the person who is considered to have normal vision is still experiencing something that is a result of not only the world, but the brain as well. Analogously, since the analysis of our temporal experience revolves around our particular biology determined by our need for survival in a world that demands our timely action and reaction, it seems that all of our temporal experiences are mind-dependent regardless of who you are. Any attempt to give one person's present privilege over another would require an explanation of why one person (or a group of people) is able to somehow access a mind-independent present despite the biological similarity between him and those of us who only experience a mind-dependent present. Although, it is true that in all cases the passage of time seems to be mind-dependent, it is not at all clear that this implies that it is in principle impossible to perceive time as it really is. The person who can see the full range of colors certainly perceives differences in the world that the color-blind person does not. However, while there is evidence of differences that the colorblind person fails to see, there is no evidence for a real distinction between past and present moments.

The above argument against a unique present determined by the experience of a privileged person is similar to those arguments from special relativity against an objectively correct foliation of space-time determined by a unique and privileged inertial frame (Callender 2008).

#### **§4 Concluding Remarks:**

Although I have presented argument against the presentist above, my goal is not to prove that it is a completely unviable position to take, but only that it is rather unattractive. The Special Theory of Relativity forces the presentist to rethink the mere possibility of an unique present, while the difference in windows of simultaneity across subjects and within a subject's own life forces them to rethink the belief that the present is experienced to be unique and shared. Butterfield's account of our ability to ignore the time-lag in observation and communication can account for our intuition that the present is shared and objective, without appealing to an actual shared and objective present. My main goal is only to show that within the block universe theory, an account can be given of the first of our experiences and intuitions about time. In the next chapter I will turn to another intuition we have about time that seems to be grounded in experience, that time flows.

## CHAPTER 3: The Flow of Time

### *§1 What is the Flow of Time and Why Is It Problematic?*

In the previous chapter, I addressed one feature of our experience that the A-series seems to explain, the privileged place of the present. In this chapter, I will address another feature seemingly explained by the A-series, that is the flow of time. There are many elements of our experience that are thought to be, or at least contribute to, the experience of temporal passage or flow. These elements include the feeling of moving into the future and away from the past, our inability to control such movement, and the dynamic character of this progression. These elements together have contributed to the view that time flows or passes, a character of time that the A-series is thought to best capture. There are many ways in which temporal flow has been described: “the passing present” (Dennett 1935, 103), “the moving present” (Stearns 1950, 198), “the traveling now” (Santayana 1943, 258), “the passage of time as actual...given now with the jerky or whooshy quality of transience” (Lewis 1946, 19), “the transitory aspect” (Broad 1938, 271), “moment that is creation and fate” (Tillich 1936, 129), “...it is the flow and go of very existence, nearer to us than hands and feet,” (Williams 1951, 461). Some of these descriptions have been taken as mere metaphors, others perhaps more seriously. Most who take these elements of experience to be indicative of some property of time have criticized the four-dimensional block universe theory of space and time, in which all moments exist equally and eternally. This criticism is largely due to the block universe theory's incompatibility with temporal flow and thus its apparent inability to explain such experiences. However, I argue that we should not abandon the block universe theory

based on these criticisms and that even in the absence of temporal flow, we can nevertheless explain the experience, since they are not literally experiences of temporal flow.

The tension between the block universe theory and temporal flow is perhaps best understood by the paradoxical nature of their combination. The block universe is a four dimensional manifold that contains all events, past, present and future and all moments exist equally and eternally. Temporal flow is typically characterized as the phenomenon of a future moment becoming present. The persistence of this characteristic can then be understood as a series of moments coming into the present successively. When this series is combined with the extended temporal dimension of the block universe, the result is a kind of moving present. Broad (1923) likens the moving present to a moving spotlight traversing houses along a street. In such a metaphor, just as the houses are lit up as the spotlight traverses them, so too are the moments in the block universe “lit up” by the present, conferring presentness on each in turn. Those that have already been lit up are past, while those that have yet to be lit up remain in the future.

To see the incompatibility of the block universe theory and temporal flow, suppose that this metaphor properly captures some aspect of time and that there is such a moving present that traverses the moments in the block universe, bringing them each into the present, one by one, such that those awaiting presentness are in the future and those that have already been present, are past. This is how McTaggart himself captures the A-series properties, relativizing moments only to the present and not to B-series facts. Since the block universe contains all events, then it must also contain the events of each moment becoming present. Suppose the moments in the block universe could be named

$M_0, M_1, \dots, M_n$ . Then  $M_0$  becomes present at  $M_0$ ,  $M_1$  becomes present at  $M_1$ , etc. for all moments. It follows that every moment is present, and that there is no single, unique present that moves across all moments. However, the original supposition was that there is a single and unique present that moves across all moments. This is one of the ways to characterize the contradiction that comes about from incorporating temporal flow into the block universe. However, there are other ways one could characterize the contradiction as well. It could also be put in terms of the moments each holding all three mutually exclusive properties of *being past*, *being present*, and *being future*. One could avoid such contradictions by being a presentist and denying the existence of moments other than the present, however, my goal is only to show that one can be a block theorist and fully explain change without incorporating this contradictory notion. The block theorist, then, should aim to provide an explanation of our experience without the addition of any kind of moving present.

In what follows, I will lay out the ways the above conception of temporal flow has been utilized as an explanation of change and show that the root of the difficulty lies in explaining the experience of change (section 2). Other attempts to argue that time, itself, is dynamic have focused on the idea that the flow of time as described above is something perceived in a quite literal way and further that our perception of this aspect undeniably ties it to reality. I will examine an argument presented by Simon Prosser (2013) in which he concludes that this type of temporal flow could not, in principle, be experienced, and is thus illusory (section 3). Although, Prosser provides interesting insights into the debate, in the end, he seems to fall into the same problem of assuming the phenomenology to be of the literal flow of time and also assuming that the temporal

properties. While he is correct in arguing against the possibility of experiencing temporal flow conceived of as something like a moving present, he is incorrect in identifying any part of the content of our experience with a metaphysically heavy conception of time. Upon identifying the content of our experience that lends itself to thinking time flows, I will show that there is an important sense in which temporal flow is non-illusory. I will present an understanding of temporal flow that identifies the flowlike aspects of experience as part of the character of our experience in time, not some character of time, itself. In order to do so, I will lay out the nature of our experience of objects as a non-simple relation to the world (section 4). I will then extend this understanding to our experience of temporal properties (section 5). Finally, I will present a bundle of experiences that contribute to our belief that time, itself, flows and show how they are all experiences of different kinds of temporal variation (section 6). My main goal is to show that shifting the understanding of temporal flow from some intrinsic character of time to a character of our experience in time allows for us to account for our dynamic experiences in the block universe without any additional mechanism.

## **§2 The Flow of Time in an Explanation of Change**

Our experience of change is certainly different from our experience of spatial variation; watching something grow is very different than looking at a landscape with a series of valleys and mountains, likewise, watching something change colors is different than looking at something that is green at one end and red at the other. This difference in our experience has been taken by some to be indicative of a fundamental difference between time and space. It has been viewed as a challenge to the block theorist to explain how change can occur in a four dimensional block where time is laid out in the same way

as space, and all states of affairs exist equally, eternally and “statically” in this varied tapestry of space and time. Since the block theorist does not accept the A-series as a real feature of reality, he cannot cash out change in terms of the change in an event's presentness. The most common intuition in this case is that time, in some sense, *flows* or *passes*, and it is this added feature of time that accounts for how things change. However, as laid out earlier, this addition to the block universe is contradictory and so unappealing as an explanation of the phenomenon. In order to properly address the difference in our experience of change and variation, I now turn to the kind of change that is captured by the block universe.

In Zeno's arrow paradox, we are asked to consider an arrow's flight across the sky. We take the arrow to be in motion throughout the period of its flight, and yet at every moment in that period, we can say only that the arrow occupies a single position. Although this paradox is put in terms of motion, this is just a specific case of change. In general, Zeno's arrow paradox arises from a conflict between some of our general beliefs, which confer conflicting properties on individual moments. In *Travels in 4 Dimensions* (2003), Robin LePoidevin explains that the paradox arises from our adherence to the following two assumptions. First, we tend to believe that if an object has some property for an interval of time, then it has that property at every instant of that interval of time. For instance, if a flower is vibrant red for a few days before it wilts and turns brown, then it is red on every one of those days, and further, it is red at every instant of every minute of every one of those days. The flower is not blue or brown or any other color for any part of that interval. So when we say that the arrow is in motion throughout the interval of its flight, we must mean that it is in motion at every instant of that interval. Second, an



object is only in one place at a time, or more precisely, that an object occupies a single position – no more, no less – at an instant. This is because if the arrow occupied more than one position, the instant would have to have earlier and later parts to accommodate it being in one position *and then* in another. However, since an instant is by definition durationless, it cannot have earlier and later parts. Therefore, since motion requires a change in position, no motion could occur in an instant. At this point, we are faced with the paradox. By our first belief, the arrow is in motion at every instant of its interval of flight and by our second belief the arrow is stationary at every instant of the interval. Something has to give.

One may say, “Look, motion isn't like being red or tall or round or short, it's not something that happens within an instant, rather it's something that happens *over* a period of time.” This kind of thought reflects a very natural way of thinking about motion, that of being in different positions at different times. So we can say that an object is in motion throughout a period if and only if it occupies different positions at different instants within that period. This is the static account of motion.

Under this way of thinking about motion, we take a temporally extended interval to be the fundamental unit for determining motion. Motion in this sense is analogous to spatial properties such as being plaid or being striped. If I have a plaid piece of cloth, then I need to take a certain spatial interval of that cloth in order to call it plaid, if I had a tiny enough piece of the cloth, it would cease to be plaid as there would only be room enough for one color. If I consider motion to be the same kind of thing as plaid or striped, then the paradox is solved; one may abandon the belief that if an object is in motion over

an interval, then it is in motion at every instant of that interval. In the same way, we may say that a plaid object is not plaid at every point.

However, the block theorist has an eye towards the scientific analysis of space and time, and our best scientific theories utilize concepts such as instantaneous velocity, which require that we define motion at an instant. In our ordinary calculus, the instantaneous velocity is calculated by taking the limit of the displacement in space and time over smaller and smaller temporal intervals. An object is in motion at an instant, then, if and only if it occupies a different position at instants immediately before and after that instant. Under this account as well, the primitive notion is motion over an interval rather than at a moment.

This account captures all aspects of motion needed for physics. The evolution of a system, be it a chamber of gas, a car on the highway, or the whole of the universe, is describable without appealing to a moving present. However, those who use this account to explain how motion can exist in a “static” block universe face the criticism that it seems to fail in capturing the *experience* of motion, and more generally, change. Under the block universe account, an instant captures a state and change is a series of states. In J.E.M. McTaggart's analysis of change (1908), he claims that for any state of affairs to change, it must change in such a way that it is still the same state of affairs. The change could not be a change in any of the internal properties of the state, for that would yield a new state rather than a change in the original state. McTaggart claims that the only change that could qualify for such a role would be a change in whether that state of affairs is *present*. The change that a moment undergoes when it becomes present, is genuine change as opposed to mere temporal variation. McTaggart seems to be pushing

for genuine change to occur *within* a moment, not *at* a moment as the static account defines it. The desire for change *within* a moment seems to be behind the general belief in some kind of moving present, which creates the change *within* the moment by changing the moment, itself, from future to present. A common reason A-theorists criticize the B-theory is, while the B-theory can capture change in a moment, since it is derivative of change over an interval, instantaneous change at a moment cannot be genuine change because it is not the primitive or fundamental change under their account.

It is not really clear why genuine change must be change at an instant and why instantaneous motion or change must be fundamental. However, one way that this demand can be taken is as follows: All of our experience is confined to the present. While we may have memories and anticipations of the past and future respectively, only the content of these thoughts is past or future, the experience of remembering or anticipating is confined to the present. The present within which our experience occurs is durationless insofar as all events in our experience occur presently and thus occur at one and the same time. Since our experience is confined to the present, and I do, in fact, experience motion, motion must occur *within* the present, that is, in a durationless instant. Further, since the experience of motion in the present is what is in need of explanation, motion in the present cannot be derivative of motion over an interval. For the presentist, since the experience of motion occurs in the present, we need motion within the present instant to be fundamental in our account. By these lights, in order to truly capture what it is to be moving and, in general, changing you must not only have the appropriate changes in time and position, as given by the static account of motion, but you must also have the description of the different instants in time *coming to pass*. For the A-theorist, it is the

successive moments *coming to pass* that truly accounts for dynamic change over time. Without this additional description of time, the static account fails to completely describe change. In section six, below I address an alternative way of understanding the experience of dynamic motion, which allows there to be an experience of motion *within* an instant, without the motion itself occurring *in* an instant.

As laid out in the introduction, moments undergoing change in an A-theoretic manner results in contradiction, and even our experience of change does not seem to be an experience of moments changing so much as it is of objects changing; moments make up time and time is an arena for change, not something that itself changes. The experience of change being so different from the experience of variation over space has been taken to be irrefutable evidence of temporal flow. To overturn such views, it seems that we need to have a better understanding of our experience *within* the block universe in order to see how our experience is perfectly compatible with the block universe and the static account of motion. In other words, we need to try on the block universe and see if it fits, we cannot just look at it from the outside. My hope is not to completely dissolve these ideas of change and events *coming to pass*, but rather to provide an explanation of them without appeal to an intrinsic dynamic characteristic of time.

### **§3 Our Experience of Temporal Flow**

In this section, I will look deeper into our experience of time and change by considering the possibility of an experience of moments changing, that is, an experience of temporal flow characterized as a moving present. If the world consists of a block universe containing the entire spread of events, including our experiences, but the

experience, itself, is dynamic, we may have reason to think that the experiences included in the block universe do not adequately describe *our* experiences. If you think that our dynamic experience is indicative of temporal flow, it would be tempting to step outside of the block universe, look at it from a god's eye perspective and ask why it is not moving from *that* point of view. However, this kind of thinking seems analogous to reading the rules of a game and asking where the fun is<sup>9</sup>. It is only once one is playing the game that it becomes fun. So, too, we may say that the experience in time is only dynamic from *within* the block universe.

Change in the world can be completely accounted for by our best physical theory, which is hostile towards the addition of temporal flow or a moving present. Any attempts to argue that we have an experience of temporal flow, then, would be committed to an experience of something that does not, and could not, exist by the lights of our best physical theory. Since things that do not exist cannot be veridically experienced, we should conclude that this type of temporal flow could not be the object of our experience. Simon Prosser (2007) has a nice argument in which he defends the view that temporal flow could not, in principle, be experienced, and further argues that the sense in which temporal flow is experienced is illusory. While I agree with his stance against temporal flow, I do not agree with his final conclusion that our experience is illusory. Prosser, like many, seems to hold a marrow view of what is considered a non-illusory experience. Below, I examine his argument and lay out two ways to resist his conclusion, one in favor of flow as an intrinsic property of time, which I ultimately deny, and the other in favor of

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<sup>9</sup> Gilbert Ryle uses a similar analogy in discussing categorical mistakes in *Concepts of Mind* (1949).

flow as the character of our experience in time, which I will develop in the following sections. Prosser begins with the following premise:

1. “It is a feature of conscious experience that time seems to pass.” (Prosser 2007, 76)

It will do for my purposes now to state merely that this is what is being claimed by A-theorists, although I will ultimately take issue with this premise, as it identifies the wrong phenomenology. Next,

2. “The nature of conscious experience is the main motivation for believing in temporal passage.” (77)

This premise may be slightly more controversial for the A-theorist, but perhaps less so for the B-theorist. I hope that, given the above section regarding Zeno's Arrow paradox and our ability to account for motion and change of objects without appeal to a temporal flow, it is highly plausible for the A-theorist. Those who deny that the static account of motion truly captures genuine motion will do so, not because of a failure on the part of the account to properly explain some kind of motion, but because of some aspect bound up in the *experience* of motion.

3. “The conscious experiences of each individual subject nomologically supervene on the physical state of the world.” (78)

Prosser's third premise need only be a very mild claim regarding the connection between the physical and the mental and he claims premise (3) would be accepted by the physicalist as well as modern property dualists. All that is required for his argument is that “the conscious experience of each individual be entailed by their physical states in a

law-like manner...”(79) This is something that should be accepted by those who believe in a temporal flow since they are claiming that their experience of the flow is indicative of some real thing in the world. To deny premise three would leave them in the difficult position of explaining how, if there is no law-like connection between the world and our experience, one could claim that the experience of a temporal flow is, in fact, indicative of a real temporal flow. Additionally, he states, “This is not to *presuppose* that time, as it appears in physical theory, does not pass. Neither is it to assume that the B-series is fundamental. The assumption is merely that the laws of physics can be captured in B-series terms (without assuming that these are fundamental), and that the nature of experience, and the nature of the experiential reports that we make, is thus fixed by the facts that can be stated in B-series terms” (79). From the above premises, he concludes:

4. The (putative) passage of time would be epiphenomenal with respect to the physical state of the world. (79)

Regarding this inference, Prosser states, “by 'epiphenomenal' I mean that the passage of time neither causes nor in any sense influences or determines physical events. Insofar as physical events can be accounted for, the account is in terms of what supervenes on the physical, and no appeal to the passage of time plays a role in any such account” (79)

Given that our experiences supervene on the physical, we can say that at any moment a person has a certain brain state and this brain state is subvenient on their experience at that moment. At different moments the person will have different brain states and the different experiences will supervene on these different brain states. However, as discussed earlier, the static account of motion can fully capture change in the world without any appeal to temporal flow, so the evolution of our brain states, and thus the

evolution of our experiences, is also fully captured by the static account of motion. Thus, no appeal to a temporal flow is required to account for experience. In other words, the evolution of the physical states is captured by the static account. Since experience supervenes on the physical states, then the evolution of conscious experience is also captured by the static account of motion. Any additional temporal passage would make no difference with respect to our experience. Prosser then concludes that:

5. “We cannot experience the passage of time.” (79)

If the temporal flow is truly epiphenomenal, something that in no way shapes the physical world that subvenes experience, then it is not something that can *be* experienced. Since the whole of the world's events is captured by the physical description put entirely in terms of B-series type facts, and a temporal flow is absent from the physical account of change, there is nothing in the physical account that could properly be called the experience *of* temporal passage.

6. “Our grasp of what is meant by 'the passage of time' derives from the nature of experience.” (79)

Inference (6) is one of the most interesting steps in Prosser's argument. For something to derive from the nature of experience is for it to only truly be grasped through the experience of it. One common phenomenon associated with the nature of experience is color. For Prosser, a person who has all the physical information about, say, red – all of those B-series facts that can completely describe the physical world – but has never actually had an experience of red, would be a person who lacks information about red based on the nature of experience. What the person does not lack is another bit of



physical description. Along the same lines, what we mean by temporal passage is truly grasped only by having the experience. However, given (4), in the physical theory this experience could be said to be *of* nothing. Prosser concludes:

7. “There is no real passage of time. What we refer to by 'the passage of time' is an illusory feature of conscious experience.” (81)

Prosser concludes that the experience cannot be veridical because the experienced structure could not possibly be identical to the structural of external time. However, there are many properties that we think truly exist in the world, even though they could not exist in the world as they are experienced. For one, Prosser and others (Byrne and Hilbert, 2003) hold that colors are real properties of objects and there is something that we can say the experience is *of* when we say we have an experience of red. We believe that red is something real and not illusory because of this identification. Prosser points out that if we never found any mind-independent physical property such as a reflectance property that we identified with the content of our experience of red, we would call the experience of red illusory. Although, for him, “we might carry on using the word 'red' to talk about our conscious states” (Prosser 2007, 80). For Prosser, since temporal flow has no place in the physical description of the world, there is nothing that we can identify as being the object of experience. Thus the experience of temporal flow is illusory. Further, Prosser says that “if the experiences that we *call* experiences of temporal passage are not experiences of a mind-independent feature of reality, then no one can coherently argue that time does indeed pass even though we do not experience it. Whatever mind-independent features of reality there might be, none of them deserve to be called the passage of time.” (80)

Prosser, while providing new insights on the tensions between a kind of temporal flow and the block universe, falls into two trappings. First, he does not successfully argue against the possibility of experiencing a moving present without already assuming the block universe. Prosser takes for granted that the physical account of the world is complete. Because temporal flow is absent in the physical theory and thus does not subvene, there can be no experience of temporal flow. However, I feel that those who hold that time does, in fact, flow would largely dispute this. Most proponents of a temporal flow view of time make the complaint that the physical description is incomplete precisely because it does not include a physical correlate to the experience of temporal flow, namely the event of time itself flowing. However, my own disagreement with Prosser regarding (4) does not mean that I hold that the physical description is incomplete. I do not think that time, as an external feature of reality, described by the physical theory could in any way flow; it is conceptually problematic. Temporal passage as laid out and discussed above is an incoherent and contradictory notion, which cannot be instantiated in the world (see section on McTaggart's paradox). Insofar as the addition of temporal passage to the block universe brings about contradiction, I assume the block universe alone and attempt to spell out an account of the phenomenology from within this frame. Perhaps this is all that Prosser has in mind in his argument, but I do not think that one can argue for the completeness of the B-series without assuming the B-series to be true.

A second, and somewhat related mistake Prosser makes is that in arguing against the possibility of experiencing temporal passage, he can only conclude that a moving present type of temporal passage does not exist and thus our experience of temporal

passage conceived of in this way is illusory. He is not warranted in the stronger claim that any kind of temporal passage does not exist. Recall that Prosser claims that whatever the source of the experience of temporal passage may be, the experience would be illusory; the content of our experience of passage could not be identified with an external feature of reality. It is questionable whether there is a single experience whose content is temporal flow, rather there seems to be a bundle of experiences of different kinds of temporal variation<sup>10</sup>, all of which contribute to the belief that time flows or passes. While it is true that we could not experience time flowing since there is no feature of reality that it could be an experience of, the experiences we do have may all contribute to the *belief* in a kind of moving present and it is perfectly possible for these experiences to be non-illusory. I believe he is mistaken in thinking that, unlike in the case of color, these experiences of temporal flow cannot be identified with something in the physical world that we could properly call temporal flow or at least in some sense call temporal flow. In searching for something to identify with our experience of temporal flow, we may find something that could honestly be called temporal passage. It may be that something fairly mundane, like temporal variation, instills in us a dynamic feeling that we take to be an experience of flow or passage and we should, as in the case of color, treat that dynamic character as non-illusory. After all, it is not obvious that redness exists in the world if by redness we mean a certain reflective property, and yet Prosser, as well as most of us, would not call red an illusory aspect of experience. To be clear, again, I am not suggesting that time inherently flows, however I am suggesting, and will explain further

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<sup>10</sup> One kind of temporal variation is motion; another is having different memories at different times.

below, that our experience has a certain character to it, and if we strip away all the metaphor and metaphysics that get tied to the phenomenology, we may find this character fits right into the B-theoretic world and need not be considered illusory.

Elsewhere, Prosser acknowledges that the source for the experience of temporal flow is more than a literal experience of temporal flow or a moving now. Rather it is the dynamic way in which we experience temporal variation. He argues, however, that even this way in which we experience temporal variation is illusory. The illusion, therefore, is not merely that time passes or flows, but that things change in a dynamic<sup>11</sup> way. Prosser's argument comes in three parts. In the first part, he argues that the content of the experience of temporal passage is a necessary falsehood (and thus the experience is illusory). In the second part of his paper, he suggests that the contradictory content in that element of experience associated with temporal passage is that of an object changing, that is, an enduring object holding mutually exclusive properties. In the final part, he provides a possible explanation for why this content is represented in experience. I suggest that while Prosser argues that the experience of change is incorrect and thus illusory, he is taking for granted that the “correct”, veridical and therefore non-illusory way of experiencing temporal variation would be analogous to our experience of spatial variation, and this he has no reason to suppose.

For my purposes here, I will discuss the first part of his argument only briefly. He presents an extensive argument showing that a contingency cannot be the content of the experience of temporal passage and since the experience is non-veridical, the content of

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<sup>11</sup> Prosser assumes throughout that temporal flow and dynamism are synonymous, therefore presupposing that the dynamic experience is illusory insofar as he assumes the A-theory to be false.

the experience must be a necessary falsehood. I will not go into his argument for the non-contingency of the content of passage experience; it will do for purposes here to momentarily assume that the content of our experience of the passage of time is not a contingency, as is hinted at in (6) of the above argument – that the passage of time is part of the nature of experience and not simply a contingent perception. I will be more concerned with his claims regarding the falsity of that content. Prosser, himself, admits at the end of the first part of his argument that “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.” (Prosser 2012, 15).

Prosser points out that the experience of time passing would be an experience of a necessary falsehood, however one of a sort that we cannot experience. An experience of time passing would be an experience with a contradiction as the representational content, equivalent to the represented content of a round square. He admits that there are some kinds of necessary falsehoods that can be represented in experience, such as that found in the waterfall illusion<sup>12</sup>, whereby there is an experience of motion without change in position. He claims that these kinds of contradictions come about in a *combinatorial* way when two processes in the brain represent conflicting content, each of which could be veridical on its own. He claims that in combinatorial cases, there is no single representation that is by itself contradictory. However, with regards to the experience of time passing, he says:

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<sup>12</sup> In the waterfall illusion, after a period of watching a moving objects such as a waterfall, one continues to experience motion. Although the image that follows is not moving, it appears to move due to the motion after-effect.

“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 if it could be combinatorial either. 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.” (Prosser 2012, 99)

I do not completely agree with the claims he makes regarding the phenomenology of the waterfall illusion and temporal passage. It is true that when I experience the waterfall illusion, processes in my brain output conclusions representing motion as well as maintained position. However, the experience seems to be overwhelmingly one of motion. It is not until after 15 seconds or so that I actually experience the image as stationary. It seems that, just as in the Fraser-Wilcox illusion (fig 6), you are experiencing motion, plain and simple. While you may fluctuate between an experience of motion and an experience of steady position, only one “wins out” at a time or in an area of the visual field. In motion after-effect, motion wins out for the first 15 seconds or so, until stationary position is represented. In the case of the Fraser-Wilcox illusion, motion wins out in some areas of the visual field, while static does in others. There need not be *no* representation of stationary position while experiencing a period of motion, but the multiple brain processes are constantly outputting different “conclusions” or representations in negotiating with the world. The one that seems predominant, although not necessarily settled upon, might be a kind of focus of experience; however, by this, I do not mean to imply that there is some *I* that directs its attention to one – or a few – representations. The illusion, then, comes about because motion is experienced where there is, in fact, no motion. But regardless, perhaps it is in principle possible to have a

combinatorial experience in the way that Prosser suggests<sup>13</sup>. Let us suppose for now that the experience of time passing is the experience of a necessary falsehood. For Prosser, the necessary falsehood cannot be combinatorial because that would betray the phenomenology; therefore the only kind of representation that could qualify as the content of an experience of time passing would be an impossible one. Thus, our experience cannot be one of time passing.

Since temporal passage conceived of as a moving present is contradictory in the block universe, it may be useful to look at the less analyzed conceptions of temporal passage. In section two, I discussed the idea of *genuine* change versus change as mere temporal variation. Recall that the evolution of a system, the motion of an object, etc. can be described by the block universe in terms of the variation of states at different times. The A-theorist will continue to argue that this does not capture *genuine* change and the way that I laid out *genuine* change above was in terms of a single moment undergoing the change from future into present and finally into past, this kind of change has also been referred to as a kind of *becoming*. Temporal passage as *becoming* or genuine change may point to a more familiar phenomenology than one cashed out in terms of a kind of a moving present; for while we may be able to analyze what we mean by temporal passage in terms of a moving present, it may be the case that we are better able to find the source of our experience, or at the very least figure out what the experience actually *is*, by looking at the idea of *becoming* or genuine change.

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<sup>13</sup> I'm not entirely convinced of this. It may be that in order to hold both representation in "focus" would be to hold an inconsistency, which, while maybe not impossible, at least something that would be avoided by the brain's computational system.

Recall that McTaggart cashes out genuine change in terms of a change in presentness. Since temporal variation is fully captured by the block universe, what must be needed over and above the variation must be a change in each individual state at a moment in B-series time. For McTaggart, the only change that qualifies for such a role is a change in the A-series properties. A change in B-series properties would only result in a different state at a different time. Under McTaggart's analysis, the phenomenology of genuine change is of a change *within* a moment. I take it that this kind of change, that change that occurs *within* a moment, is what Prosser has in mind when he appeals to the phenomenology of time passage as non-combinatorial and thus impossibly the representational content of passage experience.

If we want to fit the phenomenology of genuine change into the block universe, we will have to do so without the addition of any A-properties, for the addition of the A-series will lead to a contradiction unrepresentable in experience. Within the block universe, the most likely candidate for the source of our experience of genuine change is temporal variation. But can this kind of change alone give us the appropriate phenomenology? In the second part of his argument, Prosser suggests that our experience of objects changing is precisely what instills in us the experience of temporal passage, further the way in which we experience objects changing is, itself, illusory with a necessary falsehood as its represented content. He claims that the very experience of dynamic change requires a single constant entity undergoing a change and the single entity is represented in experience as being wholly present at a moment and having strict identity over time. Thus he claims that, in experience, objects persisting through time are represented as enduring objects. Endurance theories are most often associated with A-



theories as they consider an object to be a three-dimensional thing, wholly present at any given moment, with changing properties. Under the block universe account, however, the most commonly associated persistence theories are perdurance theories whereby objects are temporally extended and thus the object is identified with all temporal parts, just as I may consider a three dimensional object to be identified as a single object with different spatial parts. Under these accounts, my arm and leg are parts of me, but so are my baby-stage and my old-woman-stage. At any time, then, only part of me is present. While there is a strong correlation between endurance theories and A-theories, and perdurance theories and B-theories, I do not intend to argue for the necessity of this.

Prosser argues that the experience of passage has its roots in the represented content of our experience of change. He claims that while a perdurance theory fits with the B-theory, insofar as a four-dimensional object has different temporal parts with different properties, we do not represent objects as perduring. Rather, he argues that the phenomenology is such that we experience an object as wholly present at a time and thus objects are represented as enduring. The phenomenology of change, he argues, requires the strict identity of an object at different times, which undergoes change, and thus holds mutually exclusive properties. The object, *a*, is represented in experience as having a property, *F*, and then property  $\sim F$ . Thus, the experience of change has the represented content, '*a* is *F* and  $\sim F$ ', a contradiction. Prosser explains that this necessary falsehood is representable in experience because, as in the waterfall illusion's combinatorial contradiction, "this contradictory representation comes about because representations of

successive states of an object are somehow combined” (Prosser 2007, 106)<sup>14</sup>. The representation is importantly different from the waterfall illusion insofar as it does not represent these states simultaneously, but rather successively<sup>15</sup>. It seems, then that Prosser's point is that the experience of temporal passage is illusory because the experience of change is illusory, and that is so because the represented content is a contradiction that cannot possibly exist in the world. At this point it will be good to note that the illusory nature of the waterfall illusion is not due to it being a contradiction, combinatorial or not. The waterfall illusion is an illusion because we have an experience of motion where there is no motion. The same is the case in the Fraser-Wilcox illusion (figure 7).

In the final part of Prosser's argument he provides reasons for why objects are represented as enduring in experience. He suggests that objects are represented in this way due to a computational economy on the part of the human visual system. He says:

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

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<sup>14</sup> Here, Prosser suggests that the range of theories that “somehow combine” the successive representations all require “a combination of representations of successive states of the changing object”. In the following chapter, I will present an understanding of representation and consciousness that does not require the kind of linear model of succession that he supposes

<sup>15</sup> Again, insofar as the representations are combined, I am not sure that the combination is one in succession. I have an itching suspicion that in order for there to be an actual combination and a necessary falsehood to occur, it must come together simultaneously. However, this may be Prosser's point, that the very idea of something being wholly present at a moment and yet capable of undergoing change (being different later) is contradictory. Perhaps the contradiction in experience is something more like an object represented as both enduring and perduring. But maybe experience represents objects as neither.

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. (Prosser 2007, 112)

This switch in the phenomenology, the switch from an experience of a series of distinct things to an experience of a single object undergoing change, happens because the “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. This saves computational power, especially downstream, and also has the advantage that an object briefly obscured from view continues to be the same object” (Prosser 2007, 112). So, for Prosser, it is 'easier' for the brain to represent a single object and that is why we experience objects as enduring rather than perduring. Although Prosser does not spell out why the brain tends to 'easier' tasks, I suppose he could provide evolutionary reasons for this tendency as well. Species that identify the series of stages of a predator approaching as a single entity capable of harm earlier rather than later would be more likely to survive. Prosser claims that a failure on the part of the computational system to make such a switch in representation would cause one to no longer experience objects as enduring and further no longer to experience dynamic change and the flow of time.

Suppose, further, that there were a being who did not experience the beta phenomenon<sup>16</sup> 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 experiences would be like if objects were represented in experience as perduring. (Prosser 2007, 112)

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<sup>16</sup> The beta phenomenon is when the series of still images is perceived as moving.

I take it that the main points of the second and third parts of Prosser's argument are these: the experience of temporal variation, if veridical, would be an experience of objects perduring. This is because the experience of an object as enduring has a necessary falsehood as the represented content and so could not possibly be a veridical experience. The experience of an object perduring would be an experience lacking dynamic character; the only way dynamic change can be experienced is if an enduring object is represented as undergoing change. He mentions throughout his argument that it is possible that the only necessary object required to be represented as enduring is the self, however, he does not make any significant claim on the matter. For Prosser, endurance and dynamic change go hand in hand. Further, since the experience of endurance has a contradiction as its represented content, the experience of dynamic change has a contradiction as its represented content. The illusory experience of dynamic change is the source of the illusion of temporal passage.

I find that Prosser, while well on the way to providing a better understanding of our experience in time still makes many (what I think are faulty) assumptions regarding our experience. I will discuss three problems that I see with Prosser's argument: (1) The phenomenology of dynamic change and the representation of an object as enduring seem to go hand in hand for Prosser and I think that the experience of dynamic change can be had without representing the changing object as enduring (2) It is not clear that our experience even represents objects as enduring or perduring. These are metaphysical theories and I do not think that one presents itself in experience any more than the other. (3) Finally, he holds that the experience of objects dynamically changing is considered illusory. Perhaps if he were no longer tied to the idea that endurance is represented in an

experience of dynamic change he would reconsider this view, but given what he says in his article, he seems to be assuming that the experience of dynamic change is illusory and his goal is to find the source of that illusion. I do not think that dynamic change is illusory. It is true that time cannot pass in any literal way, but I do not think that dynamic change is equivalent to time's passage<sup>17</sup>.

First, Prosser takes for granted that the phenomenology of dynamic change and the representation of endurance are dependent on one another. Since he attributes the switch from an experience of a series of still images to an experience of motion to a switch in representation from perdurance to endurance, I take it he assumes that the representation of an enduring object brings about the experience of dynamic change. Further, based on his argument, he holds that the experience of dynamic change requires the representation of an enduring object.

Prosser argues that temporal passage is illusory because it is based on or the experience of things changing dynamically and this experience of dynamic change has as its represented content,  $a$  is  $F$  and  $\sim F$ . However, over longer periods of time, we also identify the same object with different incompatible properties in a way that does not instill in us the experience of dynamic change, only *that* things have changed and perhaps also *that* time has passed. I may feel as though time has passed, but I do not think that is the same phenomenology that Prosser has in mind. Even in Prosser's own example, he cites our ability to recognize that an object obscured from sight momentarily is still the same object when it reappears. This does not only occur in cases where the object is

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<sup>17</sup> Or in whatever sense they could be equated, the passage of time would no longer be a problematic concept.

obstructed from sight for only brief periods of time, but also for longer periods where we would not have the same type of phenomenology he cites above in the beta motion case. It seems that it is at least in principle possible for the object to be represented in experience as enduring and yet no dynamic change of the sort Prosser has in mind is experienced. Further, in the example Prosser discusses where there is a being that never has that switch in phenomenology from a series of still images to motion, he claims that in that being's experience, the object would be represented as perduring. I am still tempted to say that in this case there is an experience of dynamic change. If we consider the case of people who have had damage to the MT region of their brain and can no longer experience motion (akinetopsia) then I would think that these people are still able to experience some kind of dynamic change, although perhaps not motion. I discuss this point further in chapter five, but even in cases where someone experiences a series of stills, there is still the experience of one still being replaced by another, which can be a dynamic experience, even if the stills are not dynamic. Now, perhaps this is because of the representation of an enduring self, or an enduring spatial location, but it is not clear that this is the only possibility, and besides, it is not clear how one would experience the object as dynamically changing when it is the self or the spatial location that is represented as enduring. I will address this point further below.

Prosser uses the experience of motion as the quintessential experience of dynamic change with the represented content of an enduring object. According to him, the contradictory content of this experience is only possible because the conflicting properties are not held by the object simultaneously, it is, in some sense, combinatorial. However, in the case of motion, which I discuss in further detail in the following section,

detection can occur after a single process outputs the conclusion of, and represents, motion. So the experience of motion can have as the content, a single representation. If the object were, in fact, represented as enduring in this single representation of motion, then it would be a representation of a single enduring object with a temporally extended property (motion). But since this is not a combinatorial representation, endurance with strict logical identity over time cannot be the represented content in this experience of motion. Prosser discusses the way in which an investigation into issues surrounding the specious present may shed light on the matter. However, I argue below for what I think is a more promising path; that motion can be represented without a succession of representations of an object in different positions. Finally, motion detection can occur before the object identification even takes place, in which case it is possible for the dynamic character of motion to occur without the representation of an enduring object undergoing change.

Second, Prosser assumes that in experience, our representation of a persisting object is one of either endurance or perdurance. He assumes that the phenomenology of change is such that we experience things as enduring when we perceive them dynamically changing and perduring when they are not. However, this is not clear in experience. Prosser offers no argument for this being the case and it is not clear to me that it is, in fact, true of experience. It does not seem that when experiencing an object changing that strict logical identity is represented. That which is the same from one moment to the next could be the same kind of unity that holds different spatial parts together in a single object, or the kind of sameness that perdurantists think hold between temporal parts. With regards to this type of objection, Prosser says:

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  $\sim F$ . 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. (Prosser 2007, 106)

While Prosser does not think that the experience is one of perdurance, he does not really have much of an argument that the experience *is* of endurance. It is not clear to me that the experience needs to be of one or the other. Like the A- and B-theories, endurance and perdurance are metaphysical theories, and Prosser, himself, even says when speaking of the A-theory and the B-theory debate, “perhaps despite the pull of the phenomenology, one should be suspicious of the claim that experience favours the A-theory over the B-theory; for we do not usually expect metaphysical differences to be discriminable through perception.” (Prosser 2013, 70) If he thinks that perception should rarely if ever make a distinction between metaphysical theories, it is hard to see why he pushes so hard for endurance being the represented content in our experience of change. It seems perfectly reasonable to think that our experience of an object undergoing change is merely that of persistence, a metaphysically neutral term.

Finally, Prosser assumes that our experience of change is illusory. Before he even discusses the matter of the represented content of our experience of dynamic change, he assumes this experience to be illusory. Perhaps this is because he also assumes that the experience of temporal passage and the experience of dynamism are one and the same thing. It is true that in thinking that time, itself, takes on a dynamic character, one takes on the view that time passing, but it is not clear that in thinking that *things* change dynamically, one takes on that same view. Nonetheless, Prosser holds that our experience



of dynamic change is illusory. In order to experience dynamic change, the object undergoing the change must be represented as enduring, however, in the assumed B-theory reality objects perdure, thus the experience of dynamic change is an illusion. Prosser argues against the possibility of enduring objects by showing that the represented content of an enduring object is contradictory. However, he has already assumed a B-theoretic world, which is, in general, hostile towards endurance theories precisely because of such contradictions. So, since as Prosser argues, an experience of an enduring object undergoing change cannot be veridical, we now have the source of our illusory experience of dynamic change.

So, I now ask, what would a veridical, non-illusory experience of change be? Well it would be one of perdurance, according to Prosser, and for him, the difference in phenomenology of perdurance is that it involves an awareness of temporal parts. Recall from the quotation above where Prosser asks us to imagine a being that experiences a quick sequence of images as a “continuum of still images.” He says, “there would be representations of time-slices of objects at different positions, 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.” (Prosser 2007, 112) So, if we were to experience temporal change veridically we would do so in this manner. But, here, Prosser's analogy between the sequence of images and the dots only applies to apparent motion. Apparent motion is illusory because there is no persistence of a single object of any kind, not because of some contradictory content.

But let us suppose that we did experience objects as perduring in the way that Prosser describes. Is this way of experiencing temporal variation any less illusory than dynamic change as Prosser conceives of it? After all, each stage of the variation, each still image, would have a moment at which it comes into experience and successive moment at which it is replaced with the next stage or image. I do not know if Prosser would consider this kind of experience to be illusory, in fact, it seems he does not. But I think that this type of experience could instill the belief in temporal passage as much as the experience Prosser describes as being one of endurance could. Perhaps this type of sequence of states coming to be experienced one after the other relies on the representation of an enduring self, but I do not think that this is the only plausible analysis. It seems to me that it is the sequential nature of our experience of temporal variation that makes it seem so different than our experience of spatial variation, a more plausible candidate for the source of our belief that time passes. I am not suggesting that the sequential nature of our experience of temporal variation is *all* there is to dynamic change, so no contradictory content of endurance is required.

#### **§4 The Experience of Temporal “Flow” as Experience of Temporal Variation**

Proponents of an inherent flow of time seem to take for granted is that our experience of time is very different from our experience of things like color. Treisman (1999) expresses this point as follows:

“A distinction between two types of experience or knowledge (sensory and “the innumerable principles and laws of number and dimension” – my note ) has continued to exercise philosophers (for example Ayer 1956, Quinton 1973) but the light that this distinction has cast has fallen differently for different thinkers...The interest in this distinction is closely related to that in another

perennial problem, the relation between phenomenological sensation and the physical world. We accept, for example, that the colors we experience ourselves as seeing (the red of a rose) relate, but not in any simple way, to the world that physics describes (the spectrum of reflected sunlight) But it is easy to imagine that the dimensions of space and time that frame perceptual experience and may be conveyed by different modalities of sensation evade this difficulty, and that they feature in essentially the same way as structural aspects of perception and of the physical world. We may make mistakes in perceiving spatial and temporal relations; illusions occur; but it is felt that in the main these dimensions as given in perception directly reproduce the same dimensions as occur in physical reality. Naïve realism, defeated on the field of colour, remains upright on the plane of time and space” (Treisman 1999, 218)

In this section, I will examine the analyses of our experience of properties such as color in order to see how they may be related to the world in a complex or mediated way and yet still not be considered illusory.

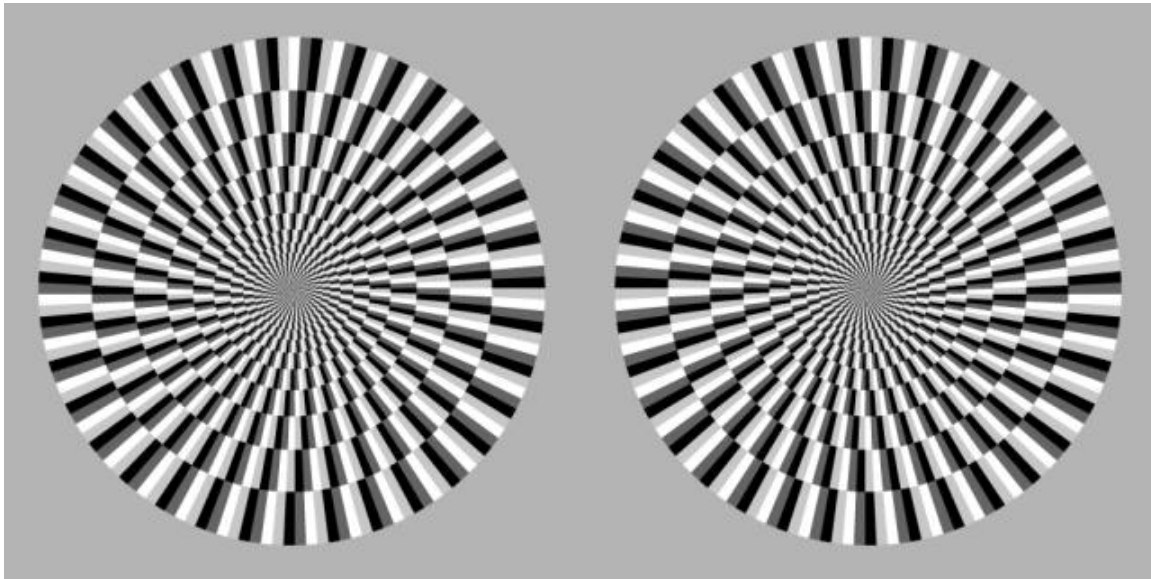
Time has a certain metric and our experience of temporal intervals, although not always veridical, is an experience of the metric. Likewise, time is ordered and although we may have non-veridical experiences of temporal order our experience is still *of* temporal order. However, time does not flow, so what is the flowlike character of experience an experience *of*? There are at least three aspects of our experience that contribute to the belief that time flows, although no one in particular can be said to be *the* experience of temporal flow. These aspects are the experience of motion, the serial nature of our experience and, related, the asymmetry of memory. Below, I look at the experience of motion. In chapter four, I turn to an examination of representations and consciousness. Finally, in chapter five, I address the serial nature of experience and the asymmetry of memory before turning to the question of whether these three pieces together really give us the kind of experience commonly associated with temporal flow.

## **§5 Motion Detection**

The experience of motion contributes to the belief that time flows by being a dynamic experience of things undergoing change, rather than a mere experience that things have changed. Things that are moving are experienced as “flowing” from one position to another dynamically, rather than simply being in those different positions at different times. If we take the case of vision, what we find is that when we detect the motion of an object the following goes on: There are pairs of photoreceptors on the retina set up to detect motion. Any individual receptor cannot detect motion, they only detect light/dark edges, but as a pair they can detect motion. Two receptors, A and B, are set up to detect, say, rightward motion. They do so by sending their signals to a third comparator neuron, C. The signal sent from B to C is direct while the signal sent from A to C contains a time delay. This group of receptors works such that when the signal from the object (the light/dark edge) first hits A and then hits B while moving rightward, the two signals are received by C simultaneously and motion is detected (although there is also some higher order motion detecting going on as well). It is in this way that if a car were to move continuously rightward, the light/dark boundary of the dot would hit photoreceptor A and then hit photoreceptor B and motion would be detected by the comparator neuron, C. Even though the car is moving continuously and smoothly, the brain only gets information in discrete packages, those from the A and B photoreceptors. However, this is all the brain needs in order to cause an experience of dynamic, smooth, continuous motion. This capability of the brain can be “tricked” in illusory case, however, by inducing the experience of dynamic continuous motion where there is none. This is why the phi- and beta- phenomena occur. The experience of motion can occur

even in the absence of any change in position at all, for instance, the following Fraser-Wilcox Illusion mentioned earlier.

Figure 7



In this case, the slight movements of the head and eyes are enough to make it appear as if the discs, with their tightly alternating light/dark pattern, are moving. The case of visual motion processing is one type of process that outputs a certain kind of conclusion. This conclusion serves as input to other processes and is either that motion has occurred or that motion has not occurred. The experience of visual motion is not an experience of some multi-modal presentation in the brain of an object moving, but rather the experience is that of being in a certain brain state representing motion. In the case of motion detection, the experience of “flow” is an experience of a certain type of temporal

variation, one that involves an object (or objects) being in different positions (i.e. motion), and one that can be captured by the static account of motion presented above. Since the dynamic experience of motion does not imply motion in the world (as in the Fraser-Wilcox illusion), and motion in the world does not always induce a dynamic experience of motion (as in cases of akinetopsia), we should not consider the dynamic experience of motion to be indicative of an inherent character of time, but rather a character of our experience. In looking at studies in motion processing, we see that even in cases where there is motion in the world (such as a car driving by) and an experience of dynamic motion, the brain produced this experience utilizing discrete information. As we see that the experienced redness of an object can be a veridical experience of reflectance properties, we may also say that the experienced dynamism of a motion object is a veridical experience of the object being in different places at different times. The brain experiences real, dynamic motion and there is real, dynamic motion in the world. It is a veridical experience, but one that relies on a complex process. Thus, the dynamic motion in the world is captured in the block universe. Since the brain can represent dynamic motion in a singular, momentary representation, the B-theorist can explain how one can have an experience of dynamic change *within* a moment without this being a change in the A-series properties of time, that is, without the addition of temporal flow.

Further evidence that motion detection contributes to the belief that time flows may come from cases where the motion detection is absent, for instance, in people with akinetopsia, a kind of motion blindness typically caused by damage to the MT region of the brain. One such woman could not see, for instance, the coffee flow as she poured it into a cup, rather the liquid appeared to be frozen in space. The cup would appear partially

full and then in the next moment the cup would be overfilled. Moving cars would seem far away at one moment and in the next, very close. The lack of “flow” in these kinds of experiences may make one less inclined to believe in a temporal flow since experience seems more like a series of “static” states. I do not claim that this is the only experience that contributes to the belief in temporal flow, but this does show that motion detection contributes to the “flowlike” character of experience and that our experience of motion could be rather different without any difference in the character of motion in the world. I discuss the case of akinetoposia in further detail in chapter five.

## CHAPTER 4: Consciousness and the Nature of Experience

### §1 Considering Consciousness

In chapter three, I introduced the major problems associated with the traditional view of temporal flow. I also offered a sketch of an alternative understanding of that quality of our experiences that leads one to the intuitive view that time, itself, flows or passes as a kind of moving present. Such an alternative calls for an understanding of our experience of dynamic change as just the way in which we experience temporal variation, or loosely speaking, the “what it's like”<sup>18</sup> to experience temporal variation. Below, I sketch out how we might understand the nature of this experience and why our experiences may lead us to fallacious beliefs about time.

In order to flesh out the relationship between time and the individual, many issues must be addressed along the way. I will only attempt to take on a few here. In chapter three, I described the relationship between time and the individual as direct, but complex. In what follows, I will flesh out this description by laying out an understanding of direct vs. indirect, immediate vs. mediated, and simple vs. complex. In order to develop these descriptions, I will begin by looking at the nature of representations. The discussion of representations will act as a wedge opening a discussion of the individual's side of the relationship being described. I intend to remain neutral as to what particular representational theory is correct, and further whether *any* representational theory properly captures what is going on in the mind when we have an experience *of*

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<sup>18</sup> This phrase is most notably used by Thomas Nagel in “What Is It Like to be a Bat?” *The Philosophical Review* LXXXIII, 4 (October 1974): 435-50. However, I remain neutral with regards to his conclusions and also with regards to the existence of qualia.



something. I only argue that there are feasible, if not compelling, alternatives to models of consciousness that require the experienced timing of events to mirror the timing of conscious experiences.

## **§2 Mental Representations and the Nature of Experience**

Representations, in general, can do their representing without themselves having all (or any) of the properties of the thing that is being represented. For instance, I can represent a person's face with a three dimensional bust, but I can likewise write the word "face", or "so-and-so's face." In the case of the bust, many of the properties of the represented object are also held by the vehicle of representation, the contours of the face, the size of the face, etc. However, there are no relevant shared properties between the word "face" and an actual face. Likewise, we can represent temporal progressions and other temporal properties without our representations having those very same temporal properties. For instance, I may write a letter to my grandmother on July 1<sup>st</sup>, 2009 and date it appropriately. The letter will arrive a few days later, perhaps July 6<sup>th</sup>, 2009 and my grandmother will take the letter to represent my thoughts on July 1<sup>st</sup>, not July 6<sup>th</sup>. On July 6<sup>th</sup>, my letter will represent my past thoughts and activities (the writing of the letter), not by itself being past, but by being indexed to an earlier date. Further, suppose I call my grandmother on July 4<sup>th</sup> to wish her a happy Independence Day. Upon receiving my letter two days later, she will order the events, not in the order in which they appeared to her, but in the order that they are represented as having. So, although my call preceded her receipt of my letter, she will order the information contained in the letter before the call since the date on the letter is July 1<sup>st</sup> and the date of the call was July 4<sup>th</sup>. Temporal

intervals also may be represented without the representation exhibiting the property, for instance, it does not take me 60 seconds to say “60 seconds.” Temporal flow can be represented with a static image, for example, the quotation from chapter three: “the jerky or whooshy quality of transience” does not, itself, flow or move, but it does represent flow.

Mental representations, in general, are rather different from external representations. There are two ways in which the vehicle of representation differs from the object being represented and these differences are much more obvious when it comes to external representations. First, the object being represented has properties that are not captured by the vehicle of representation. Normally, our external representations fall noticeably short of containing complete information regarding the object being represented. For instance, as mentioned above, the word 'face' fails to contain any details of an actual face. Further, even more detailed representations, such as the bust representation of a person's face, will fail to capture details such as the skin tone or plasticity of the face being represented. Second, the vehicle of representation has its own properties independent, content-wise, of the object being represented. As such, we can be aware of the vehicle of representation as an object in its own right. For instance, the bust has certain properties as a bust such as rigidity, being made of marble, etc. In the case of mental representations, however, we do not have access to the properties of the object of experience independent of our representation, so we treat the representation as the object itself, which is the intentional content of the representation. Further, in experience we do not usually have access to the properties of the representation that do not contain representative information, that is, we are not aware of the properties of the vehicle of the

representation. When I have an experience of red, etc., an experimenter may be able to look at my brain and provide a physical description of what is going on, but as the person doing the experiencing, the total content of my experience is the represented object, not the vehicle of representation. So, there is nothing that tells me that it is a mere representation rather than the object of the experience itself.

There is a position, although fairly out of favor nowadays, that holds that vehicles of mental representation do their representing by themselves exhibiting those very properties. This is the sense data view of representation. The sense data theorist holds that the experience of red is an experience of something mental and something that is, itself, red. This view is generally motivated by the argument from illusion, whereby someone has an experience, for example that of a purple rabbit, where there is no purple rabbit in the world. Their conclusion is that the object being experienced, then, must be something mental. Since the experience is qualitatively indistinguishable from veridical experiences, the object of perception in all cases must be something mental, rather than something out in the world. Therefore, we are always aware of some mental intermediate object, the sense datum. In response to this argument, Gilbert Harman (1990) presents a useful analogy as reason to resist the argument from illusion. His analogy rests on a distinction between the content of the representation (the intentional content) and the vehicle of the representation presented above.

He says that if we take the case of Ponce de Leon's search for the Fountain of Youth, it is clear that the object of his search, while non-existent, is also not something mental. He points out that Ponce de Leon already has the mental representation of the Fountain of Youth what he is searching for is something very physical and external, it

just happens to be nonexistent. Likewise, we should not consider the experience of things that are not out in the world, such as the purple rabbit, to be an experience of something mental. According to Harman, the experience may come about in the absence of an actual purple rabbit, but the intentional content of the experience is something physical and external. When we have a veridical experience of a red rose, it is certainly true that there is something similar going as when we have a non-veridical experience of a purple rabbit. And it is also true that the latter case is crucially different from the former in that there is no purple rabbit out in the world, while there is a red rose out in the world. However, we should resist thinking that this means we are immediately aware of something mental which exhibits these properties in both cases, rather we should understand that this is indicative of us standing in a complex relation to the external world. When I look at a red rose, my brain forms a representation of red through various processes and this representation is not, itself, red. I am immediately aware of the representation, but a representation *of* the external world. My brain need not produce something mental that is red to be the object of perception; my brain need only produce the representation that conveys the information that there is something red out in the world, before me. In the case of the purple rabbit, my brain forms a representation of a purple rabbit out in the world – through various non-perceptual processes – although no such rabbit exists.

As mentioned above, we stand in a complex relation to the world when it comes to things like color, that is, the experienced quality of red is not on the object of perception, but rather comes about through a complex relation between us and the reflectance property of the object. The experience is a direct experience of the world insofar as we are aware of properties of physical objects, not intermediate mental objects.

My experience of the red rose before me comes about from the rose having a certain property, some reflectance property (along with some “normal” lighting conditions), and by some complicated processing, my brain's representation of red. The red rose can be described purely in terms of the physical description, the reflectance properties, the wavelength, the lighting conditions, etc., and the rose we identify as being red. However, when I experience red, it is not immediately obvious that I am experiencing those properties described by the physical account. Some have argued that the difference between the qualitative experience and the properties described by the physical theory is indicative that there is something the physical account fails to capture, namely its *redness*.

The above criticism of the physical account parallels the criticism that the block universe fails to completely capture the flowiness of time. How might the issue be resolved in the case of red such that we do not consider the physical description of red to be incomplete, nor do we think that the experience of red is illusory because of our complex relation to red things in the world? One possibility Harman (1990) proposes is that the physical description is complete and that what is necessary to properly represent the physical description to oneself is the relevant concept of red. If someone has never been in a position to experience red (because of blindness, say) they fail to have the full concept of red. Under Harman's functionalist account, “mental representations are constructed from concepts, where the content of a representation is determined by the concepts it contains and the way these concepts are put together to form that representation” (Harman 1990, 44) He goes on to say “[s]omeone has the appropriate concept of something's being red if and only if the person has available a concept that

functions in the appropriate way. The relevant functioning may involve connections with the use of other concepts, connections to perceptual input, and/or connections to behavioral output.” (Harman 1990, 44) So rather than there being something missing from the physical description of red because it fails to capture the “what it's like” feature of redness, there is something missing from the person who fails to have the relevant connections to perceptual input to fully represent the concept 'red'. So, red is non-illusory even though the phenomenological character of red comes about through a complex relation to the physical character of red. Our experience of red is an experience of something described by the physical account and not of something else in the world that in some way more closely resembles its phenomenological character, whereby the red of experience would relate to the *redness* in the world in a simple way.

However, when it comes to the mental representations of time, it is generally held that what you see is what you get. Arthur Prior (1998) states “I believe that what we see as a progress of events *is* a progress of events, a *coming to pass* of one thing after another, and not just a timeless tapestry with everything stuck there for good and all.”(Prior 1998, 104) I will put aside his comment about the timelessness of the tapestry, which, if he is talking about the block universe, is incorrect since time is a very important and real dimension in the block universe. But more importantly, he is espousing the view that we stand in a simple relation to time, that is, the representation of time resembles or is structurally similar to time, itself. He makes the jump from an experience of progress to a structurally similar progress in the world. Further, he claims that the underlying problem for the block theorist is of explaining “the *appearance* of time's passage: for appearing is itself something that occurs in time.” (104) Prosser's argument discussed

earlier also seems to take for granted that the experience of time would be a direct and simple relation. Above, I provided a sketch for what it is for an experience to be complex and direct, but what does it mean to say that our experience of time is *simple* and direct?

### **§3 Not So Simple**

Time, while part of the physical world, is not a sensible object in the same way that roses and rabbits are sensible objects. We cannot see, hear, smell, taste, or touch time. We can see things change, but we cannot, as it were, sense the arena in which these relations hold. It may be this very character that inclines one to believe that there is a direct and simple experience of time. To have a direct and simple experience of time just is to have one's experiences occur in time. That is, while there may be some complex processing or some intermediate presentation of the objects in space and time, the time in which these things exist is structurally the same as it appears to be; time is its own representation. Why is this way of understanding the experience of time wrong?

There are three properties of time that I will discuss in order to show that our relation to time cannot be a simple and direct one. These three are temporal metric, temporal order, and, finally, “temporal flow.” One common phenomenon is that of objectively similar intervals of time being experienced as very different in duration. For instance, the same trip to one's destination may seem to drag on, while one's return trip (although of approximately the same interval) may seem to fly by. The variations in apparent duration are also evident in experimental studies, which Treisman (1999) discusses. In one such study from 1963 by Kerr and Keil, a mechanic was introduced into a factory where he visibly worked on the clocks. Afterward, employees were told that the

clocks had been altered and were asked to estimate how fast or slow the clocks were. Surprisingly, employees with dull jobs judged less time to have passed than the clock indicated while employees with varied tasks judged more time to have passed than the clock indicated. In another study from 1965 by Siffre, a man stayed in an underground cave for two months in solitary boredom. Surprisingly, again, at the end of the 61 days, he thought that only 36 days had passed. While these results may seem counter to the common sentiment that “time flies when you're having fun,” the point to take here is that there is a discrepancy between the objective time and the experienced time.

In the case of temporal metric, we do not take apparent similarity or difference of temporal intervals to be indicative of objective similarity or difference of temporal intervals. We consider clocks to be more accurate judges of temporal metric and our physical laws confirm those more accurate clocks. In the case of temporal metric, we recognize a difference between apparent and objective metric.

Another phenomenon found in the 1961 experimental study by Hirsch and Sherrick discussed by Callender (2008), is that of order discrepancy. There are a few ways in which one can induce erroneous order judgments. When two aural stimuli are played in fast succession subjects can distinguish the two tones, but cannot reliably judge the order. In the case of temporal order, again, we can recognize a difference between apparent and objective order.

One may think that our failure to perceive the correct metric and order of events can be attributed to our complex relation to the objects in the events. It takes time for light and sound waves to reach our senses and for us to process the objects in the events we perceive, so perhaps the experienced metric and order deviate from the objective



order and metric of the events. We recognize that our experience of events cannot occur at the very same time the event occurs because it takes a certain amount of time to process such events. Nor should we think that the events are experienced as having the very same duration and order that they, in fact, have. However, even if one grants that the metric and order of events is not experienced reliably, the way in which the metric and order (veridical or not) is represented is by one's experiences occurring with a particular metric and order. That is, the time in which the experiences occur conveys the timing of the experienced events and this is the simple relation we are believed to have to time. While we may not be able to say that the experienced metric and order are those of the world, we may still maintain that time flows since our experiences flow. It seems that it is this flow of experience, the stream of consciousness, which is at the root of our belief that time flows. I would like to argue, though, that what we take to be the stream of consciousness could not be a stream at all. The idea that our experiences flow is rooted in a problematic view of consciousness, one that relies on information in the brain being funneled into a central location as a multi-modal presentation. The temporal properties of the presentation are thus the temporal properties experienced, that is, time is its own representation.

In *Consciousness Explained* as well as his article "Time and the Observer," coauthored with Marcel Kinsbourne, Daniel Dennett (1991, 1992) argues against a centralized model of consciousness, which he calls the Cartesian Theater model, and for his own Multiple Drafts model, which is a non-centralized model. While I will not argue for his model in particular, I will argue for the general type of model that he presents, one which does not require a single serial/linear node of consciousness located at a point in

both space and time and which is naively described as itself having the experienced properties. That is, I will argue that what we take to be the “stream of consciousness” cannot be a stream at all.

In the following section, I will present two specific phenomena Dennett takes up which prove to be difficult for the Cartesian Theater model to explain, at least in a way that is in the spirit of the intuitive pull of the Cartesian Theater model. I will then move on to discuss an account of cognitive architecture that accounts for the case of tactile motion processing in one of the phenomena. Given the accepted understanding of our neurology, I will present Dennett's Multiple Drafts Model of consciousness as well as a general cognitive architecture called the Temporal Abstraction Network (TAN), both of which are more accommodating to the two presented phenomena. In chapter five will turn to a discussion of visual change detection and its intimate connection with focused attention in hopes of showing that a spatio-temporally smeared consciousness is not as counter intuitive as it may first seem.

The Cartesian Theater model of consciousness comes out of the intuitive idea that the information gathered by our senses comes together in the brain in a central location whereby it plays out for the mind thus creating a stream of consciousness parallel to the represented unfolding of events in the world. This stream of consciousness is such that the temporal structure of the presentation, itself, represents the temporal structure of the events being experienced. On the face of it, this model of consciousness meshes with how we normally think about experience.

However, upon examining experience over very short time intervals with quickly changing stimuli there are many phenomena problematic to the above way of thinking

about our conscious experience. The two that I will be examining here are the phi-phenomenon and the cutaneous rabbit phenomenon. The phi phenomenon, or apparent motion, is the phenomenon behind our ability to see motion in television, movies, flip books and other media where experienced visual motion comes out of a sequence of static images. The phi-phenomenon, specifically, is observed when two small dots, separated by up to 4 degrees of visual angle are flashed sequentially and experienced as a single moving dot. The experiment traditionally had been performed with many variations always using two dots of the same color. While many questions were raised by the experiments, Dennett reports that even more interesting questions arose once Nelson Goodman queried about the results if the experiment were done with two different colored dots, perhaps the first red and the second green. What Kolars and von Grünau found (reported in the 1976 paper) was that subjects not only continued to perceive the two dots as a single dot in motion, but they reported that the dot suddenly changed colors midway to its destination (the position of the second dot). The flash of a single dot does not appear to move, nor does it appear to change colors. Why, then, when a second dot is flashed, would the dot appear to both move and change colors *before* it reaches its destination; the destination being the position of the second dot? In other words, how can the end of the trajectory, which has not yet been experienced, affect the experience of the middle of the trajectory?

The cutaneous rabbit phenomenon is the tactile version of the phi-phenomenon, although with no experimental correlate to the change in color. In the cutaneous rabbit experiment, originally performed by Geldard and Sherrick, with results reported in their 1972 publication, mechanical square-wave tappers are placed at various locations on the

subject's arm; the location of the tappers can vary from 2cm to 35 cm apart. Most often the tappers were placed at the wrist and then at various points going up the forearm. The tappers were set up to send, for instance, five pulses each lasting 2msec and separated by 40-80 msec<sup>19</sup> at one location followed at the same interval by five more pulses, again, each lasting 2msec and separated by 40-80 msec at a second location; a third location can also be added, but the phenomenon appears even when tappers are placed at only two locations. The results were that subjects experienced the pulses spread over intermediary locations on their forearm, rather than only at the locations of the tappers. Subjects reported that it felt as if a small rabbit were hopping up their arm, sometimes the trajectory even extending beyond the location of the final tapper. The direction of the pulses makes no difference to the experiment and, in fact, one can induce “colliding rabbits” when three tappers are set up and the two extremes are pulsed simultaneously followed by the middle pulses. As in the case of the phi-phenomenon, the experienced spread of hops is not felt when the first set of pulses in one location is not followed by the second set of pulses at the second location. And similar to the phi-experiment, this raises the question of how the second set of pulses could affect the intermediary experiences *before* they themselves were felt.

Both of these experiments raise the same puzzle for the traditional Cartesian way of thinking about consciousness. How can later stimuli affect earlier stimuli? If the stream of consciousness is indeed a stream in the way it is modeled in the Cartesian Theater, there must be some way that the information from the second set of stimuli affects and is adjusted for so that the conscious experience remains a coherent stream. An

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<sup>19</sup> The taps can be separated by up to 200 msec, though.

adequate answer should treat the original stimuli in the same way whether followed by a set of second stimuli or not. That is, there should be no need for anything special to occur when the appropriate second set of stimuli is present, be it the second dot or the second set of pulses on the arm. There are a few ways in which proponents of the Cartesian Theater model could attempt to answer these questions, without appealing to any sort of backwards causation. Two attempts that Dennett presents are the Orwellian and Stalinesque answers.

The Orwellian account is so named for the Ministry of Truth in Orwell's *1984*, whereby all traces of certain past events are erased and history is rewritten. In the case of consciousness, suppose that there is a stream of information from the brain that gets fed into the theater of consciousness. Take, for instance, the phi-experiment. First, the brain will feed the theater the information about the first stationary dot and one will have a brief experience of a single stationary, red dot. After an ever so slight delay, the brain will then get the information about the second, green dot. Once the brain gets this second bit of information, it feeds that information into the theater and one has an experience of a stationary green dot. However, as we will see in the following section, these two stimuli will register in the brain as motion and once the brain processes the motion it will quickly erase the memory of the stationary red dot followed by a stationary green dot, and instead insert a memory of a single moving dot, which changes color midway. There is a single story fed to consciousness, but tainted memories cause the mind to misremember what that story was, so the story that is remembered and the one identified with the stream of consciousness is one of a continuously moving dot changing color. Notice that although the first story, the stationary red dot followed by the stationary green dot, made it to

consciousness and the second story did not (insofar as the memory is not conscious experience, only memory) one was never conscious, in the Cartesian Theater sense, of the moving dot changing colors, one only has a false memory of being conscious of it. In this story, the order of events is never presented the *second* time in the “correct” order and so, under the Orwellian account, some of the temporal properties of the events are not construed by the temporal properties of the representations. The fallacious memory of the conscious experience just contains the information (temporal and otherwise) about the rewritten story and does not require the story to play out in consciousness in a certain way to convey that information. It does require that the story be remembered as if it played out in consciousness in that manner, though. This way of accounting for the phenomenon in the Cartesian Theater model does not seem to be in the intuitive spirit of the Cartesian Theater model, since one will more often than not remember conscious experience as being something completely different than what it was. Furthermore, it does not fare well for someone who thinks that time flows because our experiences unfold in a dynamic way. In this case, we would only have a false memory of the conscious experience of the moving dot unfolding in a dynamic way.

In the Stalinesque account, this trouble is avoided because the second story *is* fed to consciousness and played out in a dynamic way such that the representation maintains the temporal properties of the dynamic experience. In this account, so named for the show trials set up during Stalin's regime, the brain delays information being fed into the theater of consciousness until more information is obtained, although how much more is hard to say. Under this account, the information about the stationary red dot would be delayed in its path to consciousness until the information about the second stationary,

green dot was gathered. Upon processing the two, the brain would present a story about a single moving dot that changes color to the theater of consciousness. The conscious experience in this case would be a dynamic experience of a moving dot, and the temporal properties of the experienced event would be conveyed by the temporal properties of the representation, itself.

The biggest problem for the Stalinesque way of thinking about conscious experience is that it does not seem experimentally (or biologically) viable for there to be such a long delay between when the brain receives stimuli and when the final presentation is fed into consciousness. In the case of the phi-experiment, up to 200 msec can pass between the flash of the red dot and the flash of the green dot. Dennett and Kinsbourne (1992) state “...our natural intuition is that the *experience* of light and sound happens *between* the time the vibrations strike our sense organs and the time we manage to push the button to signal that experience,” (186). However, when subjects are asked to report when they first see a red dot their responses “occur with close to minimum latencies that are physically possible; after subtracting the demonstrable travel times for incoming and outgoing pulse trains, and the response preparation time, there is little time left over in 'central processing' in which to hide a 200 msec delay” (1992, 189).

These seem to be the only two methods for accounting for the phi- and other such phenomena, and neither seems to be adequate. But these phenomena are only puzzling for our account of consciousness if we assume that the mind can only represent temporal properties by the representations, themselves, having those temporal properties, either as they play out in consciousness or are remembered as playing out in consciousness.

Dennett's own Multiple Drafts model of consciousness avoids the pitfalls of the Orwellian and Stalinesque models because consciousness is not identified with a single stream. Instead, he acknowledges the blurry boundary between consciousness and memory and proposes that consciousness should be thought of as multiple streams running parallel to one another, and these streams are constantly updated by new information. Rather than a single story being identified with consciousness, he takes consciousness to be the whole of the writing and rewriting process. Although a single story will eventually settle into memory, this single story is not determined by where it ends up in the brain, but rather what is relevant to and utilized by different tasks or probes.

Dennett's Multiple Drafts model of consciousness avoids many problems of the Cartesian Theater model, which aside from being unable to adequately handle the phi- and cutaneous rabbit phenomena incorporates two generally problematic presumptions. The first is that there is a central spatial location of consciousness, a threshold for what does and does not count as conscious experience, and the second is that the experienced temporal structure is conveyed by the presentation's order. Regarding the first, we are faced with the risk of falling into an infinite regress, for if there is a central location in the brain where our experience plays out for the mind, should there not also be a pooling together of information in the mind, which itself must have a central observer? If not, if the mind is somehow able to grasp the information presented by the brain immediately, why is it not the case that the mind grasp the world immediately in the first place rather than through the interface of the brain? And why would the mind require the information to be pooled together and presented to it at all? The mind, after all, has no spatial location



itself. To add a mind that watches the already pooled presentation seems to make the mind redundant and to make the mind able to immediately grasp the information seems to make the sensory interface unnecessary. It does not seem entirely necessary that we abandon the idea of a central location of the brain, however, it will not be found. Further, if we treat the location of the multimodal display in the brain as being spatially extended, then there does not seem to be any disadvantage to treating the whole brain or indeed the whole sensory system<sup>20</sup> as the location for a pooling together of information.

Dennett finds the centralization to be problematic because it seems to provide a threshold for consciousness, when really information is fluttering all about the brain, sometimes utilized, other times not. However, under his redefinition of consciousness in the Multiple Drafts model one could claim that there is a kind of threshold (perhaps the whole sensory system) and the threshold is for information that makes it into consciousness as the Multiple Drafts model conceives of consciousness. What he says is that: "...given the relatively slow transmission and computation speeds of neurons, the spatial distribution of processes creates a significant temporal smear – ranging, as we shall see, up to several hundred milliseconds – within which range the *normal common-sense assumptions* about timing and arrival at the observer need to be replaced" (emphasis mine) (1992, 2). He also admits, however, that "the brain itself is Headquarters the place where the ultimate observer is, but it is a mistake to believe that the brain has any deeper headquarters, any inner sanctum, arrival at which is the necessary or sufficient condition for conscious experience," (1992, 187), which seems to

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<sup>20</sup> Since animals like rabbits are able to process motion in the eye, it seems that animals like people could have been that way too.

imply that the centralization is fine so long as the center is the whole brain, not something within the brain, and is temporally smeared. Dennett finds centralization to be problematic and, under the traditional view of consciousness, it is. However, when he redefines consciousness, he no longer needs to argue against the centralization since even centralization of consciousness looks very different in something like the Multiple Drafts model.

The bigger problem with the Cartesian Theater model is its claims about how temporal properties are conveyed. It is very tempting to think that the way our mental representations play out is much like the way a movie plays out as a representation of events. Representations, mental or otherwise, can do their representing without themselves having all (or any) of the properties of the thing that is being represented. Before turning to other models of consciousness, it would do us well to look at how the brain processes phenomena such as the phi and cutaneous rabbit, which prove difficult to account for in the Cartesian Theater model of consciousness. In both cases, we experience a single object moving, be it a dot or a rabbit, while being presented with distinct static stimuli. However, the brain is doing the same thing in these cases as it is in cases of non-illusory motion. The discussion at the end of chapter three lays out how normal, non-illusory motion detection works. As the information about the occurrence of motion is conveyed by a singular output conclusion, it need not be represented by representations playing out in time.

It is in the above way that the brain can process information about temporal properties like variations over time, such as motion. Dennett, himself discusses the ability of the brain to make other temporal judgments such as synchronizing the sound of a voice

with the movement of lips despite presentation that are themselves out of synch. What Dennett says about the brain's ability to process information in such a way is that

Two important points follow from this. First, such temporal inferences can be drawn (such temporal discriminations can be made) by comparing the (low level) *content* of several data arrays, and this real time process need not occur in the temporal order that its product eventually represents. Second, once such a temporal inference has been drawn, which may be *before* other processes have extracted high-level features, it does not have to be drawn again! There does not have to be a *later* representation in which the high-level features are “presented” in a real time sequence for the benefit of a second sequence-judger. In other words, having drawn inferences from these juxtapositions of temporal information, the brain can go on to represent the results in a format that fits its needs and resources – not necessarily a format in which ‘time is used to represent time.’” (1992, 189)

In Dennett’s Multiple Drafts model of consciousness the brain makes multiple discriminations, some used while other still fall to the wayside for lack of usefulness. The discriminations are fed into different processes leading to further conclusions made by the brain, but never is it necessary for the original discriminations to be made again in some bigger, or more advanced, or more detailed picture. The information is simply fed into these other processes and either used or not. So, in the case of the phi-phenomena, the information about the two stationary dots falls to the wayside and the information about motion is used to draw the further conclusion about a single object moving. The brain does not even need to go to the work of representing the single dot moving in a complete picture, it need only have the representation of motion and the representation of a single dot. Further, for Dennett, what we identify being conscious of will depend on what and when we are asked, that is how and when we probe the processes. If asked immediately following the first dot, the answer may be that we were only ever conscious of a single stationary, red dot. If asked later, we will report a single moving dot that changes color. What he means in calling his model of consciousness the Multiple Drafts

model is that consciousness consists in multiple processes occurring at the same time and constantly being updated by the stream of new information entering the system. The processes will continue to draw conclusions, abandoning what it may deem inconsistent information, until probed, a probe being anything from a direct question about experience to a presented task that requires action. Information may, too, be abandoned because of irrelevance resulting from unuse.

Another model of consciousness inspired by Dennett, is the Temporal Abstraction Network (TAN) presented by Madden and Logan in “It's About Time.” Their paper gives a more detailed account of how the information from low-level processes gets fed as input into higher-level processes. They propose a model whereby there are multiple ongoing processes; each process includes a time-limited buffer and a way to draw inferences from input contained in the buffer. The input buffer has both a capacity and a duration, which dictates how much information it can contain and how long it can stay there. The procedure rules are the rules for drawing inferences based on the information contained in the buffer and these conclusions serve as outputs. The processes are connected with a bus architecture, which simply means that the output from these processes (the inferences or conclusions drawn) is sent to multiple other processes to serve as input. It is this bus architecture that allows for multiple processes to be ongoing, each with local convergence, but without requiring global convergence in some type of “stream of consciousness” due to the fact that the lower level information is sent to multiple other processes.

In the case of the cutaneous rabbit phenomena, they provide the following account. Recall that the pulses sent out by the tappers can be separated by up to 200

msec. It was also found that pulses separated by less than 20ms could not be discriminated as separate taps and so were experienced as a single tap. At the lowest level, the process would have a capacity of one element, with a duration of 20msec, so that if more than one pulse is input into the process within the 20msec, the most recent pulse remains in the buffer (the newest pulse “overwrites” the older pulses). Next, an intermediate level process, which has a capacity of 2 elements and a duration of 200msec, will draw conclusions about start and end points of the “run” and the number of pulses. The output from this process will be distributed to an array of other processes, but will also feed back into the same intermediate process and the conclusion about the end point of the run will be adjusted for any new information also fed in from the lowest level process. The process will continue in this feedback loop combining with new information. Any pulses separated by at least 20msec, but falling within the 200msec time frame of the intermediate process, will contribute to the conclusions drawn about the start and end point of the run and be outputted to other processes. At the highest level, the input is taken from the intermediate level process and the final end position of the run is determined. The experience of a rabbit running up one's arm is produced, that is, the highest level process outputs the conclusion of a spatially spread “run”. Although this account is more abstract than that of visual motion processing in the case of the phi-phenomenon, we are still faced with discrete input producing a continuous motion. We are also presented with a way to understand how this information is processed in such a way as to avoid a central convergence of information presented for final judgment.

Consciousness as conceived of in the Multiple Drafts and TAN models is very different than the traditional centralized models. Under these two models there is no

need to worry about thresholds for consciousness because consciousness itself is a vague, fuzzy concept with fuzzy borders whereby a physical border need not imply a metaphysical threshold. In these models, representations of motion need not themselves move (although certainly the outputs from one process move to another process). Further, a representation of motion need not even be a representation of *an object* moving. That is, the brain need not put the information about the object together with the information about motion in a singular representation that in some way plays out in experience (another aspect of the Multiple Drafts model).

Under the above analysis of experience, temporal properties are conveyed via output conclusions from different processes. The output conclusion contains the relevant information about temporal properties without being a presentation in time. Since the experienced temporal properties are conclusions drawn from multiple processes, our relation to time should be considered a complex one, or at least one that is not simple and direct.

## CHAPTER 5: An A-Theoretic Experience in the Block Universe

### §1 Placing Ourselves in the Block Universe

In chapter three, I discuss the condition akinetopsia or change blindness. The purpose of this example was not to argue that those suffering from this condition have a more privileged or correct experience of time. The condition does, however, allow for a teasing apart of a few different components of experience that are often taken to be an experience of time, itself. Recall that those suffering from change blindness do not experience the dynamic change or motion of objects. The reported experience is more like the experience of difference or *that* change has occurred. In J. Zihl, et al (1983, 314) they reference a prior report by Potzl and Redlich from 1911, whereby the subject “described the perceptual experience of a moving target as if the visual stimulus remained stationary, but appeared at different successive positions.” The reported experience is of one where dynamic change, or motion, is absent, but succession is still present. This succession of one state followed by another is what I will refer to as the serial character of experience. Akinetopsia provides a good example for the separation of two distinct components of experience, which are tied or attributed to the supposed experience of temporal flow. The experience of temporal flow seems to be comprised of (1) dynamic motion and (2) the *serial* nature of experience. In chapters three and four, I tried to show that the experience of dynamic motion can be accounted for in the block universe by appealing to motion processing along with an alternative view of consciousness, the multiple drafts model. And while this account can begin to give us an explanation of our temporal experiences, some issues still remain.

In this chapter, I investigate the serial nature of experience and the challenges it poses for the B-theorist. I hold that the serial nature of experience is misunderstood, usually based on the contentious assumption that there is a unique stream of consciousness that mirrors the unique stream of temporal flow. My hope is that the isolation of the serial character of experience will allow for a clearer examination of how it is utilized by A-theorists in arguing for temporal flow, and the explanatory function of temporal flow in an account of the serial character. Generally, the serial character of experience is thought to be indicative of the serial progression of time. One can deny this implication (and I argue should), but must still deal with remaining puzzles that are more difficult than the previous one. Temporal flow can do so much work in the A-theory; it can account for dynamism, the asymmetry of memory, and a progression that is seemingly out of our control.

In what follows, I hope to provide the beginnings of an account that can do the same explanatory work without admitting the contradictory notion of temporal flow. Part of this account will attempt to cast a different understanding of our experiences, one that is honest about what the true components of experience are and which are merely metaphorical, illusory, or just stories we tell ourselves. The other part of this account will be an attempt to understand the experiences we do have within a B-theory of time. I argue that part of that experience is due to the perspectival nature of our experience and part due to the asymmetry of memory.

In section two, I lay out an analysis of the serial nature of experience. In doing so, I put aside some of the earlier issues involving dynamic motion and focus on the successive character of the experience. It is here where I provide an account of the



memory asymmetry, although even with this account, I feel that there is something left out, something beyond mere asymmetry and wrapped up in what is thought to be the progression from one mental state to another. That is, why is our perspective in time *changing*? In section three, I address why our temporal perspective is so different from our spatial perspective when space and time are structurally similar. Here, I investigate how a B-theorist can account for our *changing* perspective. If the serial character of experience is not reducible to something that is itself devoid of seriality and change, then we will be stuck with the same paradoxical problems with which we began. Also in section three I argue that there is some sense in which we may say that time flows or passes, a sense in which temporal variation is different than spatial variation. This difference, however, is largely due to the way in which we experience the temporal variation, for I do not argue against the fact that we experience them differently. I only argue against the idea that the differing experience points to a fundamental difference: that there is a fundamental flowlike character of the temporal dimension and a fundamental static character of the spatial dimensions.

I also consider the implications of an alternative view of consciousness, like the Multiple Drafts model, for a serial character of experience. I will begin with an explanation of what I mean by the serial character of experience. The two defining characteristics of a series are that it is linear and it is directed. The linearity of the experience is paralleled by the linear order of the temporal dimension in the block universe; it is a dimension whose points can be ordered by the betweenness relation. In section four, I look at how we explain the *linear* aspect of experience in a multiple drafts model of consciousness, while I address the directedness of the series in section two.

Even if we shift to talking about the perspectival character of experience, we are still resting on the idea that the perspective amounts to a singular point of view for, after all, is that not what it is to be a *point* of view? In order to explain how this aspect of consciousness can be accounted for in the multiple drafts model of consciousness, and thus leave room for time to be represented in structurally dissimilar ways, I will look at research done in change blindness and the role of attention in unifying our experience in an otherwise messy and disparate process. In sections four and five, I will reexamine experience and argue that it is not as linear as it is taken to be in many debates about temporal experience.

Lastly, in sections five and six, I look at some tangential issues that can be addressed using the account of time and experience laid out in this and preceding chapters. I flesh out a brief sketch of how we may understand personal identity of a temporally extended being and in the context of a model of consciousness devoid of global convergence. I also look at how we may be able to understand free will in a block universe with a perspectival understanding of our experience of events unfolding.

## **§2 The serial experience of events**

If A-theorists rely on our experience of flow as a basis for saying that time does flow, then we must ask to which experiences they are actually pointing. If the experience of temporal flow is thought to be present even in the absence of dynamic motion, it seems that the experience being pointed to is the experience of a single perspective in time, unfolding either statically or dynamically. Earlier, I pointed to cases of akinetopsia, whereby the patient, in the absence of motion processors, does not experience dynamic

motion. My earlier point in highlighting these cases was to extract the role that the brain plays in the experience of dynamic motion and show that the experience of dynamism need not indicate an inherent property of time. However, the patient does still have an experience of succession. In a case where dynamic motion is not present, what experience is being pointed to here? It seems that even if the akinetopsia patient does not experience the change in events as dynamic, they are still experiencing the static events successively or *serially* and as such they are experiencing a kind of temporal change that differs from spatial variation. If we usually use the metaphor of a film to represent temporal experience and temporal flow, I am instead using the metaphor of a slide show, whereby static images are projected one after another and no dynamic change of the slide contents is experienced. In order to attempt a B-theoretic explanation for this type of phenomenon, the serial nature must not be cashed out in terms of a series of moments popping in and out of existence, or even a series of events popping in and out of existence.

It is very tempting to think that the chain of experiences occurring one after another can only manifest as such within a framework where the static states, themselves, occur one after another. In other words, even if we allow that the most plausible solution to Zeno's Arrow paradox is to flesh out motion in terms of an object being in the appropriate series of positions at the appropriate series of moments without any change *within* the moments, the A-theorist may still insist that the only way to cash out the succession of those positions is by appeal to time unfolding in one direction. And although there are accounts of temporal direction that do not involve flow, many have held that the direction of time cannot be separated from the passage of time. McTaggart,

himself, can only give the B-series a direction, such that events are ordered by the *earlier than* relation, by imposing the A-series on the timeless, undirected C-series<sup>21</sup> and thus producing the B-series. The thought is that insofar as the moments are supposed to be successive, there has to be a successive unfolding of the moments, or equally for the A-theorist, a succession of moments coming into the present. The successive unfolding of moments seems, then, to be evidenced by the serial nature of experience. More recently, Tim Maudlin (2007, 108) has described the passage of time as “the asymmetry that grounds the distinction between sequences which run from the past to the future and sequences which run from the future to the past.” With regards to its connection to the direction of time he claims:

“The passage of time is deeply connected to the problem of the direction of time, or time’s arrow. If all one means by ‘direction of time’ is an irreducible intrinsic asymmetry in the temporal structure of the universe, then the passage of time implies a direction of time. But the passage of time connotes more than just an intrinsic asymmetry: not just an asymmetry would produce passing. Space, for example, could contain some sort of intrinsic asymmetry, but that alone would not justify the claim that there is a ‘passage of space’ or that space passes. The passage of time underwrites claims about one state ‘coming out of’ or ‘being produced from’ another, while a generic spatial (or indeed a generic temporal) asymmetry would not underwrite such locutions.” (Maudlin 2007, 109-10)

Although, Maudlin is not arguing that you cannot have an asymmetry in time without temporal passage, he does hold that the temporal structure of our world is such that direction is more than a mere asymmetry. He holds that only temporal passage or flow can adequately capture the succession of states. Below, I attempt to present an account

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<sup>21</sup> One may argue that the term 'series' is a misnomer with regards to the C-series since it is devoid of a direction. It should more appropriately be called a C-extension or C-line.

for that experience of succession without appeal to the literal successive unfolding of moments. I turn now to the direction of this succession of experience.

It is fairly obvious and uncontroversial that there is a privileged direction of experience. We have more knowledge of the past than we do the future, we no longer dread those painful events that are in the past, nor do we joyfully anticipate those exciting and pleasant events that are in the past. We regret and revel in those events that are in the past, and feel no weight of responsibility for those events that are in the future. We remember the past, while we can only expect the future. While it may seem a bit artificial to separate the attitude towards past and future moments from the experience of succession, I would like to first focus on the differing attitudes we have at any moment. In particular, I would like to focus on the knowledge or memory asymmetry.

At any particular moment, the knowledge I have of my own past and the knowledge we as humans have of the past is much greater than the knowledge we have of the future. It may even be argued that the knowledge we have of the future is not, properly speaking, the same kind of knowledge we have of the past. This character of our experience suggests that our experience plays out sequentially. As I have laid out in chapters three and four, with an alternative account of consciousness, we can step away from the view that experienced time must be structurally similar to external time. However, even with this alternative model of consciousness in hand, some may still feel that while time need not be its own representation when it comes to small scale temporal properties, such as those that occur over microsecond time intervals, there is a large scale temporal order of experience, that which occurs over a lifetime, and it is this large scale order of succession that poses problems for the theory that time does not flow. Below I

will suggest a way to impose successive order onto experienced time using only the alternative model of consciousness and an asymmetry in time, which does not rely on temporal flow.

The experienced sequence of events need not mean that time itself is unfolding, but rather that time, or even some cosmological character of the universe, is merely asymmetrical. While Maudlin thinks that asymmetry alone is not enough to capture the successive character of the world, below I argue that if we turn to our experience of succession, we may be able to separate the two. The block universe theorist has two options for explaining the experienced sequence of experiences. The first option is to maintain that time has an inherent direction. This direction may be just the nature of time itself and would be the equivalent of making McTaggart's B-series fundamental and considering the *earlier than/later than* relations to be essential to time, much in the same way McTaggart considered the A-series properties to be essential to time. Under this view, time would still be extended like space, but would have a asymmetrical, “textured” character. This asymmetry is also compatible with there being no “right” or “wrong” way to the order, only that there is a difference between going one way or going the other. Recall that even McTaggart describes the B-series as “[t]he series of positions which runs from earlier to later, or *conversely*” (McTaggart 1923, 10), suggesting that an asymmetrical order is what makes the series a temporal series as opposed to the symmetrical, atemporal C-series. Huggett (2010, 112) uses the metaphor of the direction of cat's fur to explain the idea that there could be an asymmetry in time without there being a fact about which direction is correct. The direction does not rely on the successive moments unfolding for its direction any more than a cat's fur relies on a hand

petting it for its direction. Further, the directedness or asymmetry of the fur (and time in this metaphor) does not imply that one direction is “right” while the other is not. In the case of the cat's fur, the only thing that would be right about one direction as opposed to the other is how it feels to the cat while being pet, but independent of the petting and independent of the cat's perception of the petting, there is no privileged direction. In the case of time, we need not privilege one direction over another such as in cases where the future is treated as being less real than the past, or even when the future is thought to be open and the past, real or not, is settled. We can treat time as being asymmetrical and ‘textured’.

The second path one may go down in order to impose an asymmetry in time is to embrace the symmetrical C-series, which is a series of “realities” (McTaggart 1908) ordered by the *betweenness* relation. Although McTaggart himself does not believe that this kind of series could be a temporal series, it is still possible to view time in this way. I hold that there is good reason to think that time, itself, is undirected and symmetrical, and that the asymmetry in time comes from a cosmological character of the universe, however, I will not attempt to provide a defense this here. For my purposes, I will only be using the idea that there can be an account of the serial nature of experience using only an asymmetry in time or some other cosmological character of the universe<sup>22</sup>. Paul Horwich in *Asymmetries in Time* (1987) argues that this character of the universe can be used to explain the memory asymmetry. He argues for the idea that brains are a kind of recording device. And also that there is a certain cosmological character of the universe such that

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<sup>22</sup> For a defense of undirected and symmetrical time see Horwich, P. *Asymmetries in Time*. MIT, 1987.

for a given temporal segment (and a rather long one at that), things at one end are in a state of low entropy and things at the other end are in a state of high entropy. The details of his argument are not crucial for what follows. In order to explain the memory asymmetry, there need be only the possibility of an asymmetry, either in the B-series or in the C-series along with some cosmological character of the universe. If it turns out that there is no consistent way to defend a symmetrical time, then the block universe theorist can still resort to an asymmetrical time series without appealing to flow.

However, while an explanation for the memory asymmetry may give us an understanding for why our memories (and other forms of knowledge) are all on one side of the experience of the rather than the other, one may still object that the more fundamental work that temporal flow does is in getting one *from* the experience *to* the memory. That is, a temporal flow theorist may still hold that the facts about when along the temporal dimension the memories are and when the experiences are still does not explain why we go *from* experience *to* memory. Why not, after all, have all of these experiences collectively?<sup>23</sup> Those who appeal to experience still may not agree that this kind of direction can explain the kind of serial unfolding we, in fact, experience.

Price (1997) points out that if you take the world to be three dimensional and dynamic, as the presentist does, then it is easy enough to see how the events can be mapped onto a four dimensional picture. Further, since our experiences themselves occur in time (and in that present moment), they too can be mapped onto the four-dimensional picture. For instance, let's look at the following analogy. Suppose one was to give you a

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<sup>23</sup> Note that this could not be the same as asking why not have them *at once*. These experiences could not all occur at the same time in this model.



film reel and say, “This is a great movie, a movie about a summer road trip. There are scenes of the beautiful passing country-side accompanied by the main character’s inner dialogue where she negotiates the land and the complex situations along the way.” It’s all there. The dynamic trip, the experiences she has, the accompanying emotions, etc. I could point to any snap shot in the film and it would contain a part of her whole journey, the sum of these snap shots would be the entire film. Further, since I have presented a way that we can understand our experience in time as one that does not require a series of experiences in order to have an experience of seriality (see chapter four), even the dynamic experiences of the characters is captured in any single snap shot. What may still be bothering those who hold that time does flow, may be that while the dynamic passage of events and experiences through the present may be mapped onto four dimensions, the four dimensional picture fails to fully determine the actual world we experience. The argument is that there is a difference between the three dimensional picture and the four dimensional picture, despite it being possible to describe the former in terms of the latter. The four dimensional description will be incomplete; it would fail to capture *something*. However, if this is their argument, they are mistaken in appealing to an experience we have of temporal flow for, as it is laid out in the example, all the experiences are captured in the four dimensional picture. Following in the spirit of Leibniz’s identity of indiscernibles, the three dimensional universe and the four dimensional universe are indiscernible and, thus, one and the same universe; thus the temporal flow that was supposed to make them different, insofar as it makes no discernible difference, does not exist.

But perhaps those who think that the two universes are not identical do so because they are, in fact, discernible by some experience or aspect of experience that is not captured by the film reel or perhaps required for the film reel to exist in the first place. If there is a difference in the experiences themselves, then there would be something wrong with the four-dimensional mapping of the three-dimensional universe; something failing to be captured, despite Price's point that the experiences themselves, insofar as they occur in time, also get mapped onto the four-dimensional picture. If one is inclined to think that the film needs to be placed upon a projector and played for these experiences to exist in their full capacity, they may be recognizing something that is lacking. But it is not the film that is lacking, nor the experiences of the players in the film, the only thing that is lacking would be our own experiences of these events unfolding from an external vantage point. The temporal flow theorist, who argues that the serial experience cannot be completely described by the four-dimensional block, wants things to look from this outside vantage point as they do from the actors' vantage points. Below, I will argue that the temporal flow theorist, insofar as he wants the experiences he has to be indicative of an objective reality of time, is pushing the *perspectival* aspect of temporal experience to the objective level, the level of no perspective. Doing so will either be contradictory or lead to an infinite regress since the perspectival view is supposed to be of *something*, something to which the perspective is added.

In what follows, I examine the kind of serial experience that A-theorists may appeal to as being of some kind of temporal unfolding. I begin by analyzing the serial nature of experience as a progressively changing perspective in time. With this description, I provide reasons for refraining from holding fast to the perspectival view as

indicative of an objective feature of time, and argue that we do abandon the perspective in the case of space and we should do likewise in the case of temporal perspective. Once I have argued that we should not take the serial experience to be indicative of temporal flow, I point out that even that which we take to be serial turns out to be less present in our experience than we may initially think. I argue that a serial experience requires at least a linear experience, which has been found to be an unviable option when accounting for consciousness. Although the account of consciousness I have proposed cannot have any real global convergence into a linear train of thought, I will provide a possible explanation for how we come to have the sense of linear consciousness. In this explanation, the linear and serial aspects of consciousness become arbitrary and somewhat illusory, leading one to conclude that there is no simple and direct experience of temporal unfolding.

### **§3 A-series of Time, A-layout of Space:**

B-theorists can cash out the serial nature of experience in terms of the change in temporal perspective. Those who push for a non-perspectival view of time have made a similar move. Price, Huggett, Horwich, LePoidevin, push for a view from 'nowhen' (Price, 1997, 17). This gets us out of our heads in order to see what time could look like without our human perspective. But what still remains to be explained are why and how it looks the way it does *with* our human perspective. That is, why does something like the A-series so aptly capture our experience of time when it is absolutely incompatible with the non-perspectival view of time, that view from no-when? How could it possibly be derived from something merely within this extended and unchanging temporal

dimension? Since the serial nature of experience in an extended four-dimensional block universe would amount to occupying successive temporal positions within an otherwise non-perspectival temporal map, we may be able to find an explanation by looking at the similarities between the way we experience our movement in space and the way we experience our changing perspective in time.

When we experience space, we take space itself to be laid out for us in a certain way, usually characterized by Euclidean properties. However, as we exist in space, we must experience these properties from a place in that space and so we will always be viewing space from a perspective. In general, the particular position I occupy in space is determined by my own actions and the actions of other physical objects. For instance, sitting at this desk I feel that my particular position in space has been determined by my decision to walk in the room and sit down, the position I have decided to turn my head, the support of the chair underneath me, the location of my house based on social and financial factors, the Earth's gravity, etc. I think that any of these causes for my particular position in space is contingent – I certainly could have decided to live on the other side of town, I certainly could have positioned my desk facing the opposite wall, I certainly could have been in a different position than I am right now. Our experience of time is similar to that of space; we tend to think that there is a sense in which time is extended (even if only some of that extension is real) and we are situated at a particular moment in that time. However, our changing perspective in time seems to be less a matter of *happening* to be at one particular place as opposed to another, but rather a necessity, something that is out of our control. Not only did I have no choice in being at this very moment, but also it seems that no other physical object had a hand in it either. It may be

true that *it* could have been a minute earlier, but experience doesn't seem to suggest that *I* could have been a minute earlier if *it* weren't. As I have argued earlier, this way of speaking is problematic. Part of the problem with this way of speaking is holding the present to be unique and privileged, a problem I address in chapter two. Since this chapter is about flow, however, it would be good to talk about the role that flow plays in this kind of talk as well.

So it seems that experience more readily lends itself to shedding perspective from space, but not from time. Perhaps in an effort to maintain our grasp on the objective world of properties of space and time, we take for granted that the experience that we have of time must also be representative of how time is outside of ourselves, flowiness included. However, neither space nor time is given to us in such a simple and direct way. As mentioned in chapter 4, while we have long since abandoned the idea that colors are given to us in a simple and direct way, we should also be skeptical that we have a simple and direct relation to any properties of the world around us. What are we “given” exactly in our experience of space? I am not sure anything, really. We always experience the world through the filter of our senses and the complex processing that goes on in the brain. We experience space from our point of view within it. This is, in principle, the case since an experience, by its very nature, is had from a perspective. Suppose I take the view that my experience of space is a simple and direct experience. The initial images projected onto the retina are ones that are in many ways neutral with regards to being three dimensional and Euclidean: parallel lines converge, similar objects, which we later see as the same size, but at differing distances, are of varying sizes on the retina, etc. It is only after the information has been processed that my spatial map of the world starts to

look more Euclidean, or at least is no longer tied to a perspective. In fact, the experience itself is one of the world as three dimensional and Euclidean. But if we do think that we see the world as three dimensional and Euclidean, we cannot hold that our experience of space is a simple and direct one, but rather one that comes about from complex processing. Although we are still directly seeing the world, we cannot hold that the experience is a simple mapping of the world onto our representations like a mimeograph; a more complex relationship always exists.

Similarly, we may look at the way that we build up a temporal picture of the world. I begin, as in the case of space, with an experience of events from a point of view *in time*. If we keep in consideration the Multiple Drafts model of consciousness, this need not be a literal point, or even a singular point, after all there are various processes in the brain that carry with them temporal information. There may be multiple temporal orderings that are compared and negotiated, and eventually a kind of temporal map is built ordering events by the before/after relation; there may even be multiple temporal maps in play. Perhaps through memories and reminiscence of past events or hope and imagination of future events, I, in some ways, extract away from my particular perspective in time (now) and come to represent the events laid out in a line, similar to a dimension in my spatial map. If I hold that my representations are simple and direct copies of the world, then I would think that time must be structurally similar to that experience. However, there is something that seems to leave me unable to part with my perspectival image of time. Is it because I always experience time *from a perspective*? If that is the reason, then I should no more be willing to accept that space is something always tied to a perspective. It seems that in the cases of both time and space, we have

the dual representation of the objective map and ourselves *in* that map. For some reason, though, the objective map “wins out” in the case of space, and the perspectival map “wins out” in the case of time. Some of the reasons behind this have been discussed in chapter two. Further evidence may come from research in spatial mapping.

Before turning to the research on spatial mapping, I would like to point out two key differences between temporal mapping and spatial mapping. The first has to do with control, the second with accessibility. When it comes to my spatial perspective, I have the ability to control my spatial perspective. If I want to occupy a different spatial perspective, then all I need to do is move, and barring cases of paralysis or restraint, this is generally under my control. When it comes to changing my temporal perspective, I must wait. That is all I can do: wait. I cannot speed it up, I cannot slow it down, I am seemingly at the mercy of time's own will to march on. This first difference is less of a worry once we replace space and time with spacetime. I am not then indexed to a point in space that I am free to move from, but rather to a point in spacetime that I am at once free to move from and forcefully moved from by the marching on of time. This difference between spatial and temporal perspective has its own set of puzzles, but ones that are equally problematic for both metaphysical views of time. I will leave these now and focus on another difference that is possibly more telling. What does it mean to have a different perspective? We often use the spatial term “angle” as a synonym. But even the word “perspectival” is a spatial word. There seems to be a connotation that different perspectives give one a view of different things, but also a connotation that different perspectives give one a different view of the same things. The statue of David is properly viewed from a certain angle and from a different perspective it would look different.

When it comes to spatial perspective, one thing that we are able to do is see what other positions look like from different perspectives. For any given position, I can see it not only from that very position, but upon changing my position, see that same point from other perspectives. But what of our temporal perspective? A change in our temporal position bars us from any perceptual access to our previous position. This is another repercussion of the fact that our experience is confined to the present. It is true that we have memories and anticipation of times other than the one we occupy, but this is not analogous to viewing these moments from a different perspective. It is analogous to having a map of a distant land while you sit at home. You do not have a different perspective of these other times or places, you only have information about these other times or places. So what, then, would happen if we were to take away sensory access to other spatial positions?

The National Space Biomedical Research Institute explains that there have been cases of astronauts who report that when their eyes were closed or with the lights were turned out, they lost the sense of where things were around them, that is, they lost their spatial map. Surely, however, they were still aware of their perspectival position expressed by “I am here.” Likewise, there are many cases where we find ourselves losing track of time, yet we are still perfectly aware that “I am now.” In the case of the astronaut, however, it may be that without sensory access to other places, one loses or at least no longer locates oneself in the spatial map. In our normal experience we have no sensory access to other times and so become less attached to the extended temporal map. The extended, non-perspective (and objective) spatial and temporal dimensions maybe preferred when sensory access to other spatial and temporal positions is available. The



abandonment of the extended spatial map in the absence of this access in the case of astronauts may provide an explanation for why we privilege the perspectival view of time over the extended non-perspectival one.

The main point to draw from the above discussion is that the A-series does have a manifestation in our experience; it is the perspectival nature of our being *in* time, however, there is also an *A-layout* in our experience of space, and we do not need to appeal to spatial flow in order to account for the presence of the type of the experience or the preference/privilege of this type of experience. One who takes seriously the perspectival experience in time should also take seriously the perspectival experience in space (see images below)

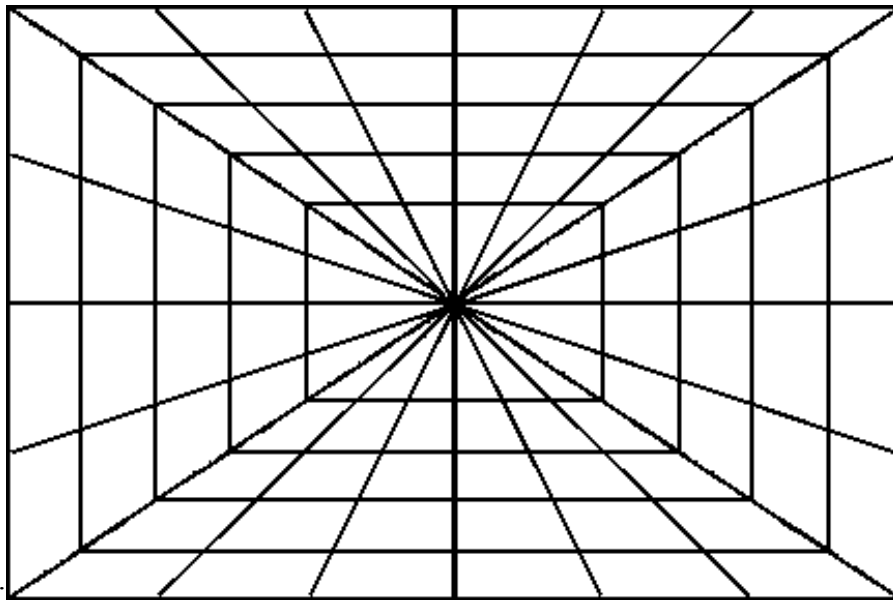
Figure 8

What I see:



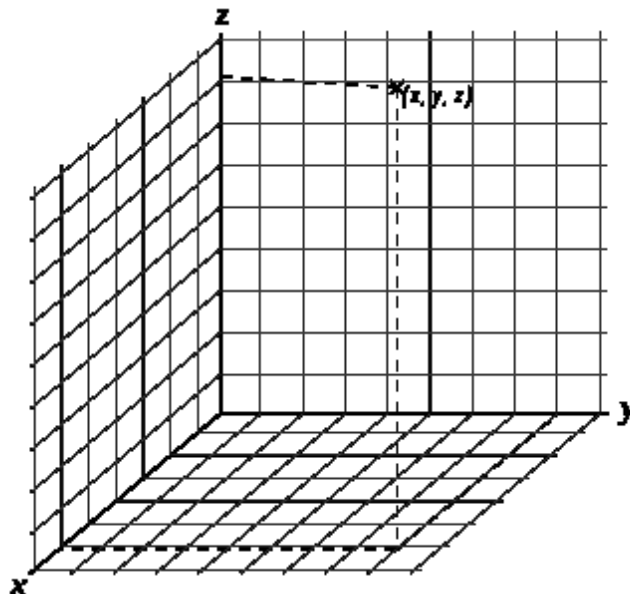
The A-layout:

Figure 9



How we think space really is:

Figure 10



Note that I cannot adequately capture the non-perspectival three-dimensional space in a picture. The picture is (a) a three dimensional space represented on the two-dimensional plane of the paper and (b) seen from the perspective of the reader.

However, I hardly suggest that we start treating space as if it really flows. Instead, what we need to do is make sense of how we can have that A-series experience in a B-theoretic universe. If we can accept a theory of representation that does not require time to be its own representation (as laid out in chapter 4), then it is possible for us to represent A-series properties in the B-theory. This will work as follows. Assume time to be in a B-series, then at some moment, M1, my mind represents something like an approaching train. I have a single representation, and the vehicle of this representation is momentary, effectively durationless, and occurs at M1. The content of my representation, however, is packed with the properties such as the dynamic motion of the approaching train, the presentness of that event (but not necessarily that event *at* M1), the pastness of my approach to the platform, and the anticipation of my future boarding of the car<sup>24</sup>. The content of my representation is effectively the world I live in. That representation is updated with every passing B-series moment. For instance, at some later time, I will have a representation with a different event picked out as present, perhaps the boarding of the train. That representation will place the approaching of the train earlier in the temporal map and thus in the past. There is a constant positioning and repositioning of myself and my perspective in that B-series of time. The series of my representations of time thus *is* an A-series. Further, my representation of that series of updated positions *is* a representation of an A-series. I have a representation of myself, here, now, followed by a different myself-here-now. The entirety of my experienced life, then, becomes a stack of

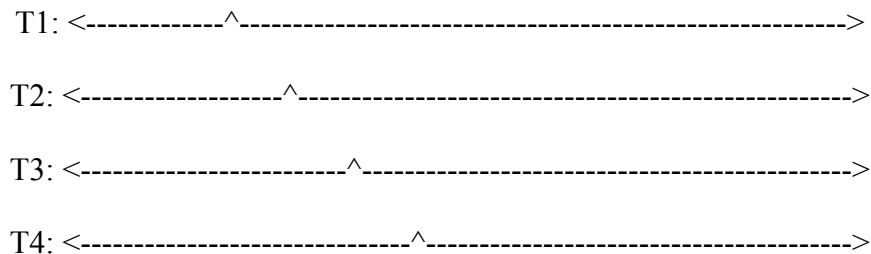
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<sup>24</sup> It is not necessary that all of these properties be represented in one and the same representation, nor even that they are represented simultaneously. All that is required for this example is that any representation, regardless of the temporal content, occurs at a time.

B-series with different “myself-here-nows” lit up. The A-series, insofar as it incorporates a moving present, could be described as a series of B-series, each one with a later moment “lit up” as the present moment<sup>25</sup>. If we instead utilize a perspectival account of experience, then the successive lighting up the moments is not a lighting-up of a moment that is being traversed by a unique and objective present, but rather, a moment that is lit up by virtue of it being “myself-here-now” within a temporal map. From an external view of the B-series, all of the moments are lit up, but from within the B-series, the mental map of time only has the present moment lit up. The mental temporal map would look as follows:

Figure 11

^ = “me-here-now!”



The external map of time (if we could look see the thought “me-here-now”) would look as follows:

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<sup>25</sup> The presentist, insofar as they believe in the existence of only the present moment would not agree with this characterization. However, I do not think that they would deny that the experience incorporates an extended temporal dimension; their metaphysics just choose to drop the extended dimension instead of admitting to a perspectival character of the experience.

Figure 12

[illegible]

Each moment is lit up from outside of the B-series. To privilege every moment is to privilege no moment, though. So we can account for an A-series experience without needing an A-series of time.

I take it that the experiential character is the strongest pull of the A-series. The A-series represented world is in fact the world we experience and act in and so it is easy to see how this would be compelling evidence for the A-theory. However, as I have attempted to show, the B-theorist can fit these experienced properties into his theory without admitting the independence of these properties outside the subject. Notice that we do not feel compelled to maintain that space flows, despite the indexical “here” being part of that positioning and reposition in the spatial map. The A-series becomes no more a part of the subject independent world than itchiness.

And just like itchiness, or a variety of other subject dependent properties such as visible, poisonous, etc., we can still talk about temporal flow. I can say, “This sweater is itchy,” “This wavelength of light is visible,” “This berry is poisonous.” Likewise, I can say, “This dimension is flowing.” Whether we conceive of this difference as one caused by the sensitivity of the human skin, the constraints of the human's visual sense organs, or the biology of a human (or whatever organism we may be talking about), I can still talk

about the property while recognizing it to be a property dependent on the relation between the thing and a subject.

And it is true that time stands in a different relationship to us than space. As mentioned above, there seems to be a sense in which I can control my place in space, but I cannot control my place in time. In one sense I can trivially say these amount to the same thing in both cases. “I am here” and “I am now” are both necessary, but in order to change my spatial position relative to other objects I must move, but to change my temporal position, I need only wait. There is a sense in which, by my own choice, I could be in a different place, and so only contingent that I happen to be in this place. But as I cannot, by my own choice be at a different time, it starts to look to be a necessity that I am in the temporal location I am.

The last question regarding the unfolding character of our temporal experience is one regarding the issue of a changing perspective. Even if one grants that the serial nature of experience is bound up in the perspectival character of experience, I still need to explain what it means to be in one perspective *and then* another, that I need to explain how I *change* from one perspective to another. But at this point, we have returned to a problem addressed early on in the discussion of Zeno’s Arrow Paradox. We need not think of our positioning and repositioning of ourselves in the B-series at every different moment to be a literal *repositioning*. The series of different experiences at difference times is the only change needed. As the B-theorist can always point out, change is something that occurs *in* time. My different representations of my positions in time, is just that, different representations at different times, and the sum total of those

representations at every moment of my existence is something structurally dissimilar to time.

#### **§4 Multiple Drafts, Single Perspectives:**

In order for a kind of A-series to be represented in experience without being part of time, itself, we had to incorporate the possibility that our representations in experience could be structurally dissimilar from that which they represent. Further the best type of model for consciousness in this picture is one like Dennett's Multiple Drafts Model. The B-series looks sterile and stripped down, but in its barren state contains a kind of beauty and elegance. Then we have our experienced perspectival time. Our experience is connected to the world and time via a kind of interface; we have senses that are sponges for potential information from the external world. The information that makes its way into our mental processes does so in time, and the timing of the movement of pieces of information can, in principle, be mapped onto the B-series of time. The processing is, after all, occurring while the world carries on and this is probably one of the reasons it happens so quickly. B-series time and the time in which information zips around the brain are one and the same time. There is also, however, the content of the information being shuffled around, that is, what the information *is*. In the case of time, the information is about when things are happening, relative to other moments, relative to some present moment, sometimes mixed in with where things are happening and also *how* they are happening (dynamically, statically, slowly, quickly, etc.) So we have the

timing of the thing delivering the information and the timing of the events contained in that information<sup>26</sup>.

When we allow for this non-cinematic view of temporal representation whereby time is not its own representation and the conveyance of structural properties can be achieved in ways other than by the vehicles of representation being, themselves, structurally similar to the represented time, then we have a theory of representation that fits best with a multiple drafts-esque model of consciousness. As laid out in the previous chapter, this model portrays consciousness as being vague, disconnected, fuzzy, and in some ways ill-defined.

Although initially, it may be counterintuitive in nature, it does solve many perplexing phenomena that traditional cinematic models of consciousness are unable to solve without becoming cumbersome and themselves counterintuitive. The Multiple Drafts model of consciousness can do the work, but can it mesh with how consciousness *feels* to us?<sup>27</sup> The Multiple Drafts model is not just about the vehicles of representation having a plurality of parallel timing, but the content of the representations having a plurality of parallel timings as well. So, the content of the representation is what the timing *seems* like.

Consciousness does *seem* to “settle” on a single linear timing of events, at least in memory. The following will focus on two main tasks. The first is to examine our

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<sup>26</sup> Sometimes these two are structurally similar, though. Sometimes the information of, say, the order of events, is conveyed by the order of the representations.

<sup>27</sup> While there are some things that do not have to be as they 'feel' or 'seem', consciousness does not seem to be afforded this luxury, what with it being consciousness and all.



experience, our consciousness, to determine whether it does in fact seem to be as linear and continuous as it is considered by some to be. Specifically, whether two characteristics of the Multiple Draft model, (a) the disjointedness of the individual streams, and (b) the many disjointed and parallel running streams, really are at odds with experience. The second task will be to provide an account of our experience and the Multiple Drafts model that does capture whatever experienced properties there actually are. For instance, if it turns out that our experience does in fact seem to be singularly linear, we will need to provide an account of how that comes about in the Multiple Drafts model. In the end, I will argue that experience does have some of the properties of linearity and continuity, but not by virtue of a singular stream of representations that necessitates a linking and unification of experiences. Instead, consciousness is sometimes continuous, most of the time linear. The linearity, I argue, is a contingent linearity that is determined by somewhat arbitrary “probes” into consciousness, rather than being created by structural similarities between represented time and objective time. These probes are arbitrary in the sense that some character of consciousness does not determine them, but they are not completely arbitrary, instead being determined by environmental and internal conditions.

### **§5 Why Does It Seem So Singular?**

The Multiple Drafts model can have a convergence like aspect because there is a certain amount of collapsing when information settles. That is not to say that there are not multiple, parallel drafts constantly being updated and reworked, but there is an *apparent* singularity. The singularity could come about it two ways, it seems. (1) It could be a

singularity that is an experience of a single stream of information, or (2) it could be the idea of the singular individual, the self, that underlies the streams of changing experience. The Multiple Drafts model does not support the first option, so how might we have an apparent linearity from an underlying notion of the individual?

In *Change Blindness*, Ronald Rensick (2005) lays out multiple ways in which individuals are blind to change. These differ from cases of akinetopsia where dynamic motion is not detected in two ways. First, change blindness does not rely on a specific defect in the brain's natural capacities, such as those which occur when there is damage to the MT region of the brain causing a systematic failure to detect motion. Instead, change blindness is common to all people and inconsistently occurs across the population and even within an individual. Second, the change to which one may be blind does not rely on motion detectors. The change being discussed in reports of change blindness is of a specific sort. It is to be differentiated from dynamic motion, completed change, and difference. The point of the first differentiation decouples motion detection from the detection of change. For instance, I may track the change in the position of an object that is moving slower than needed to detect motion, or track an object that is temporarily occluded and so motion detectors are blocked from being activated. The second is distinguished from change in that it is an awareness *that something has undergone a change* rather than *that something is undergoing change*. Rensink points out that the former does not require an internal representation of a spatiotemporally continuous entity, whereas, the latter does. However, the external entity being represented need not, itself, be spatiotemporally continuous, for instance, in cases where the object is occluded. While there are many specific ways in which change detection can be induced, I will speak of

three different types. First, change blindness may occur when the change occurs while the object is temporarily “cut off” from the observer. This can be done by either making the change during a blink, a saccade, object occlusion, or film cut like those which occur in movies. For instance, in one experiment (Simons and Levin 1998), subjects were approached on the street by a stranger asking directions. While the subject was giving directions, two movers with a large door passed between the subject and the stranger, obstructing the subject's view momentarily. During the obstruction, the direction-seeker was replaced with a different person, also a stranger to the subject. Once the door had passed and the subject's view was no longer obstructed, he continued to administer directions without pause. The change from the original direction-seeker to a new person was in most cases unnoticed. This type of change blindness relies on the object that is represented as spatiotemporally continuous not being spatiotemporally present for the observer<sup>28</sup>. Second, change blindness may occur when the changing of an object occurs simultaneously with the introduction of a brief distraction. This kind of change blindness (or inattentional blindness) is often used in stage magic, whereby a large flash, puff of smoke, or fiasco of some sort is introduced, thus drawing the attention of the audience away from the target change<sup>29</sup>. Note that in these cases, while the attention is draw away,

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<sup>28</sup> It may be objected that, in these cases, there is a failure to detect that change has occurred rather than the object is changing. However, when we successfully detect change in such cases, we represent that the object is *changing*, not that it *has* changed, and so should allow that when we do not successfully detect change, we have not successfully detected the object *changing*. Further, it will not have too much philosophical bearing here, and Rensink even states that it is an open question whether there is a hard and fast line that can be draw between the two.

<sup>29</sup> For a further discussion of stage magic and change blindness and inattentional blindness see: Macnick, et al. “Attention and Awareness in Stage Magic,” *Nature Reviews: Neuroscience*, 9. 2008.

the change is still within sight of the audience. Finally, change blindness may occur when the changing occurs gradually, although not too gradually that one cannot notice it once pointed out. One case of this appears in the Monkey Business Illusion by Daniel Simmons (2010), whereby a curtain behind a dynamically changing scene, changes colors. Unless known about ahead of time, this change goes unnoticed most of the time. In the second two types of change blindness, the object undergoing change is left undisturbed and so available to the observer as spatiotemporally continuous.

In the Monkey Business Illusion, subjects are asked to watch a video. In the video, six individuals, half wearing black shirts and half wearing white shirts pass two balls between them, while intermingling amongst each other. The subject is asked to count how many times the balls are passed. The task is difficult and requires great concentration on the scene. Regardless of the success in counting the ball passes in the scene, what is most striking is that a man in a gorilla costume walks right through the scene, right through the middle of the ball passing. Only about half of subjects who do not know about the gorilla ahead of time actually notice the gorilla passing through the scene, which they are so intently focusing on. How is it that a change such as this can be missed by so many people?

Rensink proposes that the successful change detection is tied to one's *focused attention*. Rensink (2005, 262) points out, “Prior to focused attention is a stage of *early processing*, i.e. processing that is low-level, rapid, and carried out in parallel across the visual field. The resultant structure (*proto-objects*) can be quite sophisticated, describing several aspects of scene structure. However, they have limited spatial coherence. The also

have limited temporal coherence. They are volatile, and so are simply replaced by any new stimuli at their location.” An object may be brought into a *coherence field* by focused attention. He states that focused attention serves to pick out the proto-objects from the lower level processes and bring them into a coherence field where they gain a more robust and coherent representation maintained with constant feedback from the lower level processes. In the case of the Monkey Business Illusion, one's attention is focused on the task of counting the ball passes and although there are only two balls, there are two members of each ball passing (the thrower and the catcher). Evidence suggests that our attention can only hold about four different objects in a coherence field at a time. This illusion is a case where the task is distracting from the detection of other changes in the scene. However, there are cases of gradual change blindness that occurs even when the subject is asked specifically to focus on a single change in an otherwise unchanging scene (they are not told *where* the change occurs, only *that* it will occur).

Attention may be focused in a few different ways; it may come about from motion detection, tasks at hand, etc. How might this aid in an understanding of the linear feel of consciousness? The processing that occurs prior to objects being represented in a coherence field in a more robust way seems to be rather compatible with a Multiple Drafts model of consciousness, one where information is being updated and reworked by many different parallel running streams. For instance, all this information is coming into my body and brain and I perform a certain actions based on it. However, the totality of the information coming in does not ultimately determine what action I perform and the resulting experience, but rather the action I perform determines what information gets “settled” in consciousness. That “settling” is, in a way, the experience. The performance

of an action focuses attention and becomes an artificial “probe” (as Dennett puts it), which can settle things into consciousness. Without these (artificial for Dennett) probes, the constructed story that settles into memory does not get told. However, we are constantly probing our consciousness by acting, reacting, and responding in the world. This steady stream of probes, settles stories into memory and becomes the “stream” of consciousness and gives the appearance of a single stream. What studies in change blindness shows us is that those things that get settled upon in memory are not determined by merely making their way into our experience, but rather require further engagement. What gets patched together in the narrative that settles into memory is a collection of largely disconnected experiences along with enough reconstruction to make it seem coherent.

Returning to the topic of magic, one way that we are confronted with the gaps of our experience and the reconstruction that takes place is in sleight of hand tricks, which often take advantage of change or inattentional blindness as well as our mind tendency to recognize and project patterns. In a conference on neuroscience held in Las Vegas, discuss in Macnick, et al., one such trick was discussed. The trick consisted of the magician, Teller, pulling coins out of thin air and tossing them in a bucket. He then reveals an empty bucket. This is what we see, this is the narrative that settles into memory, this is magic. But there were no coins that appeared from nowhere for us to experience, and there were no coins being tossed into the bucket, there was no magic. What was going on was that of all the things that were before our eyes, only some of those made it into the narrative. The sound of a clang in a bucket draws our attention serving as a probe into our brain processing. Earlier, you saw a thrusting hand movement

towards the bucket, which is still buzzing around your brain being processes (probably long enough to be connected with the clang because it was a sharp, attention grabbing movement). The narrative of a coin being tossed into a bucket settles into memory and no experience of a coin flying through the air is ever had. But this is the very reason that magic works; we think that we see everything that is right in front of us, and we think that we *see* what we *think* we see.

Dennett rejects the notion that consciousness is continuous and streamlike in his presentation of the Multiple Drafts model of consciousness. Galen Strawson (1997, 405) also rejects the continuity of consciousness when he says, “It is always shooting off, fuzzing, shorting out, spurting and stalling.” Dennett's argument comes couched in neuroscience and psychology more than the first person experience. The single stream of consciousness is illusory in the sense that the experience of a single stream is really just a reconstructed narrative that does not even get “filled in” in memory, but only appears to be filled in; there are gaps that we just do not notice or even consider. While I have argued above that there is this sense in which the singularity of the stream is illusory, there is also a sense in which we might be overly romanticizing how singular and unified our consciousness really seems. Aside from the familiar case of failing to notice that you are tapping your pen while carrying out a math problem, everyday we lose our train of thought, have the ability to multitask, and are able to carry out a complexity of tasks with differing timings. This indicates that our experience is not as singular and continuous as we may like to think.

Issues in personal identity are closely related to those of time. One way that the debate between A-theorist and B-theorists crops up is in terms of whether my self is

constituted of three or four dimensions? Am I a three-dimensional self, wholly present at every moment? Or am I a four-dimensional being with different parts present at different times? As a B-theorist, I opt for the later. But I do not intend to get into these issues here. For my purposes, I only want to assume the four-dimensional picture and see how it may fit in with the rest of what I have laid out above. When I add the Multiple Drafts model of consciousness to my four-dimensional self, I start to look like something fairly ill defined, something with fuzzy boundaries, sprawled out in all directions. I have no mark of what counts as me and what counts as the rest. Resistance to this fuzzy picture seems to be embedded in the classical Cartesian view of consciousness. I have already shown that this view is mistaken, but its effects on us cause us to resist an alternative view of consciousness, but a more plausible and objective view of time. We want our selves to be unified in space (or at least the mind) and in time, we do not want to relinquish control to the different parts of the brain, and we may be even more resistant to handing it over to our different temporal parts. Once we understand the smeared nature of consciousness, we can have a much better understanding of how we find ourselves in time and how to separate our own experiences and biases from time, itself.

### **§6 Free Will in the Block Universe**

Even if we accept the Block Universe as the correct model of time, there may be remaining worries about the place of free will. In chapters two through four, I argued against an objective, unique, and shared present, as well as an inherent flowlike character of time. In the absence of such qualities, we can no longer conceive of our existence as unfolding in a moment of *becoming*. The idea of *becoming* is in many ways different than



our mere idea of a flowlike character of time. The flowlike character of time may be appealed to in explanations of a dynamic experience, of objects moving, of the dynamic character of our experience passing. However, the idea of *becoming* seems to be more entrenched in our ideas of free will and our ability to create or affect the future (even if the future is a subjective idea).

Supposing that we now have a story (or at least a gesture towards a story) for how time can be experienced dynamically in a way that space is not<sup>30</sup>, I will turn to an underlying weirdness about the whole thing. There seem to be strong intuitions that do not fit into the block universe picture: (1) we think that we have free will and there seems to be no room (or at least an unsatisfying amount of room) for this, and (2) intimately tied to the notion of free will is the idea of creation and that the future is in some way created by us, or at least our present actions along with other present events.

Gödel describes the passage of time as the slices of 'now' coming into existence<sup>31</sup>. In a footnote in the same piece, he claims that relativizing the passage would not properly capture what we ordinarily mean by 'passage', since what we normally mean when we talk of passage is a change in what exists. And he states something similar to what I have pointed out in chapter one, that the idea of relativizing existence is rather unappealing.

So what are our ideas of free will and creation that run counter to the block universe? What kind of freedom is allowable in theories where time flows? Suppose the future does not exist under these theories, then there are no future facts that we are

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<sup>30</sup> I put the contrast between space and time here, not because I have given an explanation for *why* we experience space and time differently, but only, given that we do, how this is possible without them differing by the former being fundamentally static and the latter being fundamentally dynamic

<sup>31</sup> He does not claim that the slices then go out of existence.

changing, there is no way that the future is such that our actions in the present will alter those facts. If there is no such future, we may consider that the future only comes into existence when it becomes present, and it is very important that it is an act of *becoming*, or *unfolding*. So free will must be a different kind of control over the future. Free will must consist in our ability to change or interact with the objects around us in such a way that later events are counterfactually different, that is later events are not *what they would have been* had we taken no action or different actions on those prior objects. Our freedom to create the future is only tied up in our ability to affect objects.

Given that the block universe includes past, present and future events, how are we free to change the future from any point in the history of the universe? Well, if free will is just our ability to change objects such that they have different properties later, then the block universe theory is perfectly compatible with it. Take any moment on the timeline of a person, and suppose that at that point the person has the free will to push a glass off of a nearby table or not. They decide to push the glass off the table. The block universe, at a moment after the person decides, contains the fact that the glass is shattered on the floor. Could they really have done otherwise if that fact is “already” included in the block universe? The answer is yes, and if they had, then the block universe would include the fact that there was an intact glass on the table moments after they decided against their mischievous inclination. But there are not two facts awaiting creation just prior to their deciding moment, there is only one fact that has existence, but there is only ever one fact of the matter as to how we decide to behave; the universe is logically consistent and cannot contain two opposing states of affairs. To put it briefly, the block universe does not contain the facts about what you *will* do; it contains the facts about what you *do* do.

So the intuition that time flows can be adequately accounted for with the right understanding of what we mean when we say that time flows. The dynamic character of time is maintained by identifying temporal flow with temporal variation plus our perspective toward the temporal dimension. The unfolding character involved in future freedom and creation is maintained by understanding the block universe, not to be a story laid out before we experience it, but to be the totality of facts about the universe, and ourselves in general.

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**Courses Independently Taught:**

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- PHIL 225: *Metaphysics*, Fall 2012
- PHIL 100: *Consciousness*, Fall 2012 (2 sections)
- PHIL 319: *Independent Study on Philosophy of Time*, Spring 2012
- PHIL 224: *Theory of Knowledge*, Spring 2012
- PHIL 268: *Topics in Metaphysics*, Spring 2011
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University of Illinois at Chicago, Philosophy Department

- PHIL 105: *Science and Philosophy*, Spring 2009
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