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Temporal Minimalism: The Metaphysics of Time and Temporality

Jonathan C. Tallant

2005

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- 1 SEP 2005

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Introduction

In this thesis I set out to argue for the germ of a new metaphysic of time and temporality. So far as I am aware the assumptions made and the premises adopted, though perhaps not entirely uncontroversial, are at least defensible. They are in line with an approach to metaphysics that takes the discipline seriously as a study of being and not merely as the study of semantics. Broadly speaking my approach to metaphysics is in line with the notion of metaphysics as a discipline outlined in *The Possibility of Metaphysics* by Jonathan Lowe. That is, I take metaphysics to be the project of delineating what there could be (c.f. Lowe 1998: p. 9), and offering arguments as to what there is.

Thus, my study here concerns itself not merely with logical relations but with the metaphysical nature of temporality. For example, in chapter four I draw the conditional conclusion that, given the nature of our experience of temporality, the B theory of time requires us to adopt an account of temporal experience that is not sufficient to explain the way we perceive time and, hence, that this entails that we should reject the B theory of time. I say that this argument is conditional since it is clearly possible that our experience of temporality could be relevantly different. Were this the case (for example, were we to not perceive temporal passage) then the non-logical terms introduced into my arguments (i.e. the nature of temporal experience) in conjunction with the laws of logic, would not be sufficient to motivate the rejection of B theoretic analyses of time. However, since I maintain that our metaphysics, the conjunction of logical laws and non-logical terms, rules out B theoretic analyses of time and temporality it follows that all such theories are false.

In adopting the approach to metaphysics, and to time, that I do there are some further premises assumed. I assume that our metaphysics is privileged in the sense that it is prior to our science. In other words, I assume that if we have metaphysical reasons to revise the metaphysical commitments of an accepted physical theory, then we are entitled to make the revisions to our physical theory, provided that the metaphysical reasons are adjudged to be sufficient to warrant such a revision in the physical theory. The significance of this assumption becomes clear in my rejection of the contemporary interpretation of the special theory of relativity.

With these assumptions in hand I attempt to argue in favour of a new theory of time, Temporal Minimalism. In the first chapter I offer a recapitulation of McTaggart's argument to the conclusion that time is unreal. This provides an important foundation for what follows inasmuch as it is not clear that the "paradox" revealed by McTaggart is always treated as a metaphysical problem – as it should be. Rather, it seems that in much of the literature McTaggart's arguments are revised into a semantic thesis about the nature of tensed sentence tokens and their truth conditions. In this first chapter, then, I argue that McTaggart's "paradox" is best thought of, not as a genuine metaphysical problem, but as a signpost to two distinct ways that time could be.

In chapter two I argue that what is commonly referred to as "B theory" has taken on a number of other ontological commitments. Few, if any of these, are essential to the endorsement of a B theoretic account of time and temporality; but all are used as motivational in the arguments in favour of B theoretic accounts and against A theoretic accounts of temporality. Having established the existence of this revised form of B theory in the literature, I set out to show that the various commitments do not form the coherent whole that is commonly supposed.

Throughout chapter two I concentrate largely on semantic theory and the relationship between tensed and tenseless accounts of truth conditions and the nature of time. I argue that the new B theory of language can be rescued from the criticisms made of it by tensed theorists provided the B theorist of language is prepared to endorse certain modal claims and certain views of dates as definite descriptions of their contents. Ultimately, however, I believe that the debate has taken a wrong turn. It is my claim that the theory of tense that one adopts is entirely independent from the ontology, A or B theoretic, that one endorses.

In chapter three I argue that the conjunction of B theory and theories of space-time is misplaced. I argue, in the first instance, that theories of space-time are undesirable given our current scientific theories and, second, that the conjunction of B theory and space-time is a metaphysical impossibility. With these two arguments concluded it should be clear that the B theory of time (taken to include an endorsement of space-time) is much less powerful than is commonly supposed. Much of the motivation for accepting a B theory has been removed and the cogency of adopting B theory as the "view from science" has also been denied. I also probe the definition and formulation of the B theoretic position.

In chapter four I argue that it is intrinsic to the nature of temporal experience that it cannot be accounted for by a B theoretic ontology of temporality. The argument here hinges on the claim that standard B theoretic “secondary quality” accounts of temporal experience entail an “explanatory gap”, and that the best attempts to close that gap, not only fail, but assume that which they set out to prove – namely that a B theoretic account of temporal experience is possible.

In chapter five I argue that it is the eternalist conception of time that is mind dependent – that such treatments of time supervene upon mind dependent conception of time as essentially space-like – and that the mind dependency of such views of time is evident throughout the development of time concepts. In addition I offer the mind dependence of eternalism as a potential solution to the problem of why theories of space-time have been so successful if they are, as I claim, non veridical. Thus, chapters two to five should be seen as composing a negative thesis.

In chapters six and seven I attempt to develop a positive thesis, a strain of presentism that can satisfactorily deal with the numerous technical problems that beset our current best theories of presentism. In chapter six I lay out what I perceive to be the most serious problems with contemporary accounts of presentism as well as what I perceive to be the defects with the models suggested by Smith and Craig. It is with these criticisms in mind that I turn, in chapter seven, to an explication of Temporal minimalism. Temporal minimalism provides a hybrid solution to McTaggart’s paradox; a hybrid between presentism and a C theoretic analysis of time. It is a strain of presentism that has sufficient resources to meet the problems raised in chapter six, and, as a dynamic theory of time, sufficient resources to account for the nature of temporal experience.

Chapter One

In chapter one I:

- *Lay out McTaggart's terminology and arguments in detail (1.1);*
- *Show that McTaggart's arguments do not uncover a paradox, but that they show the constraints placed upon any theory of time (1.2);*
- *Argue that A-theoretic responses to the paradox should not be pursued (1.3);*
- *Argue that the current species of hybrid theories should not be endorsed (1.4);*

1.1 McTaggart's paradox

In *The Unreality of Time* John Ellis McTaggart argues that time is unreal. Although McTaggart's conclusions are not accepted his argument has left an indelible impression upon the philosophy of time. An explication of the "paradox" will be fruitful since it is not clear to me that the nature of his arguments has been appreciated by all. Quite simply I believe the thrust of McTaggart's arguments concerning the nature of time to have been ignored, or missed, with philosophers preferring to comment on semantic arguments concerning tense.

1.1.1 The A series

McTaggart begins by differentiating three distinct series. The first, the A series, may be defined as, 'the series of positions running from the far past through the near past to the present, and then from the present to the near future and the far future' (McTaggart 1908: p.458).¹ This series, then, is intended to capture the transitory nature of time, for it is through the continual alteration of this series that we may say that there is change and time. Specifically this A series change consists in an entity first being future, then present and then past. The Battle of Hastings, for example, has changed inasmuch as it *was* future, it *was* present, and it *is* past. Because of this change in A qualities we are entitled to say that there has been a real change in the metaphysical qualities of the Battle of Hastings from future to present to

¹ I refer to the "A series", rather than "A-series", in keeping with McTaggart's original tabulation. I also refer to temporal "qualities," again following McTaggart.

past. The transience of the A series (the continual change in what is past, present and future) seems laudable inasmuch as it appears to capture how we think about time as intimately related to change in what there is.

There are obvious overtones here of an event ontology, since it would appear that events are the prime candidates for this kind of change. But it does seem that whether one views events, substance or some other metaphysical category as ontologically primitive one will still want to say that there is, at least as implied by natural language, a reason to treat certain states or entities as past, certain states or entities as present and others still as future.² If this is true, if entities are past, present and future, then it makes sense to ask in virtue of what it is that this is true: what it is that *makes* entities past present or future? If one endorses an A theory then one will believe that it is temporal properties of these kinds that make entities so and that it is these temporal properties that constitute temporality.

Although there are good reasons for rejecting the claim that there are genuine A theoretic qualities (1.3), for now let us suppose that McTaggart was correct, and that an entity is past just in case it has the quality of pastness, present if it possesses the quality presentness and future if it has the quality futurity.

1.1.2 The B series

In distinction to this ever changing A series, we also speak of entities as standing in a set of permanent relations; the relations of earlier than, simultaneous with, and later than.³ McTaggart defines these relations as constitutive of the B series. Thus, if x is ever later than y then it is always later than y, if x is simultaneous with y then it is always simultaneous with y and if x is earlier than y then it is always earlier than y. If one is a B theorist one will believe that it is these relations that are necessary for time to be real. However, these relations do not *prima facie* capture the sense in which we think of change. Returning to the example of the Battle of Hastings it is not altogether clear that the Battle of Hastings being earlier than McTaggart writing *The Unreality of Time* provides us with an account of change. In being comprised of

² In view of this claim I will use the term “entity” to refer to occupants of positions in time. In doing so I hope to avoid prejudging whether such occupants ought correctly be thought of as events or otherwise.

³ McTaggart himself refers to only earlier than and later than; I include the simultaneity relation since it is a useful relation for the B theorist.

permanent relations the B series seems to lack the transience that was held up as desirable in the A series. Whereas on the A theoretic account an entity *becomes* present and past, on the B theoretic account entities simply stand in the permanent relations of earlier than simultaneous with and later than. This is, however, only a *prima facie* objection and is one that stands in need of further scrutiny.

1.1.3 The C series

The third series McTaggart mentions, and one oft neglected in the literature, is the C series. I suspect that the reason that the C series is normally left out of discussions of McTaggart and time, is that it does not tell us anything about what time is. As McTaggart says,

But this other series – let us call it the C series – is not temporal, for it involves no change, but only an order. Events have an order. They are, let us say, in the order M, N, O, P or O, N, M, P or in any other possible order. But that they have this order no more implies that there is any change than the order of the letters of the alphabet, or the Peers on the Parliament Roll, implies change. (p.462)

For now, we ought to note that a series of entities existing as the C series exists is a series that has no time. There may be an ordering relation among the entities, such as that of the alphabetisation of the names on the Parliamentary Roll, but an ordering relation, as in the case of the Parliamentary Roll, does not entail temporality unless that particular ordering relation is itself a temporal relation. Certainly, there is no obvious reason to suppose that a simple ordering relation, such as the list of names on the Parliamentary Roll, is sufficient for temporality. If this were the case then it seems that we should have to say that such lists themselves were temporal, that the Parliamentary Roll changes (in the sense intended when we think of time) in virtue of being composed in accordance with an ordering relation.⁴

Of course a C series is not without direction; any C series will have at least two directions, from less inclusive to more inclusive and from more inclusive to less inclusive. Returning to the case of the Parliamentary Roll we have the two directions

⁴ Though the names on the list will change over time and there is a sense in which the list, once ordered, demonstrates alphabetic variation across its length.

from A to Z and from Z to A. Broad (1938c: pp. 519-526 and pp. 534-575) analyses McTaggart's concept of the C series. Much of what Broad has to say about the C series concerns apparent perception of temporality within the C series, if time is unreal: put another way, how it is that we believe there to be time if, in fact, we exist in a C series (pp. 551-575)? Since I do not accept McTaggart's conclusion, that time is unreal, much of this is irrelevant to us here.⁵ All that we need to take from our brief examination of the C series is that it is a non temporal series.⁶

1.1.4 Paradox

With the three series in mind, what is McTaggart's "paradox"? In describing the C series as an ordered, but as yet non temporal series, it is necessary for a proponent of real time to state how we get from the non temporal C series to the temporal B series. Both the B and C series are constituted by permanent relations, but, as was noted above, there appears not to be anything obviously temporal about an ordered series. If the B and C series are identical then there would appear to be no time, there is simply an ordered relation.⁷ According to McTaggart, in order for time to be real the B series must be a very particular type of series. It is a series that may be formed from the conjunction of the ordered relations of the C series and the temporal qualities of the A series. However, McTaggart argues that the A series itself proves to be incoherent and, since the B series is to be formed from the conjunction of the ordered relations of the C series and the temporal qualities of the A series, it must be the case that the B series and, hence time, is unreal.

McTaggart argues:

Positions in time, as time appears to us *prima facie*, are distinguished in two ways. Each position is Earlier than some, and Later than some, of the other positions. And each position is either Past, Present, or Future. The distinctions of the former class are permanent, while those of the latter are not. If M is ever earlier than M, it is always

⁵ Though if one were to suppose that time is unreal then one may wish to explore this notion further.

⁶ There is a striking similarity between the way McTaggart (1909) conceives of reality as timeless, and his view of the C series (see Broad 1938c).

⁷ Of course if all ordered relations were temporal then this would not be the case, but since we know of ordered relations that are not temporal it is necessary to state how it is that the B series is temporal where the C series is not

earlier. But an event, which is now present, was future and will be past. (McTaggart 1908: p458)

Of course, if an entity is present then it cannot be past or future, neither can a future entity be present or past, nor a past entity present or future; these qualities are mutually exclusive. But if an entity is past at some time, then it is also present at another and future at yet another. Hence an entity is past, present and future, a clear contradiction. If the A series is unreal then that which discriminates the B series, as temporal, from the C series, as mere ordered relations, is denied to us and the two appear to collapse into one and the same thing. Further, if the B and C series are one and the same thing, then there is no time as the C series is not temporal. The most obvious objection to McTaggart's arguments is that entities do not hold each of these incompatible temporal properties *at the same time*. However, as we shall now see, this is of little use since it forces us into an infinite regress.

Consider, for example, McTaggart's writing of *The Unreality of Time* as present, my writing this paper as future and the Battle of Hastings as past. If the C series does not itself change then it is not true that the Battle of Hastings is *past, then present and then future*; rather the Battle of Hastings will simply *be* in the C series. And if the C series exists *simpliciter* then it cannot be the case that each of these temporal qualities can apply to entities consecutively for the obvious reason that this appears to entail a change in the C series where the C series is defined as that which does not change.

The most instinctive move to make is to argue that there is a further series, call this the D series, in which the state of affairs where the Battle of Hastings exists as past, the writing *The Unreality of Time* exists as present and my writing of this paper is future, exists as a single entity. In addition to this the D series includes entities – or D times – where the Battle of Hastings is present, and both the writing of *The Unreality of Time* and my writing this paper are future, where the Battle of Hastings and the writing of *The Unreality of Time* are past, and my writing this paper is present. These will all exist, as well as a whole host of other temporal entities, each of which will possess A series qualities.

The problem with this move is that while it is able to account for the existence of each of the A series qualities without contradiction, so far it fails to provide any kind of metaphysical change of the sort that was mentioned above as being genuine

change, the change of the A series. Each of the D times simply exists. There is no change in which one of these states is genuinely past, present or future. For example, the D time in which the Battle of Hastings is past, the writing of *The Unreality of Time* is present and my writing this paper is future, simply exists unchangingly, in a series of permanent relations to other D times, such as the D time where the Battle of Hastings is past, the writing of *The Unreality of Time* is past, and my writing this paper is present. In order to provide some genuine metaphysical account of this change we would have to stipulate further that which of these D times is instantiated is dependent upon which of them is, itself, present. But, if we are to reconcile this to the existence of the C series, then we must say that all of these various D times exist, *simpliciter*, and then we must find some way of avoiding saying that one of these D times is past, present *and* future – which we are committed to unless we further specify a higher time series in which each D time is first future, then present and then past.⁸ It is easy to see, then, that this attempt to move away from the paradox by specifying temporal passage in a higher time series leads us into an infinite regress. For every level at which one postulates a time series it is necessary to have a further series into which to build an account of genuine metaphysical passage and so on.

As McTaggart goes on to argue,

[T]his explanation involves a vicious circle. For it assumes the existence of time in order to account for the way in which moments are past, present and future. Time then must be pre-supposed to account for the A-series. But we have already seen that the A-series has to be assumed to account for time. (McTaggart 1908: p.468)

I think that we might sum up McTaggart's claim thus:

M1: The A series is essential to time

M2: The A series is composed of the qualities past, present and future

M3: The qualities of pastness, presentness and futurity are mutually exclusive

M4: Every entity has the quality of pastness, presentness and futurity due to being in the A series, if time is real

M5: Time is unreal

⁸ For shorter, though less detailed, expositions of the paradox see variously, though not exclusively, Horwich (1988: p.18); Dummett (1960: p.498), Lowe (1987a: pp 62-63) and Geach (1979: p. 90)

1.2 A or C

However, McTaggart is wrong; time is real. The first thing to say about the “paradox” is that even if all of the premises that are offered were essential and the arguments led to the conclusion that time is unreal, then it might still not be possible to accept that conclusion. There is an important sense in which time is so fundamental an experience and concept that to declare it unreal may actually border on the impossible – at least to *believe* the conclusion to be true might be impossible.⁹

In any case McTaggart’s argument does not force us to accept that time is unreal. What it does appear to force us to do is to give up *either* the A series *or* the C series. In 1.1.4 it was noted that if the C series was to be reconciled to an ever changing A series then it would become necessary to specify the existence of a higher time series to account for temporal change. It was this need to postulate an ever higher time series that forced us to admit that there is a paradox at the heart of our descriptions of time, since there is no series in which we can coherently capture the passage of time alongside a changeless description of what there is.

But, if this is true, if it is the conjunction of the A and C series that gives rise to the paradox, then the formulation of the paradox at the end of 1.1.4 is incorrect. Instead we ought to state it thus:

M1*: The A series is essential to time

M2*: The A series is composed of the qualities past, present and future

M3*: The qualities of pastness, presentness and futurity are mutually exclusive

M4*: Every entity has the quality of pastness, presentness and futurity due to being in the A series, if time is real. Either that or the C series does not exist

M5*: Time is unreal

But plainly M5* does not follow: instead it ought to be replaced with M5**

M5**: Time is unreal *or the C series does not exist*

⁹ One might, for example, strike an analogy with Hume’s claims concerning causation.

This would appear to be the correct reading of McTaggart's original argument and this suggests that McTaggart's arguments do not form a paradox, but that they point to the fact that time must be perspicuously described as composed of ordered relations (B theory), be unreal (though whether we could accept such a conclusion is a debatable point) or the A series is real and the C series must be unreal.¹⁰ Our analysis must then turn to an examination of theories that purport reality to be composed of ordered relations and theories that prefer A theoretic descriptions.¹¹

1.2.1 A problem of tense?

It has been argued, in various places, e.g. Mellor (1981: pp. 5, 92-98), that rather than proving time unreal, McTaggart's real success, or at least the real success of his argument, is in proving that tense is unreal. Proponents of such views (Mellor and Le Poidevin 1987: p. 535) suggest that McTaggart fails to show that time is unreal but that he succeeds in showing tense to be unreal. The problem of tense will be dealt with below in chapter two. For now it is simply my intention to argue that there is a genuine issue at stake here and one that we cannot afford to conflate with a problem of tense. This is not to say that Mellor and Le Poidevin do so, merely that we must be careful how we proceed. If, for the sake of argument, we suppose that the C series exists then we cannot conjoin that C series to any objective account of becoming. Any attempt to do so leaves us with a contradiction, our metaphysical problem – McTaggart's "paradox". A metaphysic that includes an account of metaphysical becoming cannot be conjoined to an account that entails the existence of more than one time. This is, at any rate, the apparent conclusion we should reach from a careful examination of McTaggart's arguments. Thus, there *is* a metaphysical matter at issue here, something that may, or may not, be over and above a discussion of tense, but there is no paradox.

¹⁰ (C.f. Craig 2000a: p. 180).

¹¹ Although as it turns out we shall have to explore another type of theory to stand in stead of A theoretic accounts. The view I have in mind is presentism.

1.2.3 A signpost not a paradox

The metaphysical matter in hand does not, as I suggest above, entail that there is a paradox. In addition to the reworking of the conclusion to McTaggart's "paradox" to the conclusion of M5**, there are a number of objections that one can make to McTaggart. One could deny, as Horwich (1988: pp. 18-20) does, that the kind of change envisaged as essential by McTaggart is a non essential feature of time, preferring instead to think of time as mere variation (Russellian change) or as physical change in a given entity, or entities. Both of these options come with an attendant metaphysics. In any case, given the discussion above showing that McTaggart's arguments force us into viewing time as composed of either ordered relation, or as somehow A theoretic, it seems inappropriate to continue to suggest that he uncovered a paradox, unless of course it can be shown that both of these options are themselves paradoxical or that we *must* accept the union of A and C theoretic accounts as he conceived of them. Thus, we now turn to sketching a more detailed account of the A and B theoretic solutions to the paradox.

1.2.4 A theory

A pure A series account would appear to offer us the advantage of according with our natural language descriptions of tense (desirable, if not essential) and with our perceptions of temporality. It achieves the first of these by taking literally the claim that if an entity, say the Battle of Hastings, is past then it is so in virtue of having the quality of pastness (similarly for the other temporal predicates). Thus, what exists now is the Battle of Hastings (with the quality of pastness), my writing of this paper (with the quality of presentness) and the year 3000 (with the quality of futurity). The second virtue of the A theoretic account, that it accords with our perception of temporality, is achieved by having what exists literally change. Hence, the reason that I perceive first my flicking of a light switch and then the turning on of the light is that when I press the light switch that event *is present*. It has the quality of being present and it is that quality that permits the mediation of the sensation to my mind. Whatever peculiar powers we are to attribute to this moving present among them must be the ability to mediate sensations to the mind. But it seems reasonable to suggest upon first

analysis that we perceive there to be change because there is change in the temporal qualities borne by entities.

This *kind* of view is held by Jonathan Lowe, who argues that McTaggart's denial of the reality of time hinges on a misinterpretation of indexical statements.

The mistake consists in forgetting the *uneliminably* indexical nature of A-series expressions, at least while they are being *used* as opposed to being *mentioned*: philosophers writing on time are constrained to *use* these expressions in the same context-dependent way in which ordinary humanity is – they, too, cannot escape their own temporal perspective, however much they may be tempted to suppose that they can view things *sub specie aeternitatis*. (Lowe 1987a: p.67)

Lowe's own view of time as passage is one of 'routes' through space-time positions (p. 69), where each 'route' is understood as 'a sequence of spatio-temporal perspectives' (op. cit). Note, therefore, that for Lowe, there is an important distinction between the present, the locus of any perspective, and the past and future.¹² It is obvious, given the arguments above, that someone wishing to maintain a "Lowe-style" metaphysics of time must give up ontological commitment to the C series. For if we can conceive of reality as C theoretic, or as composed from the unchanging relations of the B series, then we cannot also conceive of it changing, as it must for the A theoretic description to be true. Thus, a "Lowe-style" metaphysics cannot be conjoined to the existence of the C series.

1.2.5 B theory

Rather than agree with McTaggart and stipulate that it is the addition of the A series to the C series that gives rise to temporality, the B theorist argues that the ordering relations that stand between entities in time are, themselves, constitutive of temporality. This type of view is due to Russell originally, and can be stated thus:

Change is the difference, in respect of truth or falsehood, between a proposition concerning an entity and a time *T* and a proposition concerning the same entity and

¹² Gale (1969) also seems to hold a pure A theory – though he believes that there must be gradations in temporal properties in order to account for entities being more past, more future etc. In any case one must still deny the existence of the C series.

another time T' , provided that the two propositions differ only by the fact that T occurs in the one where T' occurs in the other. (Russell 1903 *Principles of Mathematics*: sect. 442)

Change, then, is not to be thought of as a physical change in what there is, i.e. a change in the location or composition of an entity or entities, nor is it the alteration of A theoretic qualities. Instead, change is variation in temporal location. For now all I wish to do is to dispel the pre theoretic intuition noted in 1.2 that seems to rule out B theoretic approaches as *a priori* false. We may separate this pre theoretic objection out into two distinct types of resistance: first that space is unlike time and hence talk of variation is inappropriate when talking about time, and, second, that the B theoretic account does not account for a change in the sum total of facts about reality that is necessary for there to be genuine change.¹³

The spatial objection can be dealt with quite simply, at least initially. The pre theoretic intuition is brought out and detailed by McTaggart (1927: ch XXXIII, sections. 315-316)¹⁴, where he points us toward the idea that a poker being hot at t_1 and cold at t_2 is insufficient for the poker itself to have undergone change. Rather, all that exists is a poker at t_1 in one state and a poker at t_2 in another. This no more provides us with a genuine account of change than does a poker being hot at one end and cold at another. In the latter spatial case we do not think of this as entailing change, at least not change as we conceive of temporal change as being, so we ought not to think of variation as sufficient for genuine temporal change in the temporal case. As Sider (2001) puts it:

No one says that the relative locations of the Greenwich meridian and the United Kingdom change, and no one says that a poker that is hot at one end but cold at another is thereby changing. But on the Russellian theory, change is the instantiation of different properties *at* different times, and is thus analogous to these cases of the instantiation of different properties *at* different places. (p.214)

However, there are ways in which the B theorist can respond. In the first instance talk of variation in the spatial and temporal cases may be simply analogical. It remains to

¹³ c.f. Sider (2001: pp. 212-216).

¹⁴ See also Sider (2001: p. 213), Lombard (1986: pp. 108-9), Mellor (1981: pp. 103-4, 110-11).

be seen whether or not the B theorist can account for all of the necessary features of temporality and temporal passage, but the presence of an analogy with the spatial case of variation does not entail that temporal variation will be unable to prove distinct from spatial variation. It may turn out that there are distinctions in type between spatial and temporal variation. Whereas in the spatial mode “variation” is mere variation across space, temporal variation may turn out to be manifestly different in virtue of being constrained by entropic increase (or some other constraint unique to time) – a condition that is not obviously applicable to spatial variation.

Second to this line of response, it seems likely that in order for the B theorist to provide an adequate account of temporality, and the distinctness of temporal and spatial variation, that time and temporal variation will turn out to be ontologically basic in some sense.¹⁵ As a result, the spatial analogue with temporal variation (which can certainly be found in language, e.g. the “length” of time an event might take) ought not to be taken to imply that time *is* space; rather, that although both time and space are extended they have fundamentally different characteristics. At the very least our experience of temporal and spatial extension and variation is sufficient for us to delineate successfully between the two. Thus, the notion that temporal variation is insufficient for change can be repudiated, at least for the time being, for it is not at all clear that temporal and spatial variation need to be at all alike.

The second, though related, objection to the B theoretic account was that genuine change requires an account of facts whereby the sum total of facts at time t1 is different from the sum total of facts at t2; a poker being hot at t1 and cold at t2 clearly fails to provide this. There is no change in the sum total of facts on the B theoretic account and, as such, the pre theoretic intuition that the sum total of facts at time t1 must differ from those at t2 must be violated if the B theory is to be true.

But it is quite simply unclear as to how serious an objection to the B theory this really is. If the B theories wishes to preserve some kind of account whereby the truth of tensed locutions changes then they will, presumably, admit that sentences change in truth value, such that “the poker is now hot”, spoken at t1, is true. But spoken at t2 “the poker is now hot” is false. The B theorist will, then, need to draw some kind of distinction between ordinary sentence tokens, utterances and the like which do change their truth value, and propositions; whereby propositions such as

¹⁵ Equally, it seems that a corollary of this view will be that spatial variation will turn out to be ontologically basic, irreducible into more basic metaphysical components.

“the poker is hot at t_1 ”, if true, are always true. The critic of the B theory supposes that the sum total of facts will change and then points to failure of the B theory to account for this as a problem. But it is not clear why the B theorist should accept the premise, namely that the sum total of facts will change when to endorse this appears to be something which is obviously in contradiction to their own view. Nor is it clear that it is true that the sum total of facts do change. Hence, it seems that the B theorist can, at least in principle, meet these opening objections.

On the B theoretic account time will turn out to be extended, though either in a manner that is of itself distinct to spatial extension, or through the instantiation of temporal relations that are suitably distinct from their spatial counterparts. It is unclear, at this stage, precisely how the B theorist should explicate the distinction between space and time. Ultimately, the distinction appears to become blurred by technical considerations from relativity (chapter three), but for now it is sufficient to note that a B theoretic account is *prima facie* possible.

1.3 Why not to pursue pure A theory

The type of response mooted by the A theorist, and discussed in brief in 1.2.4, will not be pursued to any serious extent within this paper. That is not to say that such theories are technically unviable. It may turn out that such positions are viable and even represent desirable options for a metaphysics of time. But for a number of reasons detailed below they appear initially unpromising. Although I think that pure A theoretic metaphysics of time *are* inadequate to the task in hand, I lack the space to argue more extensively for my position. The problems raised, specifically that of 1.3.4 seem to me to provide sufficient grounds to not give further consideration to A theoretic accounts here.

1.3.1 Degrees of past and future

Central to the claims of the A theorist is that there are at least three temporal, ontological categories, past, present and future. These categories are such that if an entity is, or has, any one of these qualities, it lacks the others. It is also true to say of any entity located in time that it is more, or less, future or past with respect to other entities. Hence, in 1066, when the battle of Hastings was present, it was true that

McTaggart writing *The Unreality of Time* was a future entity, but it was also the case that my writing this paper was more future than the production of McTaggart's. Reciprocally, it is now the case that the battle of Hastings in 1066 is more past than the production of *The Unreality of Time*.

It is not immediately clear precisely how one would cash this out in terms of A theoretic qualities. One might be tempted to say that those entities that are more past have a greater quality of pastness, those that are less past have slightly less pastness. In other words, how past something is, is dependent upon the quantity of pastness that it has. Intuitively, though, this means of characterising temporality seems wrong. An entity is not past because it has more pastness. If an entity is more past than another it is so precisely because it *is* more past, not because it *has* more past.¹⁶ The A theorist might demur on this point and offer a relational account of temporal passage, such that the battle of Hastings is, now, more past than McTaggart's writing of *The Unreality of Time*, because the battle of Hastings stands in a relation to the present that is "more past" than the relationship McTaggart's writing of his article stands in to the present. Likewise, in 1066 my writing this paper was more in the future than the writing of *The Unreality of Time* because of the temporal relation it stands in.

But then the A theoretic account of time must describe precisely what the present is on this relational account and, if such a notion proves intelligible (1.3.2), go on to say something about how the present moves from 1066 all the way through 1908 up to the present day. Without this motion of the present it will prove impossible to construct a coherent metaphysical account of temporal relations whereby entities stand in particular relations to the present. We would have a theory whose key tenet is the claim that temporality is constructed from the relation that entities stand to the present, and no account of the present.

It is relatively obvious to see what kind of things the temporal relations past and future will be; they will be akin to two distinct directions and those things that lie in one direction will be future and those that lie in the other will be past. But it seems unclear what the present will be on this account and I suspect that in this case simply moving to say that the present is a metaphysically irreducible concept will prove deeply unsatisfactory since we need to know in virtue of what an entity is present in order to understand correctly how it is that entities can stand in a relation to it.

¹⁶ One might strike an analogy with colour. One leaf is not "more green" than another because it *has* more green, it is "more green" because it *is* more green.

1.3.2 Qualities in motion

The point was made above that essential to both a property and relational account of A theoretic temporality is the question of what is predicated by tensed locutions. Clearly they must predicate something for it is an intrinsic feature of the A theory that they do so. The two options considered above were properties and relations, though it seems to me that what follows could equally be said about modes or qualities of a different sort. The problem noted above was that accounting for degrees of temporality by recourse to a degree of temporal quality will turn out to entail a revision to how we think of things as being past – their having pastness – or, on the relational account, that without a clear understanding of what is intended by the term “present” we should not proceed with the A theory on the relational account. But I should like to press this latter point further here. Whatever is delineated by “present”, whether we opt for a relation, property, mode or some other account, must be something that occupies a succession of different times such that we can create something like the temporal perspectives mentioned in 1.2.

But there is no obvious means by which times “become”. Put another way, we appear to lack an account of how one time is future, becomes present and then goes on to recede ever further into the past. The analogy at hand is that of a spotlight tracing a path along a particular region of temporality, moving from the direction of the past to the direction of the future. A series of points will, successively, have the property of being lit. Likewise a succession of points in time will have the property of being present. But what is it that moves the spotlight along its course? Although the point is made by analogy one need not take it literally; one need not think of the moving spotlight view as literal in order to understand the thrust of the question. There must be *something* that drives presentness forward along its path. It seems clear that the A theorist owes us some account of this mechanism though none has been forthcoming.¹⁷

¹⁷ Given Lowe’s remarks (pp. 93-4) concerning the nature of temporal predicates, it appears unlikely that he would accept this criticism of tensed theories of time, though, so far as I am aware, no account of the motion of the present has been forthcoming.

1.3.3 Change *to* times *through* time

One may further object to A theoretic accounts of temporality that they talk of change *to* times constituting a change *in* time. Temporal passage, what we perceive as physical changes in everyday objects, is, in fact, the product of qualitative change in times themselves. Thus, instead of me going through the motions of typing this paper, what is taking place, according to the A theorist, is that various future states are becoming present (however this turns out to take place), such that my typing of these words appears to take place. In fact all that is happening is that various, previously future, states are “becoming”. Of course, in following on from McTaggart’s initial formulation of the A and B series my objection to time as changes *to* times is, in essence, a criticism of McTaggart’s formulation of the A series. But the fault then lies only partially with McTaggart, for it was not he who developed the A series he sketches into a metaphysical account of time.

If, as I claim, A theoretic accounts of temporality rely on changes *to* time constituting changes *in* time, then we would appear to have something of a problem, for the A theoretic account draws much of its strength from the claim that it is the more intuitively and pre theoretically obvious account of time and temporality. The A theorist appears to have something of a complex position on their hands here however, where a change *to* times is what we think of as change *in* time. The problem is not, as it stands, an insurmountable one for the A theorist (though see sections 1.4.2 – 1.4.4 for a more detailed analysis of the problem of change to time constituting a change in time). But in having to claim that their position is less in line with our intuitions than we initially supposed in 1.1.2 raises considerable issues for a theory which depends, at least in part, for its motivation upon its simplicity and fit with how we pre theoretically think of reality.

Of course, the A theorist might reply that I have not told the right kind of story about the A series. In fact temporal becoming is exactly as we think of it – a product of genuine change in physical entities, such as the spinning of the spokes in a wheel. But then there appears to be some complication. How is it that the physical motion of entities in this physical realm realises states that have been previously future and then reconciles them into past entities? The A theorist might claim that we can make use of modal resources to assist them. If we think of change as change *in* time, as opposed to the changes *to* time rejected above, then we might suppose that some possible world

P1 is past in virtue of standing in some relation to the actual world, or in virtue of having some quality or other.

However, then we must say how it is that a change in the actual alters the relation in which the actual stands to the possible. More importantly, one has to explain precisely how it is that a particular possible world is now past as a result of a happening in the actual. How is it that it has lost a particular temporal quality or relation? Although it is quite obvious how possible worlds might lose modal properties, their acquisition and loss of temporal properties seems to be a rather different matter. Nor have we said anything instructive concerning the mechanism whereby these qualities vary as was requested in 1.3.2, how we move the spotlight from one world to another. At the very least a description of this mechanism should be forthcoming before A theory can be developed into an intelligible account.

1.3.4 Not being “future-present”

An obvious corollary to the A theoretic account is the fact that no entity may be “future present” – no entity can be present in the future. Such accounts are ruled out both by commonsensical observation that no entity may be past, present and future since that which is predicated is mutually exclusive, but also by specific arguments. Drawing on an analogy with spatial indexicals, Lowe (1998: pp. 93-4) argues that it makes no more sense to say of an entity that it is present in the future, than it does to say in a spatial context that an entity is here-over-there. If an entity is over-there, then it is not also here. Both “here” and “now” are indexical terms and since, Lowe argues, the truth of “tensed” (whether spatially or temporally) token reflexive utterances is to be determined by tensed token reflexive truth conditions, the truth of a sentence using a temporal indexical, “now”, will be dependent upon certain tensed token reflexive truth conditions.

Yet according to the A theoretic account those things that are past, present and future are all real and, if these times are real, some of these are occupied by people, albeit future and past people. But these people, these agents, do not, now, have a temporal perspective. That is to say, they do not have the experience of being “now”. Of course, they will do so in the future, but in order to take Lowe’s claim seriously we cannot say that such people experience their “now” in the future, merely that they *will* experience their “now”. But why is it that they do not experience being future? If they

are, from the correct temporal perspective at the current time, people who exist as future entities then why do they not have future experiences? They are perfectly real, they undergo changes in their temporal qualities yet they undergo no experiences and apparently lack any real agency. If Lowe's analogy with the temporal indexical is perspicuous then future people should have future experiences just as people "over there" have "over there" experiences. The fact that I am not yet located over there with them, or not yet located in the future with them, to know what those experiences are ought not to rule out the possibility of them having such experiences. If someone is located at a spatial distance from me they will have an experience of being at a particular point in space, even though they are not located "here" according to me.

It will not do to object that people who are "over there" do not have "over there" experiences, but "here" experiences whilst being "over there" and thus that people who are future have "now" experiences in the future. This is due to the fact that people who are future undergo objective changes to their temporal qualities, whereas no such change in qualities exists in the spatial case. For example, if the A theory is true, then at the time of the battle of Hastings I was a future person and, since that moment in time I have altered in respect of my temporal properties.

Since there are no (discounting cases of *déjà vu* and alleged psychic prediction as non veridical) actual future experiences of which we are aware, despite presumably being the subjects of some of these futures ourselves, it would seem apposite to deny a pure A theoretic account of time and temporality that seemingly entails the existence of future experiences that we lack. So whilst Lowe may be right that the truth conditions of tensed tokens are to be given in terms of tensed token reflexive truth conditions, I do not see that this entails an A theoretic account of time.

It is important to emphasise that though these problems are probably insufficient to rule out pure A theoretic accounts of time without further examination of these problems and others, it is unclear to me why, in light of these problems, one would want to endorse a position with problems that seem to be so basic to its very nature. In the meantime it seems necessary to detail presentism as, pending criticisms of the hybrid A/B theories of time, this seems the most logical solution to McTaggart's paradox that makes use of genuine changed as opposed to ordered temporal relation.

1.3.5 Presentism

Presentism, as defined and defended by, Prior (1968), Hinchliff (1996, 2000), Markosian (2004), Craig (2000a, 2000b, 2003), Crisp (2004a, 2004b), Ludlow (1999, 2004) and Bigelow (1996),¹⁸ is the view that only the present exists. Now, obviously this is a tensed view of time because the presentist takes it to be true that whilst only the present exists – our most liberal temporal quantifiers range only over those entities that are present – it is also true that other states of affairs will come to be.

It should be clear from our forgoing discussion that the concept of change is integral to our deliberations here and as such it is fitting that one or two points are made clear about what is meant by “change” in this case. The type of change envisaged by the presentist is not a “coming to be” of some future state of affairs. This is obvious because the presentist denies the existence of those things past and future. Nor does the presentist accept McTaggart’s claim that change is the acquisition and loss of temporal qualities, where entities are arranged into a series. For the presentist there is only one time that exists and hence times other than the present cannot bear the temporal qualities necessary to formulate an A series. Any change that does occur is going to be a physical change in the constitution and/or composition and/or location of entities located in space and/or any other “metaphysical” changes that occur – such as changes in God or the non-physical.¹⁹

There are technical difficulties that beset presentism (chapter six) but for now I should just like to remark that there is nothing obviously incoherent about the notion that tenses, on the presentist account, do not predicate any temporal qualities of entities. For example, if I say that “it will rain in Durham”, the presentist cannot say that I am taking the event of “raining in Durham” and predicating futurity of it – for the future does not exist. Intuitively one may balk at this but I do not think that there is any reason to do so. As Lowe (1998: p. 94) notes, we have a perfectly good understanding of negativity – of denial – even though it is impossible to give a non-circular definition of negativity. There is no such thing which it is to be “not p”, rather something is “not p” in virtue of not being p. In the same way an entity is future if it

¹⁸ For less favourable reviews see Le Poidevin (1991: p. 31), Lowe (1998: pp. 94-5), Smith (2002: p. 123), Mellor (1981: p. 30) and chapter six of this work. It should be noted that in some of these cases “temporal solipsism” is used to refer to what I am here calling presentism.

¹⁹ An example of the latter might be an immaterial mind.

turns out that it *will* occur and an entity is past if it *has* occurred. In saying such we are not committing to the existence of temporal qualities.²⁰

It should also be obvious that presentism is beset by none of the difficulties mentioned with regard to pure A theoretic accounts of time. An entity is “more future” than another if it will require a greater number of changes to realise, given the current laws of nature, and “more past” than another if a greater number of changes have had to be realised in order to reach the present from that state than they would from another (1.3.1). The causal mechanism by which new times “become” (1.3.2) is simply the ordinary every day change that we see around us. A change in what there is, how it is composed by its parts or where it is located, is sufficient to provide an account of a change of time, since a change in what there is changes what exists and, hence, moves us from one time to another. Neither is it the case that presentism is beset by the apparent incongruity that a change in time is constituted by a change in the constitution of times (1.3.3). Presentism, by denying the existence of times other than the present, by denying the existence of the C series, is not prone to this type of criticism. There are no “times” to undergo the change in temporal qualities that constitutes temporal passage for the pure A theorist. Nor is the presentist vulnerable to the kind of objection raised in 1.3.4, where I claimed that if the pure A theory is correct, then we ought to have situations whereby future people have future experiences.

Indeed, as a tensed theory of time that is not beset by any of the disadvantages of the A theoretic accounts, presentism appears to be the most appealing way to proceed if we are to proceed with a tensed account of time at all. Although there are, as I am at continued pains to point out, many problems with presentism – many of which we will come across in chapter six – the *types* of problems that occur for the presentist are technical, and do not require us either to give up our most intuitive understanding of temporal passage (which appears to be required for us to deny the point made in 1.3.3 that temporal passage revolves around a change in temporal qualities). Nor does it have the problem of being unsupported by experience (as pure A theoretic accounts are, 1.3.4). Thus, presentism appears to be the best genuinely tensed option with which to reply to McTaggart’s original arguments.

²⁰ Hence the presentist may advocate tensed token reflexive truth conditions for sentences. In any case, we do not need tenses to predicate temporal qualities in order for tensed utterances to be meaningful.

1.4 Hybrid A/B theories

If we were to find a hybrid position that incorporates both a dynamic, A theoretic model of becoming, as well as an element of the permanent B theoretic relations, then we should have a theory of time that fits well with our intuitions. Sadly, as I shall show below, there are significant problems with the hybrid theories of time available. The problems mentioned are sufficient to lead me to the conclusion that our choice of a correct metaphysics of time, as indicated by M5**, is between a dynamic, presentist, or static, B theoretic metaphysics of time. Although in pursuing a solution to the problems that beset presentism I argue in chapter seven that we can construct something similar to a hybrid theory.

1.4.1 McCall²¹

McCall argues that reality is divided into past, present and future not by entities bearing temporal qualities, or standing in particular relations to one another, but by the topological structure of time. According to McCall, the future is composed of infinitely many real possible worlds, construed in the Lewisian sense, whereby each future may be thought of as a branch of reality and is a real Minkowski space-time. The past may be differentiated from the future in virtue of there being only one space-time branch – or trunk – whilst the present is the point at which the past meets the future. Temporal passage is constituted by the continual actualisation of some future branch which causes the foliation of its contemporaneous branches to leave only a single branch. This ensures that the present is continuously moving further into the future. The past is constituted by a single branch, the future by infinitely many and the present is the point at which the two meet. However, in making an objective distinction between past, present and future McCall commits himself to a position that either fails to meet the constraints placed upon a theory of time by McTaggart's arguments or a distinct empirical problem.

There is a metaphysical / topological distinction to be drawn in our analysis of McCall's work as follows. In his model, McCall claims that for an entity M to be past

²¹ There are also challenges to McCall's position raised by Nerlich (1996), though see McCall (1996) for a reply.

is for M to lie in the single actualised trunk, but not at the point at which the trunk meets the branches. So M is past if it is in the part of the tree that is actualised but not at the point the trunk of the past meets the branches of the future. However, this is an empirical claim as to the location of M within a space-time structure. For the metaphysician M *is* past if, at some past time, M *was* present and *was* future, presumably in virtue of some change in M's nature. All that McCall can say is that if M *is* past then it *is* actualised, but the past state of affairs at the time of actualisation does not exist. In other words, although all the events and processes that constitute the actualisation of M exist – all of the appropriate physical goings on are in the past trunk of the space-time – the event of the unactualised potential future's dropping out of existence does not exist. For that to exist would require that the time be conceived of in some other fashion whereby past events exist as events with the quality of pastness. But if McCall is to countenance this latter metaphysical claim then he must also accept the existence of at least three temporal A series: one in which M is in the future branches, one in which M is present and another in which M is in the trunk and hence the past – although each of these A series will determine past, present and future metaphysically as opposed to empirically in virtue of their having different temporal qualities or relations. To argue such is to invite the infinite regress we saw earlier and is an obviously metaphysical problem.

McCall can of course reply that he does not conceive of time in this fashion; that the notions of temporal quality mentioned above as the time of the metaphysician are not necessary, and that his position can get by perfectly well without it. But if he were to argue such then there is a topological problem that can be raised, for it appears that McCall must commit himself to the existence of an infinite chain of temporal series. McCall argues that the change from future to present to past is constituted by a series of topological variations in reality, that temporal flow is constituted by the foliation of branches of space-time. If we then conceive of this tree of space-times then we must recognise that the tree is itself undergoing changes. But an entity can surely only undergo changes *in* time. It will not do to say that these changes *to* time constitute the passage *of* time precisely because these changes are happening *to* time. It cannot be that changes happening *to* time happen *in* time, for in this case time itself is to be viewed as the subject of some change and hence need some time to occur. If a change in reality cannot happen without time, without the actualisation of some future branch, then it seems paradoxical to suggest that some

change can happen to another entity, time, without there being the actualisation of some previously future state of affairs.

If McCall denies the existence of entities and events with temporal qualities or relations (those that led to the metaphysical problems above), then it seems that he *must* countenance the existence of some higher dimension of time, much like the branching model he recommends for lower time. He must do so in order to explain how the changes can occur *to* time. However, if there are not many future branches in the higher time series then the future must be deterministic. If there is only one higher time future, then there is only one lower time future that can be realised and, hence, McCall cannot endorse this option. In other words, if higher time contains only one future then it will contain only the future state of affairs where M is actualised, which contradicts the idea that there is genuine possibility amongst the lower time branches.

But this higher time, also being dynamic, will be subject to the same changes *to* it, as opposed to within it, that were shown to entail the existence of higher time when we considered our lower time. Thus higher time too must be embedded within a higher time series. If this time series is construed metaphysically we find ourselves with a simple restatement of McTaggart's arguments, back with the metaphysical problem. And if we understand time to be the foliation of future branches of space-time, then we will simply find another tree and then another and so on ad infinitum, our topological problem. Hence, unless there is some other way out of these problems, McCall's metaphysics entails the unreality of time.

1.4.2 Tooley

Tooley claims that objective temporal passage is constituted by the continual accretion of reality, and whilst those things that are past and present have determinate truths about them as *truths at a time*, claims about future events are true or false *simpliciter*. All that we need to say on Tooley's account is that those things past and present *have been* actualised and *are* actual as of this time, but those things future are unactualised as of *this* time, are actual *simpliciter*, and are actual as of some future time. Note that arguing as such Tooley is immune to the criticism that his position entails an topological hyper time, since time is not to be thought of as topological in the way McCall suggests.

However, the semantic distinctions drawn above play the roles of placeholders for temporal properties. Rather than saying that an event is future we will say that an event is unactualised as of this time. Instead of having the incompatible properties of presentness, pastness and futurity we now find ourselves with the incompatible properties of actual *as of this time* and not actual *as of this time*. We have to recognise Tooley's claim that "actual as of a time" is an inherently indexical notion and, thus, he hopes to avoid McTaggart's arguments, for we cannot say of his position that an event is actual of this time and not actual of this time, which appears to block the formulation of the paradox. But where McCall was accused of avoiding the metaphysical contradiction only by entailing a further contradiction in the infinitude of temporal series, Tooley is faced with the problem raised in 1.3.4, though in a slightly revised fashion.

When we say that an entity is past, under Tooley's schema, we are claiming that the event or entity exists, is actualised, and is past, whilst the present is to be seen, as the dividing line between past and future. Thus, at any one instant in time it is true to say that a certain set of events are future, a certain set present and a further set past. In other words when M is past, when t2 is realised, it *was* actualised as of time t1, but is not *being* actualised at time t2. There is a sense that when we say that M is past at t2, what we mean is that when M is present (t1), M is at the dividing line between the actualised and the non-actualised and M that is actualised. But what we commit ourselves to on Tooley's model is the claim that in the present (t2), M is in the past. That is, M stands in a particular relation to t2; but the M in question is not M in the past. When M *was* present (t1), M was at the dividing line between the actual and the non actual. But when M is past under Tooley's model, then, M is simply actualised and is not to be found at that dividing line between the actual and the non-actual. If the state of affairs that pertained when M *was* present does not pertain in the past – i.e. if M is not at the dividing line between the actual and the non-actual – then the past does not exist, rather M exists in the present but with some quality of being actual. What Tooley is arguing is that M stands in a past relation, or has the quality of pastness, in relation to the present. But then it is not clear that there are any *past* things on Tooley's model at all, for the past – the state of affairs where M is present, where M is at the dividing line between the actual and the non actual, no longer exists because t2 is now present.

Of course Tooley could object that I am misrepresenting his position, that in fact the past *is* composed of those states of affairs whereby only those things that *had been* actualised are actual. Or, since Tooley commits to the existence of only tenseless facts, we could try to explain this by saying that those things that are in the past are, tenselessly, earlier than the present and that the attempts to bring tense in here is entirely unwarranted. But in that case it seems that Tooley too commits to the existence, and actualisation, of every event in conjunction with their bearing both the qualities of being actual and not being actual. Suppose that when M is present O is still non actual as of the present time and when O is actual as of the present time M is past. M must also exist as present in the past, otherwise it no longer exists as a past thing, rather it exists as a thing in the present with a particular relation to O. That relation cannot be the relation pastness for the relation pastness entails that the state of affairs whereby M is *being* actualised, exists, when in fact all that exists when M is past is that M *has been* actualised.

1.4.2.1 Tooley's problem of becoming²²

There is another criticism that we can make of Tooley's position. With regards to future tensed statements Tooley makes the observation that,

there does not appear to be any viable alternative to an approach that makes use of tenseless, existential quantification. (p.175)

We must then reconcile this claim to the fact that event E being at the future at time t can be translated as

Event *E* is later than time *t*, and *t* is an instantaneous state of affairs, *t* is actual as of time *t*, and no state of affairs that is later than *t* is actual as of time *t*. (p.196)

Thus it appears we are to reconcile the view that time is dynamic, that only those things actual as of time *t* are actual, to the view that tenseless quantification is more

²² It should be noted that the coherence of Tooley's distinction between true at a time and true *simpliciter* has not been accepted by all. Notably, Smith (2001), Oaklander (2001) and McCall (2001) have all raised what I believe to be perfectly solid objections along the lines of those that I reproduce here, though see Tooley (2001) for his response.

analytically basic than its tensed counterpart. As Oaklander (2001) asks, ‘is not the very concept of a “total, dynamic world” a contradiction in terms?’ (p.10) Surely if it is the case that there are, *simpliciter*, tenseless facts about the future and, *simpliciter*, tenseless truths about the future, then it will not do to say that reality is genuinely dynamic? Tooley’s (2001) response to this is to argue as follows.

- (1) There is a coherent, temporally indexed notion of being actual, and, given that notion, what is actual as of one time necessarily differs from what is actual as of any other time.
- (2) There is also a coherent, absolute notion of being actual *simpliciter*, and, given that notion it is incoherent to talk about what is actual *simpliciter* as of a time, let alone to say that what is actual *simpliciter* as of one time may differ from what is actual *simpliciter* as of some other time.
- (3) Any state of affairs that is actual as of some time *t* is actual *simpliciter*.
- (4) Claims (1), (2), and (3) are mutually consistent. (p.40)

But (1), (2), and (3) are not mutually consistent, at least not if we take them “ontologically seriously.” Tooley is right when he says, (1) and (2), that there are two independently coherent notions, one of a temporally indexed notion of being actual, the other of being actual *simpliciter*. It is, after all, these kinds of intuitions that we instinctively try to preserve when we attempt to reconcile A and B theoretic determinations. However, the two views cannot be coherently held of the same reality. If what is actual is, as (1) suggests, to be temporally indexed, then what is, in fact, actual, is actual as of a particular time. This view requires of us to take temporal becoming seriously and to admit that there is a genuine ontological distinction between the present and the future. If, on the other hand, we take (2) ontologically seriously, then there is an existent reality *simpliciter*; for in this case there is an unchanging reality, all of which is actualized. No doubt Tooley will stick to his guns on this point, but I find it impossible to see how one can reconcile the two seemingly disparate views.

1.4.3 Bourne style problems

Even if the hybrid theorist can counter the arguments laid out in 1.4.1 – 1.4.2.1, Craig Bourne (2002) has raised a technical problem, a problem for hybrid models. Bourne argues that although we can never doubt that those things that are around us are present in the sense that they are the objects of our experience, there is some other manner in which the models detailed by Tooley and McCall, in which this use of the term “present” fails to capture what it is to be present in the highly technical manner specified by each theory. In Bourne’s words we need to distinguish between the ‘referential’ use of the term present, the way we use it to refer to the objects of our everyday experience, and the ‘indexical’ use of the term in the hybrid A/B theories. I shall follow Bourne’s convention and in the case of the former we shall use ‘present’ in the case of the latter ‘*present*.’

Drawing on material in the possible worlds literature Bourne asks how we are to know that we are *present* as opposed to merely present, for in the same way that we think ourselves to inhabit the actual world, as Lewis (1986: p.93) shows we may really be living in a possible world. So when we think of ourselves as inhabiting the *present* world the fact of the matter is that we could be in the merely present world. As Bourne (2002) notes, this may not be a fatal objection to either Tooley or McCall’s theory, but it is certainly a feature that is in need of an explanation (p.366). For both presentism, and pure B theory can provide an explanation. In the case of presentism, the present is simply co-extensive with the *present*, thus any time that one believes that one is present, one must be *present*. Of course for the B theory there simply is no such thing as to be *present* and so there is no need to introduce the notion in the first place, the only B theoretic relations being earlier than, later than and simultaneous with. On such an account each merely present moment has ontological parity with every other moment, hence obviating the problem altogether. Given the ability of the competing models to provide an answer to the problem it does seem that the hybrid theories ought to be able to provide some kind of account of this distinction.

It is worthy of note here, that this is reminiscent of the problem raised for the A theorist in 1.3.4. There is, however, a subtle difference between the two. According to Bourne we find a problem with the hybrid accounts because we should have some way of differentiating the *present* from the present, at least it seems reasonable to

suppose so. My criticism of the A theoretic account was that, according to the single temporal perspective account laid out in 1.2.4, there ought to be experiences that are not merely *present* or present, but *future*. It is the lack of these experiences that poses a problem for the A theorist rather than the technical difficulty in distinguishing between the *present* and the present, for on the single temporal perspective account advocated by the A theorist the two will, presumably, be co-extensional.

1.5 Conclusion

In Chapter one I have argued that McTaggart's paradox needs to be taken seriously, though only as marking the constraints placed on any theory of time. The initial conclusion drawn was that either the A theoretic or C theoretic accounts of reality must be false. Certainly there is no real paradox to be dealt with. Our analysis of pure A theoretic accounts led us to the conclusion that they do not offer a promising avenue of investigation since it seems that they require us to overhaul our pre-theoretical concepts at the outset and are beset by a number of complications. We also saw that hybrid theories seem to be contradictory, which is perhaps unsurprising in light of the conclusion reached in M5**. The two options open for exploration then, are B theories and presentism. I do not take the claim that time is unreal to be an option worth exploring whilst there are other options open to us. In what follows I shall try to present an even handed analysis of both presentism and the B theory. Notably, although it has been established that an A theoretic account cannot be conjoined to a C theoretic account, it is not so clear that presentism cannot be conjoined to the existence of a C series. The conclusion that I find most plausible is, in fact, a hybrid presentism/C theory.

Chapter Two

In chapter two I:

- *Suggest that B theory has become a conjunction of various components, the complete set of which I call the Timeless theory of time. I set out to argue against each of the four components (2.1);*
- *Argue that the Old Tenseless theory of time fails (2.2);*
- *Argue that the New Tenseless theory of time is problematic, but that this needn't prevent the adoption of a B theoretic ontology (though it undermines some of the motives for such an adoption) and that there are moves that one can make to solve at least some of the problems for the New theorist (2.3);*
- *Argue that the traditional debate between the tensed and tenseless theorist is misplaced and that semantic matters are uninformative for our metaphysical deliberations in this context (2.4).*

2.1 The Timeless Theory of Time

The B theory referred to in chapter one has, over time, developed beyond the permanent relations of the B series. Coupled to an ontology in which temporality is cashed out in terms of the relations earlier than, simultaneous with and later than, are a number of positions that go together to form a distinct theory, or theoretical whole. Contemporary B theories of time, often assume, or give the appearance of assuming, a relation between B theories, tenseless theories, theories of space-time and theories of eternalism. Henceforth, when referring to the theoretical whole I shall refer to the TTT¹, and where I am merely referring to the existence of permanent temporal relations I shall talk of the B series, or B theory.² Now whilst the TTT certainly appears to form a strong theoretical whole, the various components are not necessarily connected. It is perfectly possible to maintain a B theory, a theory that takes time to be composed of the temporal relations of the B series, without also advocating a

¹ Sider (2001) calls a similar conjunction 'manifold theory' (p.77). I do not follow Sider as I do not concur with his claim that contemporary B theory is composed of two elements, 'eternalism - ... and the thesis of the reducibility of tense'. (pp.76-77) since this appears to neglect the earlier / later relation implicit in the B-theory, nor does it include space-time.

² I am working on the assumption that B theoretic relations are to be conceived of in a manner broadly similar to spatial relations. However, Brogaard (2000) has argued that a temporal parts analysis can be conjoined to a presentist model and, if this kind of reasoning proves viable, there would seem to be nothing preventing the coupling of B theoretic relations to presentism. However, this is not an option I shall consider further since to the best of my knowledge this particular conjunction is not one defended anywhere in the literature.

tenseless account of language or cashing this ontology out in terms of theories of space-time. A B theorist may find it rather more difficult to opt out of a form of eternalism since otherwise it would appear impossible to formulate the temporal relations of the B series. The advocate of the Tenseless Theory of time is not committed to any of the other component parts of the TTT, nor is the eternalist. It is quite possible for the eternalist to deny that the B relations exist and thus that only the C series exists.³ For ease of reference we can tabulate these distinctions thus:

Theory	Feature	Author⁴
B-theory	Earlier / later relation	McTaggart (1908)
Tenseless Theory of time	Reduction of tense	Mellor (1981)
Space-time	Acceptance of time as a dimension or of time as a component of a four-dimensional manifold	Minkowski (1923)
Eternalism	The existence of all times	Quine (1960)

It should be noted that the distinction between absolute and relative time has been left out of this list, as has any mention of endurance and perdurance. The neglect of the former is quite simple. One could maintain a TTT absolute time just as easily as a TTT relative time. Presentism is unlikely to favour either relative or absolute time, denying as it does the existence of times other than the present. It would seem difficult for absolute time to exist if there is only one time in existence, in the same way that it would appear difficult for time to be relational if there are no times between which temporal relations are to stand.

My reason for refraining from consideration of the endurance/perdurance debate is that it has become clear that endurance and perdurance accounts of diachronic identity are no longer restricted to conjunction with their obvious bedfellows – the tensed and tenseless theories of time respectively. There are, of course, those who do seek to retain a conjunction of perdurance with tenselessness

³ Although as I stated in the conclusion of chapter one it is not clear to me why one would want to pursue such a line in light of the other options open to us.

⁴ In each case the author given is one who defines the position. Many authors hold more than one of these positions in conjunction. I do not know of any author who holds one of these positions independently of all of the others.

and endurance with tensed theory. Balashov (2000, 2001) has argued that only a particular view of perdurance (which he calls four-dimensionalism) can account for the difference in the appearance of objects in different frames, thus, according to Balashov, this necessitates a space-time view and, presumably, TTT. Contrariwise, Lowe (1998) has argued that the tensed theory is to be conjoined to endurance. But Berit Brogaard (2000) has presented a thesis combining Presentism and perdurance (tense and perdurance) and Josh Parsons (2000) has allied eternalism and endurance (tenselessness and endurance). In light of these recent advances it would not appear apposite to proclaim the perdurance / endurance distinction decisive, or even of any clear import, in any quest for a metaphysic of time and as such I do not include it in my list of features essential to the TTT.⁵

My characterisation of TTT should not be mistaken for a straw man in contemporary philosophy. Sider (2001), among others mentioned below supports all four facets of TTT. He argues that events in time stand in the relation of earlier than and later than (p.21), endorses a tenseless understanding of semantics (p.21 and p.25), a theory of space-time (pp. 79-92) and eternalism (p.25).⁶ And this is unsurprising. It is when the various components are conjoined as the TTT that we see a truly elegant picture begin to emerge, one that has led to some bold proclamations from TTT theorists. From Williams (1951)

...The theory of the manifold is the very paradigm of philosophic understanding. This is so with respect to its content, since it grasps with a strong but delicate logic the most crucial and richest of facts (pp.471-472)

From Quine (1953)

The only tenable attitude towards quantifiers and other notations of modern logic is to construe them always, in all contexts, as timeless.

⁵ On a related issue, McCall and Lowe (2003) have even argued that the distinction between 3D and 4D descriptions of reality is illusory if one accepts a space-time thesis (see also McCall (2000)). See, Nerlich (2004) for a reply to McCall and Lowe.

⁶ We might also include Russell and Quine on the list of those who have endorsed TTT.

...The four-dimensional view of space-time is part and parcel of the use of modern formal logic, and in particular the use of quantification theory, in application to temporal affairs.

...I do not see how, failing to appreciate the tenselessness of quantification over temporal entities, one could reasonably take modern logic very seriously (pp.442-443).

The cohesive picture of reality presented by the TTT is the picture that we naturally desire as the end product of our philosophical deliberations.⁷

Specifically, three motives are available to the proponent of the TTT: first, the cohesive picture that I have just mentioned; second, that the TTT is supported by the scientific evidence, and third that the only viable alternative, presentism, is false. My arguments against the TTT revolve around refuting each of these motivations and attempting to show that any eternalist theory of time requires us to adopt an account of the phenomenology of temporal experience that is, at best, unconvincing. Thus, I argue that semantic considerations should be treated as unrelated to our metaphysical enquiry into the nature of time (chapter two); that the TTT is not favoured by the evidence from science (chapter three); that it requires a highly dubious account of the nature of temporal experience (chapter four) and that the apparent cohesion of the picture given by the TTT can be explained without accepting that the TTT is true, once one recognises a natural psychological trait of human beings to imagine time in a particular way (chapter five).

Hence the arguments in chapter two are arguments against the motives for accepting the TTT, as are some of those presented in chapter three and chapter five. But it is in chapter three that I also begin to suggest that the very idea of the TTT is incoherent. This is a claim supported by the arguments in chapter four, which are designed to show the incompatibility of theories of eternalism with the phenomenology of our temporal experience.

⁷ Dummett (1978) captures this when he says, 'I personally feel very strongly inclined to believe that there must be a complete description of reality' (p.356).

2.2 The Old Tenseless Theory⁸

We begin our analysis of the arguments alleged to favour the TTT with a consideration of the philosophy of language. My purpose here is two-fold; firstly to illustrate that the New Tenseless theory of time *might* be viable as a semantic account *if* one is prepared to utilise certain resources and, second, to show that there is no necessary relationship between one's theory of semantics and one's metaphysics, though it is certainly easy to see why the converse is commonly supposed to be true. This being so, it will be to other, metaphysical, matters that we will have to turn our attention.

The core thesis underpinning the so-called Old Tenseless theory of time is the claim that all tensed sentences can be translated by their tenseless counterparts without loss of meaning. Were this to be possible then one might suppose that the transitory nature of being, supposedly captured by tense (as we saw in chapter one), is not to be found in reality, since one can translate all tensed sentences that purport to reflect that transitory nature, into tenseless sentences, without loss of meaning. The philosophers who may be credited with the foundation and development of this school of thought are Russell and Quine although there are many others who contributed to its formulation.⁹ Russell and Quine differ in their motives for accepting the Old Tenseless theory. For Russell (1951), acceptance of the theory stems from the analysis of egocentric particulars, an analysis which yields the conclusion that there is no

⁸ I refer to it as the Old Tenseless Theory, rather than the Old B theory, in order to preserve the distinction in the readers mind between a tenseless theory of time and a B theory of time. I shall preserve this distinction for the remainder of the chapter in the interests of keeping the distinction I intend to draw between ontology and semantics clear.

⁹ Craig (2000a) also credits Frege (e.g.1971) with a profound role in the development of the Old Tenseless theory of Time. Whilst I think that Frege may indeed be of a similar mind to Quine and Russell, *Thoughts* is not hugely forthcoming about the distinction between tensed and tenseless propositions. Indeed in the only passage that deals explicitly with the role of the present tense Frege says;

The present tense is used in two ways: first, in order to indicate a time; second, in order to eliminate any temporal restriction, where timelessness or eternity is part of the thought – consider for instance the laws of mathematics. Which of the two cases occurs is not expressed but must be divined. If a time-indication is conveyed by the present tense one must know when the sentence was uttered in order to grasp the thought correctly. Therefore the time of utterance is part of the thought. (p. 10)

Craig (2000a) takes this to imply that, 'it is by our grasping the tenseless propositional content of a sentence as uttered in a context' (p.34) we truly understand what is meant. And while he may be correct, it does seem that Frege's contribution to the development of a tenseless reduction of tense is perhaps a little small to elicit from Craig the description of Frege as a 'great fountainhead of the date-sentence version of the Old B-theory' (p.29).

distinction between I-here and I-now. If one accepts the synonymy of the terms (I-here and I-now) and Russell's claim that use of the term 'present' merely indicates a belief concerning some state of affairs, then it is easy to see why one should wish to maintain a tenseless theory.

If I say "Finland is being invaded", ... The "present" that is involved is not the "present" in the *psychological* sense, i.e. something "presented". It is the "present" in the *physical* sense, i.e. something which, in physical time, is contemporaneous with the psychological "present". "Present" and "past" are primarily psychological terms, in the sense of involving different causal relations between the speaker and that of which he speaks; their other uses are all defineable in terms of this primary use. (p. 113).

The only difference between uses of the terms 'was' and 'is' lies in their causation, either direct or indirect in the mind of the speaker (ibid). Thus, for Russell, there can be no ontological distinction between the past and the present, as such a distinction would entail an ontological difference in the use of the terms 'was' and 'is'. His view obviously leads to the conclusion that there exist, tenselessly, states of affairs that make propositions true. According to Russell this is entirely appropriate. 'One of the objects to be aimed at in using symbols is that they should be free of the ambiguities of ordinary language' (Russell 1951: p.256). Hence, 'in order to express explicitly the whole of what is meant, it is necessary to add the date, and then the statement is no longer "variable"' (p. 257).

Quine's motives are similar, though not identical to Russell's. Quine insists that we should best think of sentences, or statements, as being true or false (Quine 1970: p.14) and it is only if we can think of a sentence as being definitely true (or false) that it is unambiguous in meaning. However, as Quine notes, 'the declarative sentence "I am ill" is intrinsically neither true nor false' (Quine 1941: p.5). In order for the sentence to be intrinsically true or false, and for us to partake in the wonders of modern logic, we must assist our natural language by means of logical translation. Thus, 'Henry Jones of Lee St., Tulsa, is ill' (1941: p.6), must be translated into ' "Henry Jones of Lee St., Tulsa, is [tenselessly] ill on July 28, 1940"' (op.cit).

What is common to both accounts is that tensed sentences must be completely reduced to their tenseless counterparts by means of a translation of the former by the

latter and, if such a translation is to be successful, the translation must be one that preserves the entire meaning of the original tensed sentence. It will not do to preserve only part of the meaning of a tensed sentence in a tenseless translation since in failing to wholly translate a tensed sentence into its tenseless counterpart the Old Tenseless theorist is forced to admit that such translation is impossible. If such a translation is impossible, it is not clear that the transitory nature of being, allegedly reflected by tense, has been accounted for in wholly tenseless terms. If this were to prove the case then the Tenseless theorist would be forced to admit that there is some feature of the language that defies translation into a tenseless language and hence we might suppose that the tense of language captures some feature of reality that cannot be described in tenseless terms.

The Old tenseless theory of Time is not a viable option precisely because it cannot capture the whole of the meaning of a tensed sentence as we shall now see.

2.2.1 The Problem with the Old tenseless theory

A tenseless token cannot provide the information that any one state of affairs is present and, hence, cannot completely translate a tensed token. This failure is demonstrated by the impossibility of timely action if one attempts to act in a timely fashion on the basis of tenseless information. Consider the following example from Gale.

Joe is a scout for a machinegun company. He is strategically stationed so that he can survey the battleground, and when the enemy approaches within 100 yards of their position he must inform the company so that they can open fire. In order to conserve ammunition and not give their position away, they fire only when the enemy is within a range of 100 yards. (1962: p.55)

The question is whether or not Joe can accurately inform his comrades that they need to open fire without making use of an implicitly tensed sentence. Gale's response is to say that Joe cannot be of use to his comrades unless he utters a tensed sentence. If he says that, "the enemy are [tenselessly] within 100 yards", his comrades do not know whether or not to open fire. If he says, "the enemy are [tenselessly] within 100 yards

at time t ”, then, again, unless the soldiers know that it is *now* time t , they will not know to open fire.

Of course, Joe *is* of use to his comrades. When he tells them that the enemy is [tensed] within 100 yards they do know to open fire. If they do know to open fire then it must be the case that Joe has communicated to them some piece of information which is not encapsulated in the tenseless sentence, “the enemy are [tenselessly] within 100 yards.” Hence it must be the case that the tensed sentence, “the enemy is [tensed] within 100 yards” cannot be wholly translated by “the enemy is [tenseless] within 100 yards. This being so the Old Tenseless theory is false; it is not possible to translate all tensed tokens and so it must be the case that tense reflects some feature of reality, such a feature as temporal becoming.

Mayo (1963) and Thalberg (1963) object to Gale’s analysis. Mayo objects on the grounds that Joe could communicate to his comrades just so long as they understand the grammar of the term ‘now’. ‘The function of ‘now’ is to refer to a particular utterance of a token of itself, an utterance which is different every time’ (1963: pp. 296-297). Thus, when Joe says that the enemy are ‘now within 100 yards’, what he could say, on the tenseless account, is something like, ‘the enemy being within 100 yards is simultaneous with the utterance of the enemy being within 100 yards being...’. According to Mayo this is fine; the enemy being within 100 yards is simultaneous with the utterance of just as much of the incompletable sentence as is actually completable simultaneous with the enemy being within 100 yards.¹⁰

Thalberg objects on what appear to be similar grounds. Whoever utters the tensed token under discussion says that,

The enemy approaches within 100 yards on October 17, 1960, at 4.00 p.m. E.S.T.’, and understands that it describes a present occurrence, i.e., an occurrence contemporaneous with the listener’s reception of the statement. Yet, contrary to the argument of Nowell-Smith and Gale, this information is communicated by Joe’s tenseless statement in the absence of contextual indications of the time at which Joe made his statement. (1963: p. 309)

But Gale’s point is surely that what is communicated between Joe and his machine gun allies is, implicitly, tensed. In Mayo’s reduction we are missing a piece of

¹⁰ C.f. (Mayo 1963: p.296)

information. We know that the enemy are within 100 yards and that this is simultaneous with an utterance to the same effect. But we do not know that this utterance is *now* and hence there cannot be any action useful to us; in this case firing upon the enemy. The same point can be made against Thalberg. Although the sentence used in his example may only be the tenseless, “The enemy approaches within 100 yards on October 17, 1960, at 4.00 p.m. E.S.T.”, the information that needs to be imparted is that, “The enemy approaches within 100 yards on October 17, 1960, at 4.00 p.m. E.S.T.” and it is *now* October 17, 1960, at 4.00 p.m. E.S.T. Without the extra information, the information that some state of affairs is *now*, we cannot translate the tensed expression accurately. And since *now* is a tensed expression this would appear to create an impossible task for the tenseless theorist.

Further, one might remark against both Thalberg and Mayo that they have mistaken the obviously tensed aspect of their tenseless translation. The observation that tensed tokens are self referential with respect to tense, is precisely to smuggle tense into a tenseless token. For if the machine gunners are not aware of the fact that it is *now* the time at which the token is self-referential, then there is insufficient motivation for them to become active. Thus both of these attempts to resist the arguments from the tensed theorist fail.

Similarly the Old token reflexive account where, ‘It’s raining now’ can be translated by ‘Rain is simultaneous with *this* utterance’, fails. In this case as in those detailed above, it is still not wholly clear that the statement, ‘Rain is simultaneous with *this* utterance’, translates completely without at least some ambiguity. There is still some further information that has not been encapsulated by the tenseless translation. In this case as with those above, the additional information is that ‘*this*’ utterance is now. Precisely what ‘now’ might mean is clearly a matter for dispute (as we shall see below), but even if ‘now’ merely indicates certain attitudes and beliefs that certain sentences incline us to take on, it is clear that there is information conveyed by the tensed statement that is not conveyed by its tenseless counterpart.

2.2.2 The New Tenseless Theory of Time

The untranslatability of tensed sentences has not been lost on the New Tenseless theorists. Instead of claiming that tensed sentences can be translated by their tenseless counterparts, proponents of the New theory are prepared to accept the ineliminability

of tense from both discourse and belief. However, they are not prepared to add to this that we ought to take this feature of language “ontologically seriously”. As Oaklander (1991) has it:

According to the new tenseless theory of time, our need to think and talk in tensed terms is perfectly consistent with its being the case that time is tenseless. Tensed discourse is indeed necessary for timely action, but tensed facts are not, since the truth conditions of tensed sentences can be expressed in a tenseless metalanguage that describes unchanging temporal relations among events. (p.27)

Thus, tense is reduced from an ontological feature of the world to a feature of language and belief. Returning momentarily to the case of Joe, our machinegun scout, it should be clear that the Old theory was unable to provide Joe with the means to galvanise his comrades into action. The term *now* was taken to impart no more information than did “simultaneous with”, which was clearly false. In the revised theory there are certain beliefs and attitudes which, although it may be possible for us to give a tenseless account of the truth conditions for, it is not possible for us to translate. Thus, whilst tense may not be eliminable, it may not be a feature of reality either. It may be merely a feature of language and belief.

Although there are certain tensed beliefs and attitudes, no matter how complicated either these (or tensed locutions) become, all that is needed to determine their truth or falsity are truth conditions that may be stated tenselessly (c.f. Mellor 1981: p. 45). For example, the truth value of any two tensed statements concerning the same entity, say the battle of Hastings, may vary. It may appear to one person in 1066 that the battle is present whereas another in 1067 may report the battle to be past. But what makes both tensed statements true is the tenseless occurrence of the battle of Hastings in 1066 in conjunction with the relevant B theoretic relation. Since we can say, irrespective of one’s temporal perspective on events, that tensed tokens are true in virtue of the unchanging temporal location of an entity such as the battle of Hastings and the B relation in which the tokener stands to it, it appears that one can give a tenseless account of the truth conditions that must be satisfied in order for a tensed locution to be true. Again, to quote Oaklander (1991),

[o]n the token reflexive account that Mellor propounds, the temporal relation between the date at which one says, thinks, or writes down a tensed sentence and the event or thing that it is about, provides an objective basis for the truth value of a tensed sentence. (p. 27)

As something of an aside, the appeal of the tenseless theory is undeniable, for we are grounding the apparently transient nature of tensed statements upon secure and unchanging foundations of a B theoretic, tenselessly described, ontology. With regards to the spatial analogue of tense, spatial tense, Mellor notes, '[n]o one believes that there are really spatially tensed facts such as London being sixty miles away from here' (p.64). In the case of spatial tense, we are persuaded that sentences about space are true and that we can give spatially tenseless token reflexive truth conditions for any token. That, "London is 60 miles away" is true, when spoken in Cambridge, is guaranteed by the spatially tenseless fact that London is 60 miles from Cambridge.

If we can capture the conditions under which tensed tokens are true, and we can state them in a tenseless metalanguage, then it appears that the tensed aspect of tensed tokens does not reflect a genuine feature of reality. For example, in the spatial case our ability to give a spatially tenseless account of the truth conditions for spatially tensed sentences seems apt as space is not objectively tensed. We might also suppose, then, that if time were objectively tensed that we should give the truth conditions for temporally tensed sentences using tensed terms. So our ability to give a tenseless account of the truth conditions for a tensed sentence might be taken to imply is that time, like space, is not objectively tensed.

2.3 The tensed reply to the New Tenseless theory of time (and how to beat it)

There are three problems that have been raised for the New Tenseless theory of time. Thus, before we look further at the relationship between semantics and reality we must see if these problems can be solved. If they cannot then the New Tenseless theory of time will not prove a viable option. My coming to the aid of the tenseless theory here may seem a little puzzling since the position I am defending is, ultimately a dynamic theory of time. However, in the interests of parity we must be careful to explore and defend (as appropriate) all theories. It strikes me that at least some of the criticisms made of the New Tenseless theory can be met.

First (2.3.1), we have the difficulty of giving an explanation of why the truth conditions of a tensed sentence are equivalent to their tenseless counterparts if their meaning is not identical, i.e. if a token, *S*, “it is now 1980” is true, then a token, *T*, “*S* occurs in 1980”, will give the truth conditions of *S*. How is it, then, that their truth conditions can be the same, e.g. both *S* and *T* are true iff *S* occurs in 1980? Second (2.3.2), consider two identical tokens that entail one another and have identical truth conditions. If the transitivity of logical relations is to be preserved, then we ought to be able to say that where two logically entailing tokens are true, so the truth conditions logically entail one another, where it appears that they do not in the New theory. Third (2.3.3), we must find some way of preserving truths at times at which there are no tokens. In 2.4 we will return to the relationship between ontology and semantics where I argue that it is not possible to determine whether or not time is dynamic within the context of a wholly semantic debate. Thus it will be to a metaphysical exploration of the matters in hand that we shall have to turn.

2.3.1 Meaning and Truth-conditions¹¹

Recall, then, that the difference between the Old and New tenseless theories of time is the shift from the untenable claim that it is possible to give a tenseless translation of any tensed token, to the claim that for any tensed token it is possible to give a tenseless account of its truth conditions. Smith (1993: pp. 69-71) and Craig (1999: p. 5) argue against this latter claim as follows. For any token *S*

(1) It is now 1980

S has the same truth conditions as *T*

(2) *S* occurs in 1980

since both are true iff *S* occurs in 1980. Smith argues that if *T* is, in fact, stating the truth conditions of *S*, and *T* is a tenseless token (which obviously it is), then *T* has the same truth conditions as *S*. Furthermore, *T* captures the meaning of *S* and thus

¹¹ The arguments rehearsed in favour of the tenseless theory in 2.3.1.1 are similar, in part, to those of Le Poidevin (1998: pp 28-9).

purports to give a tenseless translation of *S*. Thus, the New theory falls foul of the same problems as the Old. For if the New tenseless theory purports to give us a translation of all tensed sentences then it can be proven false (recall the example of our machine gun scout Joe and discussions in 2.2.1).

2.3.1.1 How to respond: truth conditions

In the first instance it appears open to the tenseless theorist to deny that, where a tenseless token states the conditions under which a tensed token is true, the tenseless token also provides a translation of the tensed token. Smith (1993: p. 14) is working on the assumption that this is so, in line with the impression given by Mellor (1981: pp. 74-76) of the New tenseless theory. But theories are open to revision and it would seem that the tenseless theory may be in need of such a revision (C.f. Oaklander 2003: p. 281, and section 2.3.1.3 below). The question, of course, is whether or not it is coherent to give such an account of truth conditions, an account where metalinguistic tenseless tokens of a tensed natural language capture the conditions under which a tensed token is true without also providing a tenseless translation of the tensed natural language. On a reading where the tenseless metalanguage provides both truth conditions and a translation,

TC For any two tokens A and B, where A translates B without loss of meaning, A provides the truth conditions for B

the tenseless theory of time is obviously false because, as was pointed out in 2.2.1, tenseless tokens cannot provide complete translations for their tensed counterparts. It would appear then that to adopt TC as a full account of the truth conditions of a sentence is to prejudge the case against the New tenseless theorist. If we replace TC with TC*, a more lenient statement of the truth conditions which must be provided by the tenseless theorist, then the problem disappears.

TC* For any two tokens A and B, where A states the conditions under which B is true, A provides the truth conditions for B¹²

Under TC* it is obvious that a tenseless token, T, of “S occurs in 1980”, states the conditions under which a tensed token, S, of “it is now 1980”, is true, without entailing that the meanings of S and T are identical. To give a spatial example, one might say that the truth conditions for “Durham is here” are given by “we are located within the spatial confines of a geographical region of England that is approximately fifteen miles due south of Newcastle”, rather than by “Durham is here.” Under such an analysis it is still clear that the two tokens differ in meaning despite having the same truth conditions.

2.3.1.2 A “tensed” addition to the New tenseless theory

But perhaps the arguments above are too swift. Assuming a B theoretic ontology for a moment, consider the New tenseless theorists’ argument once again. Token S, “it is now 1980” is true iff “it is now 1980” as is token T, “S occurs in 1980”. Now, it is possible to argue that S and T do not mean the same thing and hence do not engender the problems raised with the Old theory of time in 2.2.2, even though the two tokens have the same truth conditions. The New tenseless theorist accepts that the use of tense in natural languages serves to convey some further information that cannot be conveyed by tenseless language, but also wants to argue that this linguistic phenomena tells us nothing about the nature of time. It merely illustrates the nature of our attitudes and beliefs.

This would appear to suggest that we have missed something in stating the truth conditions for S. For S to be true is for S to exist at 1980 and, if there is a tokener J who tokens such a tensed token, for J to hold the irreducibly tensed belief that it is now 1980.¹³ If we fail to state this further element of the truth conditions then

¹² Given Smith’s (1993: p. 5) statement of truth conditions as, ‘the truth conditions of [sentence] S₁ and [sentence] S₂’ does not refer to a relation between S₁ and S₂ but to the *states of affairs that make S₁ and S₂ true*, I see no reason that TC* would be objected to by Smith. In any case, the adoption of a formulation of truth conditions that rules out either theory in virtue of that formulation should be scrutinised extremely carefully as it does prejudge the case against the theory of time on semantic grounds.

¹³ Even if J is unaware of the fact that it is now 1980, J must still believe that whatever time it is, that time is now. Of course in conditions where there are no tokeners the problem raised disappears, though this appears to walk the tenseless theorist into the problems raised in 2.3.3.

we have not given a full account of the truth conditions, for we have failed to acknowledge the New Tenseless theorists' claim that tense reports a feature of belief or language. After all, tense *is* an internal feature of our attitudes and beliefs and so it is not unreasonable to suppose that the conditions in which tensed sentences are true must include an account of an agent with those attitudes and beliefs. Thus in contexts where tokeners exist one must also accept that they believe the time in question to be present. In other words, only if, in 1980, J exists [tenselessly] and has certain A theoretic beliefs will we have fully captured the truth conditions of a tensed sentence, where such a tokener exists.¹⁴

But now consider Smith's (1993: p.5) translation thesis, composed of three necessary (1-3) and one jointly necessary and sufficient (4) conditions. For any two sentences S_1 and S_2 , S_2 fully translates S_1 if, in context C:

- (1) S_1 and S_2 as used in C have the same truth conditions
- (2) S_1 and S_2 as used in C are confirmed or disconfirmed to the same degree by the same observations
- (3) S_1 and S_2 as used in C are logically equivalent, that is, entail each other
- (4) S_1 and S_2 as used in C refer in the same way(s) to the same item(s) and ascribe to said item(s) the same monadic or polyadic property or properties

Smith wants to claim that the translation thesis results in the meaning of the tensed and tenseless tokens, S and T, being the same because they have the same truth conditions. But the proper New tenseless theory of time statement of the truth conditions of, S, "it is now 1980", would be (5)

- (5) S is true iff S occurs in 1980 and if, simultaneous with S any temporal agent J believes S to be present

Now it is clear that (5) could serve to state both the truth conditions of S and its meaning, but it is not tenseless. For the condition makes use of an explicitly tensed

¹⁴ Supposing, of course, that there exists such an agent at the time when the tensed token is tokened. If there is no such agent then it may be sufficient to recast the formulation along counterfactual lines, so the tensed token is true because *if* there had been an agent of the sort J, *then* they would have had the appropriate tensed beliefs.

component. This does not prevent a move to the claim that reality is tenseless, since as far as the New tenseless theorist of time is concerned all that the tensed component of the truth condition does is state an irreducibly tensed belief of a temporal agent. It certainly does not reflect a genuine feature of reality. Of course, by making such a move one is denied recourse to the claim that the tenseless metalanguage in which one states truth conditions reveals the nature of reality, since the truth conditions make implicit use of a tensed component. But it is still clear that such a metalinguistic account of the truth conditions supervenes upon a B theoretic ontology. We can still conclude that the tenseless account of truth conditions is compatible with the TTT, but it is less clear that the tenseless account can be used to motivate the TTT – at least if my arguments are right.

Despite the fact that this account seems viable it will probably not seem terribly palatable to the tenseless theorist. The desired move is, after all, to glean some support for a B theoretic ontology from our ability to provide an account of truth conditions in a tenseless metalanguage. In the move I have just presented no such support can be gleaned precisely because a tensed aspect is retained in the stating of the truth conditions. But perhaps this does not constitute a problem for the tenseless theorist. Perhaps they do not have to accept my claim that in stating the truth conditions for tensed sentences they must include reference to the beliefs (or possible beliefs) of an agent. If that can be achieved then they can simply make the claim suggested in 2.3.1.1, and adopt TC* rather than TC, although it is not obvious to me how this is to be achieved.

2.3.2 Entailment relations between truth conditions

A more pressing concern for the advocate of the tenseless theory is that for any two tokens *R* and *S* of “it is now 1980”, although *R* and *S* are mutually logically entailing, their truth conditions are not. Hence,

(6) “It is now 1980” (=R) \equiv R occurs in 1980

(7) “It is now 1980” (=S) \equiv S occurs in 1980

and R entails S.

But if R logically entails S , then the truth conditions of R should logically entail the truth conditions of S . Unfortunately there is no entailment relation between the two tenseless sentences on the right hand side of the conditional. If we break the conditional down into component parts where $A =$ ‘ R occurs in 1980’ and $B =$ ‘ S occurs in 1980’ things become more obvious.

- i) $R \equiv S \equiv A$ and,
- ii) $S \equiv R \equiv B$, are true, but
- iii) $A \equiv B$

turns out to be false!

2.3.2.1 Against solutions provided

Paul (1997) attempts to provide a solution to the problem by suggesting that we modify the non-indexical notion of logical implication in order to arrive at an indexical notion of implication that is acceptable. Her suggestion is that,

For sentences (which contain indexicals) A and B , A logically implies B *iff* for any context of evaluation C , where A is true with respect to C , B is true with respect to C (p. 63)

However, the price of this way out seems too high (see Craig 1999: pp. 268-9), particularly since it appears that we may have to deny the transitivity of logical implication.

For on her account, the truth conditions of the sentence types (1) [my 6] and (3) [my 7] are stated as follows

It is now 1980 \equiv the time of (1)’s context of evaluation is 1980
1980 is present \equiv the time of (3)’s context of evaluation is 1980

But it is evident that while (1) entails (3), their respective truth conditions do not entail each other. Only if the truth conditions of (1) and (3) are significantly present-tensed could they even sensibly be said to be mutually entailing – which would sink the tenseless theory – but, if they are tenseless, then it makes

no sense to say that they entail one another, since (1) and (3) can be evaluated relative to any time one chooses. ... How will she avoid the absurdity that while (1) implies (3), and (3) implies the sentence stating its truth condition, nonetheless, (1) does not imply that sentence? Will she deny the transitivity of logical implication? (pp. 268-9)

Similar remarks can, I think, be made against Le Poidevin (1998). Le Poidevin suggests that although the truth conditions for (6) do not entail (7), it is still the case that any statement of (7) that is simultaneous with (6), where (6) is true, will also be true. Hence, (7) can only be true if it occurs in 1980. Since it is true, it does occur in 1980, and since (6) is simultaneous with it, (6) also occurs in 1980, (6) is also true (c.f. Le Poidevin 1998: pp. 30-31). But, although Le Poidevin is correct inasmuch as the right hand sides of (6) and (7) are both true when one of them is true, and both false when one is false, the transitivity of logical implication has not been preserved since the truth conditions of (6) do not entail the truth conditions of (7). Thus we still find ourselves in the situation where, (i) and (ii) hold, but (iii) does not.

2.3.2.2 Spatial and temporal indexicals

Consider the following spatial analogue:

(8) 'Durham is here' (=X) \equiv X occurs in Durham

(9) 'Durham is here' (=Y) \equiv Y occurs in Durham

Although the right hand sides of (8) and (9) will both be true in the very same conditions, where they occur in Durham, X's occurring in Durham does not imply Y's occurring in Durham which it should if we are to preserve the transitivity of logical implication. One, unpalatable, option open to the Tenseless theorist of time, then, is to give up on the claim that a tenseless account of truth conditions can be provided – either spatially or temporally. Hence, although time is like space, and all that obtains are tenseless facts, it is not possible to give a semantic account which is tenseless. One might suppose this to be so since although (8) and (9) are about space it appears that we cannot make it such that a “spatially tenseless” metalanguage can preserve the transitivity of logical implication. But since space is spatially tenseless (that is, there

is nothing to distinguish ontologically between one region and another) it cannot be the case that this failure to preserve a spatially tenseless metalinguistic account of truth conditions entails that space “becomes” any more than time does. This would clearly still be compatible with the TTT, though it could no longer be seen to motivate it.

Although reasonable, I suggest that this move should be unpalatable to the tenseless theorist of time for the same reason that I suggested that the inclusion of a tensed aspect into the truth conditions for tensed tokens will prove unpalatable. In arguing that the truth conditions for tensed tokens can be given by tenseless truth conditions, the tenseless theorist is trying to derive some motivational support for the claim that reality is B theoretic. If reality is B theoretic then it would surely follow that the conditions under which tensed tokens are true or false would reflect this B theoretic nature in some way. But if the truth conditions of indexicals about space, which is itself B theoretic, cannot be given by spatially tenseless truth conditions then, although it is still the case that whatever semantic account (tensed or tenseless) we give of time may be coherent, we can derive no motivational force for claims that the nature of truth conditions reveals the nature of reality. Thus one of the motivating factors for the B theorist would be removed.

2.3.2.3 Entailment

To satisfy the A theorists objection we must find some means by which the truth conditions for the left hand side of (6) and (7) *are* such that the transitivity of logical implication is preserved. The solution for the New tenseless theorist then, is to say that the dates on the right hand side of the bi-conditional are names for the sum total of the contents of the year that they name, such that “R occurs in 1980” does imply “S occurs in 1980” precisely because both R and S are a part of 1980. Hence, by naming the particular period of time that includes R as 1980, one also includes the period of time that includes S and so, if R is true, then so is S. Moreover, not only will both be true, but R will also entail S (and vice versa). To see this consider the following where C names all of the component parts of 1980 not including tokens R and S such that, $1980 = R, S \text{ and } C$. In such a case, it would be true that

$$i^*) S \equiv R \wedge C$$

because $S \wedge R \wedge C$ are equal to 1980.

$$\text{ii*) } R \equiv S \wedge C$$

Is also true since S and R are both constituent parts of C. Hence,

$$\text{iii*) } S \equiv R$$

It would not be possible for R or S to be true without entailing all of the constituent parts of 1980 exist. Since R and S are true in 1980 this entails that all of 1980 exists including R and S. Moreover, R entails S (and vice versa) since in naming 1980 one names R, S and C.

The obvious spatial analogue,

(8) 'Durham is here' (=X) \equiv X occurs in Durham

(9) 'Durham is here' (=Y) \equiv Y occurs in Durham

appears problematic. For the right hand side of (8) to entail the right hand side of (9), it would appear that a part of Durham would have to be the tokens X and Y. In the spatial case this is obviously false. But the notion of a B theoretic ontology treating sentence tokens as composite parts of 1980 itself is not so absurd as it may first appear. After all, sentence tokens are the sort of thing that will exist, in at least some sense, at various times within 1980. Since 1980 is fixed and permanent according to a B theoretic ontology it would perhaps be apt that such tokens be treated as parts.

Logical implication remains transitive then, since in this case, if R is true, then so is S, since both form a part of the same entity, i.e. 1980. In choosing to name that period of time 1980, and then further stipulating that R occurs simultaneously with some part of 1980, indeed that it is a part of 1980, one also implies that S occurs simultaneously with some part of that entity 1980 and hence that R entails S. Whether one should be prepared to accept such a model may have to remain moot. What is clear is that although such a move *may* be viable it is highly controversial.

2.3.3 Truths at times at which there are no tokens

Smith (1993: pp. 72-86) develops an argument against the New tenseless theory of time where he claims that the theory cannot provide adequate truth conditions for tensed sentences at times when there are no tokens. He has in mind tensed tokens such as

(10) It is true that the era devoid of linguistic utterances was present

The obvious translation

(11) It [is] true, earlier than this utterance, that the era devoid of linguistic utterances [is] earlier than this utterance

is ruled out, on the grounds that it cannot account for the “being present” of the era in which there were no linguistic utterances, as the tenseless account of presence is “simultaneous with” coupled to a particular token or utterance. Since (11) makes no reference to the simultaneity of an utterance with the era in which there are no utterances, it fails to capture the truth conditions of (10) because it fails to say that it was present; (11) would be true even in the unlikely circumstances that the situation described in (10) contrived to be earlier than a token of (11) without ever having been present. Whether or not such a situation is in fact possible misses the point of the objection; there is a feature, (10), that needs to be accounted for in the truth conditions in (11), that has not been captured. Hence, a move to (12) would appear to be in order:

(12) It is true that, there [is] an era, earlier than this utterance, that is simultaneous with an utterance that there are no linguistic utterances

Of course, (12) is obviously false since it implies that it is true of a time both that there are utterances and that there are not. To my mind this is the most serious of all the objections to the tenseless theory. It is with that fact in mind that I offer a solution to the problems raised in (10)-(12). Although I do not ultimately believe that the B theorist needs to be concerned with claims against the tenseless theory, what I offer is, nonetheless, a way that the tenseless theorists could preserve their theory.

2.3.3.1 Possible tokens

The move, or at least *a* move, to solve the problem is to move to a possible utterance, and to claim that possibilia exist in time.¹⁵ Thus

(13) It is true that, there [is] an era, earlier than this utterance, that is simultaneous with a possible utterance of the fact that there are no actual utterances

Although (13) appears highly controversial, it is not internally inconsistent as (12) is, provided, of course, that a “possible utterance” is not conceived of as an utterance that needs to be spoken by an actual person. A possible utterance would simply have to be something that *could* be said, not something that could be said *if* there are actual people to say it. It would presumably be a possible token spoken by a possible tokener. This rules out there ever being a time in which there are no possible utterances since utterances are metaphysically possible entities. Although this may not be pre theoretically obvious, it is not internally inconsistent; nor is it obviously false.

This position does seem to be nonsensical against the backdrop of the standard possible world account of modality. Against the account of modality provided by Williamson (1998, 1999), however, my claims seem rather less extraordinary. Williamson (1999: p. 181) argues that existence is not really contingent. Certainly ‘existence’, in the sense that we ordinarily construe it, is contingent: a table might not have been a physical entity, it might not have had substantial existence – what Williamson’s calls S existence. But there is a further sense in which existence is not contingent;

to exist is to be something. Call that the *logical* sense of exist (‘L-exist’), since it is definable given identity and the unrestricted quantifier. Trivially, everything L-exists; not everything S-exists because events do not’ (p. 194)

¹⁵ This is not the same as saying that, “in the closest possible world, W, where there are tokeners at this earlier time, such tokens are simultaneous with the occurrence of the era in which there are no actual utterances in this world”.

Likewise, a table might not have S existed, it might have only L existed. On Williamson's account of modality it is possible for a table to either S exist – to exist as a table in space – or to simply L exist, and it is evident that whilst an actual table exists in space, a merely possible table does not. It need only occupy possible space (pp. 194-5). Williamson does not suggest that possibilia exist outside time, nor is there any reason to make such a supposition. Thus, (13) is perfectly sensible.

What would be required of possible entities, on this account, is that they stand in actual temporal relations to actual entities. We would need to be able to say that, the possible entity, say my possibly drinking my tea, exists *at the same time as* other actual entities, my actually not drinking my tea. But this seems perfectly consistent. There is, after all, a sense in which we say that, at the time I chose not to drink my tea it *was* possible that I should have chosen to drink my tea. Thus there seems to be natural language motivation for the view. Moreover, it would seem that if we are prepared to countenance modality in the strong sense suggested by Williamson, then to say that a possible drinking of tea occurs at an actual time, is simply to take the L-exist sense of existence seriously and to say that such things exist at actual times. At merely possible times the only things that will exist are possible entities, but at actual times there seems to be nothing preventing possible entities from existing alongside actual entities.

Obviously, accepting Williamson's account of modality is a bold move to make simply to save the tenseless theory of time; probably too bold. I am certainly not claiming that the tenseless theorist of time should accept the account of modality that Williamson offers in order to save the tenseless theory. Rather, I would suggest that if the tenseless theorist of time finds Williamson's own arguments as to the cashing out of unrestricted quantification persuasive, then they have the tools in hand to deal with some of the more difficult problems thrown up by the likes of Smith. In any case, what I do hope to have shown is that the problems raised for the New theory can be met if one feels it necessary to do so.

2.4 Truth conditions

Despite the fact that I think that it may be possible to give the truth conditions of tensed sentences using tenseless truth conditions, I do not think that it is possible to move from a tensed or tenseless semantics to the conclusion that reality is tensed, or

tenseless, respectively. It was assumed in 2.3 that we have a clear handle on what is meant by the truth conditions for a sentence, but in 2.4.1 I will argue that the concept is not as clearly defined as it needs to be for us to proceed. It follows from the silence of the semantic theories on this matter that, even if the tenseless theory of time turns out to be true, i.e. if we should cash out our semantics tenselessly, this does not entail a B theoretic ontology and the TTT. Nor, in contradistinction, does a tensed theory of time entail a presentist ontology.¹⁶

2.4.1 What do we mean by “truth conditions”

There are, as identified by Oaklander (2003: p. 273), at least four distinct understandings of what is meant by the truth conditions of a tensed sentence. Indeed, if we include Oaklander’s own view, the count may even rise to five. The views to be considered are those belonging to Le Poidevin (1999), Ludlow (1999), Craig (1996) and Smith (1993). Obviously, any differences in the definitions of these conditions have the potential to change whether or not tensed sentences can be given tenseless truth conditions. Here I suggest that Le Poidevin’s account is the one that captures what it is, at minimum, to be a truth condition. Rather than seeing his position as opposed to those of Ludlow et al., my own view is that the others mentioned wish to add a further constraint onto what it is for a truth condition to be a truth condition. What is Le Poidevin’s position on truth conditions?

The *truth-conditions* of some proposition *p* are whatever must obtain for *p* to be true. The *truth-makers* of a token belief that *p*, in contrast, are the facts which make the truth-conditions of *p* obtain on a particular occasion. (p. 149)

For Le Poidevin, the truth conditions for a sentence are the necessary conditions, rather than the sufficient conditions, that must be in place in order for a sentence to be true (C.f. Oaklander (2003: p. 274). Now although the other views considered here do not explicitly appear to be of the same type, indeed Smith’s (1993) view seems diametrically opposed, there is an undercurrent to each of these views that makes

¹⁶ Or any other A theoretic ontology. However, given the forgoing remarks in 1.3 it should be clear why I do not think that dynamic theories other than presentism will suffice to give us a metaphysics of time.

them compatible. Consider the competing statements of what is meant by “truth conditions”: from Ludlow (1999: p.7),

If the semantics of a natural language takes the form of a T-theory, and hence the semantics of a sentence is given by theorems like (3), then the right-hand side of the theorem – the portion following “if and only if” – states the literal truth conditions of the sentence of the left-hand side.

(3) “Snow is white” is true if and only if snow is white.

In this case, the truth conditions are that snow is white.

From Craig (1996: p.22),

The giving of truth conditions is a semantic exercise; specifying grounds for a statement’s truth concerns ontology. One can lay out semantic conditions which will permit one to determine for a sentence whether that sentence is true or false without saying anything about the ontological facts which make that sentence true.

And from Smith (1993: p. 5)

“the truth conditions of [sentence] S_1 and [sentence] S_2 ” does not refer to a relation between S_1 and S_2 but to the *states of affairs that make S_1 and S_2 true*.

It seems to me that although the semantic formulations of what it is to be a truth condition for a tensed sentence differ, each of the views represented above is dependent upon the fact that a sentence is true just in case the conditions required for it to be true are in existence. Now, it *appears* that Smith’s account requires that the truth conditions of a tensed sentence are the sufficient conditions for its truth, and that as such the inability of the tenseless theory of time to give the truth conditions for a tensed sentence without making recourse to some tensed notion entails that the sufficient conditions for the truth of a tensed token are, themselves, tensed states of affairs. However, even Smith will surely admit that part of the truth conditions, presumably a necessary condition of a tensed sentence are the tenseless truth

conditions. So for any tensed token *S* of “it is now 1980”, if it is 1980 then *S* is true iff *S* occurs in 1980. But then Smith and Le Poidevin do not necessarily contradict one another, rather Smith wishes to add a further constraint to the make up of truth conditions: they must include not only the tenseless truth conditions, but also some sufficient conditions, in the form of some tensed aspect.

Likewise, the views of Craig and Ludlow seem to be subsumed by this approach. Both would agree, presumably, that in the case of a tensed token *S*, *S* will be true iff it occurs in 1980. They will then add to that the further stipulation, the sufficient condition, that the truth conditions of *S* are such that it needs to include some ineliminably tensed component. Smith, Craig and Ludlow conclude that this is sufficient evidence to motivate the tensed theory of time.

Of course, truth conditions are standardly taken to be both necessary and sufficient. All that I am suggesting is that the approaches to truth conditions taken by the above seems to suggest that there *may* be an implicit distinction being made between the two by the authors in question. Ultimately whether this is so or not is probably beside the point since I argue that whether or not tense is ineliminable from discourse and belief does not really impinge on matters of metaphysics at all (see 2.4.3).

2.4.2 On Oaklander’s way out

Having noted the variety of ways in which one may understand the truth conditions of a tensed sentence (detailed in 2.4.1), Oaklander argues that the new tenseless theory of time may be replaced by the newer tenseless theory of time.¹⁷ In order to do so, and to meet some of the various challenges mentioned in 2.2, Oaklander argues for the intelligibility of a four category distinction of meaning. The categories he delineates are intentional meaning₁, that which is intended by a speaker (pp. 274-5), ontological meaning₂, that to which a token refers (p. 275), meaning₃ as identical with truth conditions¹⁸ and linguistic meaning₄, or, ‘the linguistic rules that

¹⁷ Though Oaklander refers to new, and newer, B theory – rather than tenseless theory.

¹⁸ the appropriate [i.e. B theoretic] temporal relation between an A sentence or belief token and what it is about are the necessary and sufficient conditions for what is asserted by the token to be true. (p. 275) ‘What is stated by a sentence token *N* of ‘It is now 1980’ is true if and only if *N* is simultaneous with or occurs at or during 1980’ (pp. 275-6)

govern their [sentences, belief's etc.] correct usage' (p. 276). There is clearly a close relation between meaning₂ and meaning₄, as Oaklander notes,

the meaning₄ of a tensed sentence is a semantic function or rule whose argument is the context of utterance and whose value is that sentence's truth conditions or truth maker in that context. In other words, the linguistic meaning₄ or character of a tensed sentence tells us how the context determines the sentence's truth conditions (p. 277)

With this four-fold distinction in place, Oaklander argues that this furnishes us with two distinct types of language, a language necessary for communication and a language suited to a correct description of temporal reality – the former being ineliminably tensed and having meaning₄, the latter being tenseless and, hence, having meaning₂. This bifurcation in terms of what is meant by the “meaning” of a tensed sentence, e.g. meant₂ and meant₄, entails that the tenseless theorist can argue that whilst tenseless truth conditions can never capture the meaning₄ of a tensed sentence (recall Joe and the machine gun company) that is no reason to suppose, in light of the difficulties allegedly raised for tensed discourse by McTaggart's paradox, that a tenseless language cannot capture the ontological meaning₂ of temporality and thus preserve the central notion of the new B theory of language; namely, that reality is correctly described tenselessly and is B theoretic.

However, in Oaklander's model there is, as he acknowledges, nothing to act as a truth maker for a tensed sentence. Any tensed belief/sentence or other token is, metaphysically speaking, false. This follows because there is no such thing as a tensed fact to act as the meaning₂ of a tensed locution. What strikes me as puzzling is that Oaklander is prepared to admit this much and yet still entertains his theory. Plainly, the fact that any tensed proposition is false and merely of pragmatic use, is sufficient grounds on which to reject Oaklander's move. A past tensed proposition such as “the battle of Hastings has existed” *is* true. To argue otherwise is utterly absurd – as many foes of presentism have argued.¹⁹ To find a tenseless theorist arguing for it makes it no less implausible.

¹⁹ See 6.1

2.4.3 Is the tense of truth conditions revealing?

Smith (1993), Ludlow (1999) and Craig (2000a) each infer from the irreducibility of tense in natural language (in Craig's case in conjunction with other factors) to the conclusion that reality must admit the objectivity of tense. Mellor (1981) and Oaklander (1990) argue that our ability to give a tenseless account of the truth conditions for tensed tokens is a point in favour of B theory, whilst Lowe's view seems to be that our ability to give a tensed account of the truth conditions for tensed tokens is a point in favour of A theory, and Dyke (2003) argues that if either an A or B theoretic ontology is correct then so is a tensed or tenseless accounts of semantics respectively. Hence, let us carve up the philosophical terrain.

It seems to be defensible to suppose that the nature of our ontology, either A or B theoretic, in some way influence our choice between a tensed and tenseless account of the truth conditions for tensed tokens. If one supposes that reality is A theoretic then this might be seen as a point in favour of the tensed account. If one supposes that reality is B theoretic then this might be seen as a point in favour of the tenseless account. Equally, it seems to be reasonable (if not correct) to suppose that if a perspicuous statement of the truth conditions for a tensed token is itself tensed, then reality may be A theoretic, and that if a perspicuous statement of the truth conditions for a tensed token is tenseless then reality may be B theoretic since we would assume that the tense of the truth conditions would reflect some feature of reality.

Whether or not any of these positions is currently a straw man is beside the point here since each is *prima facie* logically coherent. What I want to show is that this is a mere appearance of a relationship were no such relation between ontology and semantics exists, at least not in our accounts of time and tense. In what follows I argue that it is simply unclear whether the tensed or tenseless component of the metalanguage in which the truth conditions are to be stated should be seen as supervening upon, or reflecting, reality. In other words, I suggest that the tensed or tenseless nature of the truth conditions for tensed sentences could, on either side, be due to some feature of reality onto which our linguistic structure has fastened itself, or could, in fact, be due to some mind dependent feature of reality.

2.4.3.1 Tenseless language and ontology

Let us begin then with the tenseless account of time and how one might suppose that it is possible to move from a tenseless semantics to a B theoretic ontology. New tenseless theorists argue that the truth conditions for tensed tokens in natural languages can be given in terms of tenseless token reflexive conditions. Thus, according to such theories, the truth of

(1) It is now 1980

Can be given by,

(2) (1) is simultaneous with 1980

The line of thought from tenselessness to B theory might crudely be stated as follows: since tenseless truth conditions remain the same, irrespective of the temporal perspective taken on events, it follows that reality itself must be tenseless. Of course, it is still *possible* that reality might not be B theoretic, but given that the conditions under which a tensed token is true can be described in entirely tenseless terms it is not clear why the dynamic nature of this reality is not mentioned where we state the conditions under which tensed tokens are true.

The New B theory of time, as championed by Mellor (1981), would accept that (1)'s "being now" is sufficient to differentiate it from (2), but would also argue that whatever "being now" actually turns out to be will simply be akin to some feature of ourselves – our beliefs and attitudes – however this is to be cashed out. Thus, the kind of view supported by Mellor et al. is a tenseless ontology – an ontology where whatever tensed tokens do, they do not accurately report some genuine change in what there is or any A theoretic property. The claim that the tense ascribed to the truth conditions of a tensed token can be "read off" to tell us whether our ontology ought to be dynamic or static is an over statement of the tenseless theorists argument, but it does seem reasonable to garner support for a B theoretic ontology from a semantic analysis. Thus we move from the tenseless statement of the truth conditions of (1) to the claim that our ontology is, or should be, tenseless, because the description of the conditions under which (1) is true can be given in tenseless terms.

Now, what prevents the B theorist from moving directly from a tenseless semantics to a B theoretic reality is that it is not clear that these truth conditions can accurately be said to reflect the nature of time. In a case where we give a tenseless account for the truth conditions of a tensed token, e.g. it is now 1980, those conditions will be:

‘it is now 1980’ is true if it is uttered [tenselessly] in 1980

‘it will be 1980’ is true if it is uttered [tenselessly] earlier than 1980, and

‘it was 1980’ is true if it is uttered [tenselessly] later than 1980.

But from our purely semantic analysis what are we to glean? Are we to suppose that our ability to give a tenseless account of the conditions under which the above tokens are true entails that reality is tenseless? Palpably not. For it is possible that such a semantic account be conjoined to an A theoretic or presentist analysis; where one accepts that the truth conditions for tensed sentences may be stated tenselessly, but then denies that this tells us anything meaningful concerning the nature of reality. One may suppose, instead, that the linguistic earlier / later distinction itself supervenes upon a truly dynamic reality. One in which, although it is right and proper to state the conditions for ‘it was 1980’ as ‘true if uttered [tenselessly] later than 1980’, the component ‘later’ is in fact merely reflecting a feature of our semantics. It might, for example, be the case that it is a syntactic feature of our natural language that its truth conditions can be stated tenselessly even though reality itself is dynamic. Of course the tenseless theorist might deny this, and state that if the truth conditions for tensed tokens can be stated in a tenseless metalanguage then this does entail B theory. But it is unclear why this would be so. At the very least the tenseless theorist owes us an account of why it is that the tense of the truth conditions should be taken to do anything more than reflect a syntactic feature of our natural language.

But to push the point home such a syntactic feature of our natural language may be explicable in terms of our “spatialising” time in some way. If, as I claim in chapter five, we think of time as being somehow like space for a variety of psychological reasons, then it would be unsurprising for us to develop language in such a way that, much like language about space, we can give temporally tenseless truth conditions. In such a case, though, where we adopt a syntax in which we can state truth conditions tenselessly, is it clear that this is due to the nature of reality

rather than our conceptions of it? I would suggest that it is not and that it is possible that our ability to give a tenseless account of the truth conditions of tensed sentences may merely supervene upon our most fundamental conceptions of how time is.

Once it is noted that the tense of the metalanguage cannot be assumed to reflect the nature of reality – but may in fact supervene upon it – it is less clear that our ability to state the truth conditions for a tensed semantics in a tenseless metalanguage is a point in favour of the B theory at all, nor is it clear that if one adopts a B theoretic ontology then one should adopt a tenseless account of truth conditions. If there is no clear reason to suppose that our ability to state truth conditions in tenseless terms indicates anything more than a syntactic feature of the language itself, then one cannot move to argue that the tenseless statement of the truth conditions reveals the nature of reality. There is simply no justification for doing so when the tenseless nature of the truth conditions may be due to syntactic – or even psychological (see chapter five) – reasons. And although it remains tempting to argue that the adoption of a B theoretic ontology entails the adoption of a tenseless account of truth conditions, this too remains uncertain.

In order to show this we might consider a spatial case. It is perfectly clear that there is no ontological privileging of any part of space. This being so it would seem perfectly cogent to suppose that we should state the truth conditions of spatially tensed statements such as ‘Elizabeth is two metres to my right’ in spatially tenseless language; such as ‘Elizabeth is two metres due North from my front door’. But, as Lowe (1987a) has shown, it is perfectly plausible to state the truth conditions for such spatially tensed indexicals using spatially tensed truth conditions such that it is true that ‘Elizabeth is two metres to my right’ just in case Elizabeth *is* two metres to my right! Clearly such a statement of the truth conditions for spatially tensed tokens supervenes upon the nature of space – which is obviously tenseless – and supervenes upon, rather than reflecting, the nature of reality.²⁰

If one suppose that time is B theoretic, how is it that one is supposed to garner motivation for a tenseless account of the truth conditions for tensed sentences? The only reason that I can foresee would be due to sufficient semantic analysis that shows tenseless statements of truth conditions to be the “correct” way of stating truth

²⁰ By supervene upon reality I mean simply to say that the tensed component of the sentence is parasitic upon our mode of thinking about space – and hence, time – rather than describing it as we might suppose it to be. After all, we would not suppose that space is dynamic simply because we ought to give a spatially tensed account of the truth conditions for spatially tensed sentences.

conditions. But if the only reason to adopt a tenseless account of truth conditions (even once we have already accepted a B theoretic ontology, as we do in the spatial case) is semantic, then it is clear that there is no necessary relationship between ontology and tense. Rather we must find metaphysical reasons for adopting metaphysical positions, and semantic reasons for endorsing a particular semantic account.

Of course the other option would be to show beyond reproach that the truth conditions must reflect the nature of reality, rather than supervene upon it. But it is far from clear to me how one embarks upon such an argument given that all one is supposed to be doing in stating the truth conditions is stating the conditions under which a token is true and plainly those conditions may be described in both tensed and tenseless metalanguages.

2.4.3.2 Tensed language and ontology

What, then, if we adopt tensed semantics? Is a tensed ontology on the cards? Are tensed semantics incompatible with a B theoretic ontology? Certainly it would again be *prima facie* reasonable to suppose so. I fear, once again, that the issue is not really so clear. The key to the tensed token reflexive view is that the truth conditions are to be stated in tensed terms. Such tensed semantic views are taken to imply, or perhaps only suggest, that reality is A theoretic in much the same way that the tenseless token reflexive account of tensed tokens is usually taken to imply a B theoretic ontology. Likewise, it may be supposed that an A theoretic, or presentist, ontology would obviously favour a tensed account of truth conditions.

It is unclear precisely how the tensed theorist is to move from a semantic account to a claim about ontology. In arguing that such a move is to be made, the tensed theorist is clearly working on the assumption, like the tenseless theorist discussed above, that a perspicuous statement of the conditions under which a tensed token is true must reflect or reveal, rather than supervene upon, the nature of reality. Now the tenseless theorist of time is prepared to countenance the claim that tense is ineliminable from language, but argues that our ability to give a tenseless account of truth conditions in some way inclines us toward a B theoretic ontology. This ineliminable tense is merely a feature of our language and beliefs. In stating that the conditions in which a tensed token are true must be described using tensed language,

how is the tensed theorist to argue for the claim that what is being described in that tensed component is a feature of reality, and not merely some syntactic feature of how we talk about reality? If we are the kinds of creatures claimed by the B theorist, that is ones who add becoming to the world in virtue of its mind dependence, then perhaps it is wholly unsurprising that we have a language for which we can state the truth conditions in tensed terms. After all, tense is such a fundamental feature of our language and beliefs that our formulation of a semantics might be such to render our semantics inherently tensed. For example, if Lowe's tensed token reflexive account of truth conditions is to be believed then it is possible for a spatially tensed token reflexive account of truth conditions be given for spatially tensed tokens, where it is clear that space is not itself tensed. How then can we possibly infer from a tensed metalanguage to the conclusion that time is dynamic?

Furthermore the adoption of an A theoretic or presentist ontology plainly does little to incline us to support a tensed account of semantics since a presentist ontology coupled to a tenseless account of semantics, where the tenselessness of the truth conditions is taken to supervene upon the dynamic nature of becoming, appears perfectly cogent. Again, if my arguments in chapter five as to the manner in which we spatialise time are apt, then we might legitimately suppose that it should be a feature of the semantics of such being as ourselves that the truth conditions for our languages be stated in such a manner to reflect that mode of thought.

In order to argue that there is a relationship between an A theoretic or presentist ontology and a perspicuous statement of truth conditions one must first say how it is that those truth conditions are taken to reflect the nature of reality. If pressed upon the question of why the metalanguage of a dynamic reality should be tensed or tenseless the only possible answer that the dynamic theorist could give is surely that this is a result of a syntactic feature of our language, due itself either to some feature of reality or the way that we conceive of it. This being so it should be clear that the account we give of truth conditions, either tenseless or tensed, is dependent upon our syntax, or perhaps the mechanics of metalinguistic construction, and need have no relationship to our metaphysics.

As a note of interest, the argument can be broadened from an analysis of truth conditions to an analysis of language. It is perfectly possible to maintain (e.g. Ludlow 1999) that even an allegedly tenseless account of time – one whereby we take ourselves to have removed any mention of the tensed predications of the A series –

smuggles in an implicitly tensed account. In other words, there is something so powerful about tense, as it appears in language, that we cannot help but include it in our semantics. But, again, this fails to tell us anything of metaphysical importance. Ludlow may be right to say that tense is essential to our understanding of time and even that tense gives the appearance of being an indispensable part of reality, but the question would remain unanswered as to whether or not the indispensable part of reality comprised by tense reflects some feature of reality or a feature of our own attitudes and beliefs. Hence, an analysis of tense seems unable to give us any assistance in our metaphysical deliberations.

2.5 Conclusion

In 2.1 I argued for the implicit existence of the TTT within the literature, such a position being a theoretical whole composed of four different, though related, theories. The New Tenseless theory of time, B theory, theories of space-time and eternalism were the four positions recognised as composing this group. With this in mind I proceeded to an analysis of the components in order to weigh up their collective prowess as a metaphysic of time. It was noted in 2.2 that the Old Tenseless theory of time could not provide a tenseless translation of tensed sentences and was jettisoned. In section 2.3 the analysis of the New theory was initially damning, but it was noted that some of the major defects can be patched up, should one wish to do so, by making recourse to appropriate modal and semantic materials, although the move deemed necessary would not be palatable to all adherents of the TTT. In 2.4 it was suggested that semantic analysis is ultimately unrevealing when it comes to metaphysical considerations since it remains fundamentally unclear whether the tensed or tenseless component of the truth conditions stated in the metalanguage supervene upon, or reflects, some feature of reality.

Obviously, if the arguments presented here are correct, then the claim that our tenseless semantics motivates the TTT is false. Moreover, it should be noted that any account of the tense evident in natural languages is compatible with the remaining features of the TTT, but none of these semantic accounts explicitly favour these features. Thus, if we are to motivate the TTT we must look elsewhere. Likewise if we are to show the TTT then it must be through more metaphysical arguments than those presented thus far.

Chapter Three

In chapter three I:

- *Present the arguments taken to entail the second component of the timeless theory of time – space-time – and the truth of the special theory of relativity*
- *Note the dependence of such arguments upon verificationism if space-time and the special theory are to be thought of as logically entailed*
- *Argue that the special theory of relativity and any theory that takes space-time to be real are not entailed by the experimental findings, but should be thought of as inferences to the best explanation. But, upon further analysis I suggest they turn out not to be good explanations at all.*
- *Argue that the third component of the timeless theory of time, B theoretic relations, cannot be formulated within a space-time. Hence, that the TTT is not a coherent whole. I also suggest that it is not clear that the B theoretic element of the TTT can be meaningfully formulated at all.*

3.1 Relativity, space-time, and the Nature of Temporality

Much analysis is necessary in order to see precisely what is being claimed and, more properly, what *should* be claimed on the basis of the special theory of relativity. The theory of relativity presents by far and away the largest problem for the presentist (see 6.3) and is commonly regarded as the most powerful ally of the TTT (c.f. Sider 2001: pp. 42-45). In the first section of this chapter I shall detail the theory of relativity; the particular experiments which apparently yield the conclusion that space-time is real, point out in the second section what is *really* justified by these experiments and, in the third, argue that theories of space-time are insufficiently good explanations to count as our best explanations of the phenomena. With this accomplished I shall turn to the task of examining temporality and the nature of B relations.

What will become evident is that the space-time picture of reality presented is one that may prove to be metaphysically possible, but that this metaphysical picture *is not* one that fits with the TTT. Indeed, theories of space-time are, I suggest, incompatible with the TTT – specifically with its B theoretic component. As such, anyone wishing to maintain B theoretic relations will have to turn to a 3+1 theory, a theory of space and time as separate and distinct entities as opposed to a theory of

unified space-time. As a result, the argument that presentism is false since it entails scientific revisionism can be shown to apply against the B theorist and the TTT theorist, though it will not hold against someone who wishes to maintain a space-time theory and is also willing to accept that time is unreal.¹

Moreover, it will be observed that the requirement of scientific revisionism on behalf of either the B theorist *or* the presentist may not be strictly necessary, since the “proof” of the unifiability of space and time rests upon a principle of verification which can be legitimately challenged on metaphysical grounds. Since this metaphysical principle generates scientific views that point to the falsity of both presentism and B theories, all that is needed is metaphysical, rather than scientific revision. It becomes clear that both presentism and B theory are metaphysical possibilities. The more interesting question is then which of the two views do we then think represents, or is closest too, actuality. My conclusion to this question is that, since it remains unclear precisely what time and temporality are for the B theorist, presentism should be seen as the obvious solution.

3.1.1 Explanatory power of space-time

Before we proceed to an analysis of the specific examples said to favour a space-time interpretation it should be pointed out that irrespective of whether one finds the space-time solution to be ultimately persuasive, within the context of considerations of the physical examples discussed herein, a space-time solution has a great deal of explanatory power. If the universe is as is suggested below then we have explanations of why certain phenomena occur. In what follows I argue that the special theory of relativity and Minkowski space-time present us with a picture of a reality where:

- i) There are no such things as space and time; rather there is space-time
- ii) There is no such thing as absolute simultaneity
- iii) There is no “moving now”

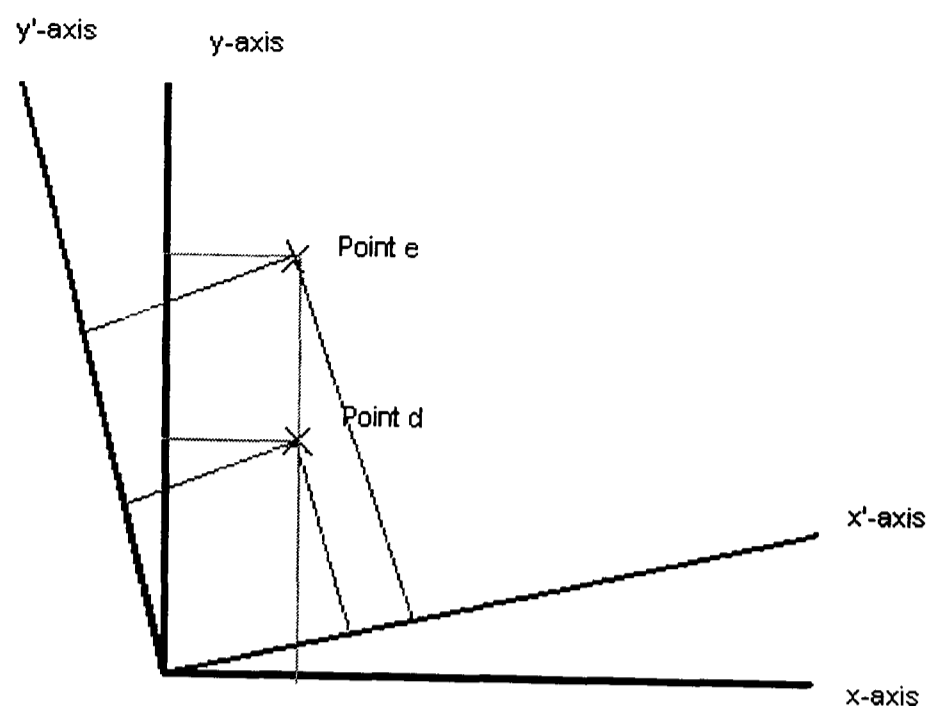
¹ As was noted in chapter one, I do not give any sort of serious consideration to the view that time is unreal precisely because such avenues seem to me to be a last resort.

3.1.2 Space-time separation

Suppose the following: Charles is on board a rocket ship, travelling away from the earth at a velocity approaching that of light. Elizabeth, his twin, is on the earth. In this example there are two explosions. Both, from Elizabeth's perspective, are to be found at the same point in space, though they occur at different times. Charles perceives things differently. From his perspective the explosions occur at slightly different locations in space, although their temporal separation is slightly shorter than that perceived by Elizabeth. However, both agree that the space-time separation is the same. A distance s in space-time equal to $\sqrt{(x^2 + y^2 + z^2 - ct^2)}$, where x , y and z are simply the Galilean spatial coordinates of an event taken in any frame of reference. The use of ct^2 is of little interest to us, since its only role is to describe the temporal interval in terms of metres.² Obviously, the total distance s is neither a distance in space nor a distance in time, but a union of the two.

Why does this make us suspect that (i) is correct, that time is a dimension of space-time? The telling part of the analysis is the request on the part of the physicist for us to explain why this expression should be one that accurately describes the behaviour of objects in space and time. In other words, "why should time look like a dimension?" Plainly it does, for the above expression *looks* like the kind of expression that would describe a separation in four dimensions and, since one of those dimensions is being taken to be time we must ask why this separation can be described in a geometric fashion. The most obvious answer to the question is that time *is* a dimension. To see this more clearly it may be salutary to consider a geometric, two dimensional example, see Fig 1.

² We cannot object that this move is arbitrary on the grounds that time is unlike space as to do so is to prejudge the argument against the TTT theorist.



What the diagram shows is that for any two points, d and e, although it is possible to rotate the (x,y) axis to (x',y') , and hence effect a co-ordinate transformation from (x,y) to (x',y') , it is not possible to alter the separation between points d and e simply by rotation of the axes. Plainly the distance between the two points is invariant, although the distances between the two points as defined in terms of the x and y coordinates obviously vary according to the frame of reference.

In the same way, the spatial and temporal separation of any two events might be variable according to one's frame of reference (e.g. whether one adopts (x,y) or x',y'), but the space-time separation is invariant. It is precisely because space and time are reducible to space-time that this invariance occurs. In order to explain why space and time appear to behave as a four-dimensional space, we simply claim that space-time *is* a four dimensional manifold. Prior to Minkowski's move we know that space-time relations are invariant, we simply do not know why they are invariant. Now we know that space and time are mere component dimensions of a space-time and thus (i) must be true.

In the space-time explanation for this occurrence we explain the observation by saying that each inertial frame takes a different four dimensional perspective on the same states of affairs.³ Thus, there is no absolute fact of the matter as to how far

³ C.f. Taylor and Wheeler (1966: pp. 39-47), Hey and Walters (1997: pp. 62-3).

apart the explosions are in either space or time; merely a fact of the matter as to their space-time separation. This points to the truth of (ii) since if there is no “fact of the matter” as to how long there is between the explosions then there is no “fact of the matter” as to what the time *is* at any moment in time. Likewise, if the “flow” of time, the motion of “the now” is to occur, in which frame does it occur? If we specify any one of the frames as having a now at a particular temporal coordinate, then, given the lack of simultaneity suggested, this will not accord with the location of “the now” in some other frame of reference. If there is no unified point of becoming then it is not clear how there can be a single and objective moving now and, thus, we see how (iii) is to be argued for.

3.1.3 Twins

Recall Charles and Elizabeth from the previous example. Instead of watching out for explosions, in this case Charles travels away from the earth at a velocity approaching that of light, and then returns to Elizabeth. During the period of his being away, Charles ages less than Elizabeth, an effect referred to as time dilation. The twins paradox can *prima facie* seem to be a rejection of relativity; since the special theory is supposed to be a reciprocal theory, hence, if the example is structurally isomorphic and if Charles ages slowly because he is travelling at a high velocity relative to Elizabeth, then Elizabeth should change slowly because she is travelling at a high velocity relative to Charles.

However, the two cases are not structurally isomorphic at all, for Charles must, if he is to travel first away from Elizabeth and then back towards her, occupy two distinct, that is – verifiably distinct – frames of reference. Elizabeth occupies only one.⁴ The explanation offered by the space-time theorist is that Elizabeth travels a greater distance in space-time, and thus everything in her inertial frame ages more than entities do in Charles’s two frames of reference. This experiment is taken to point to the plausibility of (ii) and (iii); (ii) because there appears to be a lack of a simultaneous present within the two frames. If we ask both Charles and Elizabeth to say what time it is when a certain event occurs – say Charles beginning his return trip – then they will return different numerical values for that time. (iii) is plausible given

⁴ Zhang (1997: pp. 177-9) gives a detailed mathematical explanation of the process. Sciama (1987: pp. 9-16) offers a less technical explanation.

that Charles and Elizabeth cannot agree when this “now” is, any candidate time that one of them offers will be disagreed with by the other. If there is no objective fact of the matter as to when this now is then it is unclear that there is such a moving now. Note once again that this solution to the apparent paradox of time dilation is, mathematically, very elegant and simple. Of course the other thing to note is that the unification of space and time into a space-time is essential to this mode of explanation, and thus we see yet more motivation for the acceptance of (i).

3.1.4 The Pole in the Barn

So far we have dealt with examples that point to our inability to form an agreement as to the value which ought to be given to the “correct” time coordinate. Indeed, our inability to attribute a correct value to this coordinate is indicating a rejection of the notion of absolute simultaneity. Further, the ease with which the space-time model can explain these phenomena is being taken as evidence for it being a veridical theory. Now we turn our attention to a different type of phenomenon. Roughly speaking, according to the special theory of relativity, any increase in relative velocity causes a contraction along the direction of relative motion.⁵ The reciprocal nature of this phenomenon makes it difficult to explain for it appears that there is no such thing as “the way that things are”. Instead, there are a number of different sizes and shapes that entities will take on according to their relative velocity.

Theories of space-time can explain this effect by recourse to the same claim that was made in 3.1.1.1. In the same way that space-time separation remains constant whilst spatial and temporal separation vary according to velocity, so the length of entities varies according to our relative velocity with respect to them. Thus, each velocity from which we view an entity is akin to a cross section taken from a particular perspective.⁶ We are beginning to see, here, the power of the space-time explanation of relativity. If we attempt to explain the contraction of various lengths as genuine effects outside the context of a space-time, then we are sanctioning either the existence of as many entities as there are frames of reference or the illusory nature of all observations not made at absolute rest with respect to an entity. Both seem

⁵ In fact, as Sciama (1988: p.8) points out, an entity will *appear* to be contracted *and* rotated. But when we take account of Relativistic optics we will measure the object to be shorter along its direction of travel than we would were we stationary with respect to it.

⁶ C.f. e.g. Balashov (2000), Taylor and Wheeler (1966: p. 70), Craig (2000b: p.25)

puzzling. The space-time explanation, although relying upon a markedly different understanding of reality, appears to unify these apparently disparate perceptions into a single reality. But these unified descriptions of reality treat time as a component dimension of a four dimensional manifold (i), deny that there is a meaningful notion of absolute simultaneity (ii) and rule out the notion of a moving now (iii).

3.1.5 The μ meson

The final example that I shall give is that of the μ meson from Sciama (1988). It adds nothing new to the cases mentioned above, but it does give a sense of the unified nature of the solution.

Cosmic rays, coming from outer space, generate μ mesons as they collide with the particles in the upper atmosphere. Their rate of decay, of *half-life* (...) acts as a clock. We know what the half life of a μ meson at rest is; and a simple calculation shows that it is far less than the time it takes for a μ meson to get from the upper atmosphere to our detection apparatus on the surface of the earth. (p.7)

The μ meson is of interest because it is an observable particle that is travelling at high velocity. Where we find a reference frame travelling at a high velocity with respect to our own frame we would expect to find that, from the perspective of our frame, the frame in motion would change only relatively slowly, though, of course, it will appear as if it is travelling very quickly. The case of the μ meson serves to confirm the prediction since, given the laboratory conditions, the meson would have decayed well before it reached the detection apparatus. Thus, from our perspective, the meson has changed only slowly – as the theory predicted.

For a hypothetical observer sitting on the meson as it travels into the earth's atmosphere, it will appear that the meson is changing at a normal rate since the observer is at rest with respect to the meson itself. But, the question then arises as to how the meson can travel into the earth's atmosphere as far as it does if its half life is, in fact, only sufficient to get it half way to the earth. Where we can say that the meson travels as far as it does from the perspective of the observer on earth because it is only changing slowly, from the perspective of the observer on the meson itself the meson

is changing at the normal rate. In order to explain this phenomenon we must appeal to the further relativistic effect: the contraction of bodies that are in motion, i.e. when a body moving in a certain direction will become shorter in the direction of travel. Thus, if a rod is travelling in direction d and is observed by an observer who is stationary with respect to it then the rod will appear to be length l . If, however, our observer is in motion with respect to the rod, moving toward it, then the length of the rod will appear to be less than l for that observer. Using this we can explain how the meson gets farther into the earth's atmosphere than we might suppose:

An observer travelling with the μ meson will thus measure the distance between the upper atmosphere and the surface of the earth as being much less than we would think of it as being, For him, then, the reason why the μ meson has not decayed before it reaches the earth's surface is simply that it does not have very far to go. (p. 8)

3.1.6 No Passage

Before we proceed to a more detailed analysis of the metaphysical foundations of these experiments, it remains for something to be said about the incompatibility of the space-time model with a coherent notion of passage.

First, we should note that if taken as a veridical representation of reality there is no room for passage within the space-time model. Put another way there is nothing to add to this model. Passage is to be accounted for as being mind dependent. However, this does not rule out the *possibility* of passage and my claim was that this picture was incompatible with notions of passage. Second, then, recall the arguments from 1.4.2. There I argued that McCall's model of reality fails because it relies upon the notion that either time can change without higher time (and since change requires time this is obviously false) or, if we sanction the existence of a higher time, then we entail an infinite chain of higher times in which to explain passage. Such arguments are equally valid here too. If time is alteration in temporal properties etc. then we find ourselves back in McTaggart's paradox – since space-time is supposed to be the way reality is *simpliciter*, e.g. as a C series. If time turns out to be a topological feature of reality then space-time will be in the same predicament as McCall's theory.

3.2 Dependence upon positivism

Space-time presents a powerful model, and an excellent way of representing reality mathematically. The question, however, is whether or not we ought to take that mathematical representation as we find it: should we accept that space and time are in fact components of a unified four dimensional whole and that the TTT is true?

The space-time component of the TTT might be found wanting. If it is, or if presentism is found to be our theory of choice to solve McTaggart's paradox, then we shall have to be open to the possible failure of space-time interpretations of the special theory. At the current stage this looks as though I am encouraging some kind of scientific revisionism. This is not so. What I am encouraging is an open mindedness to a possible *metaphysical* revision of certain scientific views. I wish to begin casting aspersions upon the claims of the space-time theorist. Thus far none of the interpretations given in 3.1 has been challenged; I have presented the explanations given as the only plausible explanations. Crucially, there are metaphysical assumptions that rest at the core of these explanations, and these assumptions can be challenged.

3.2.1 Verificationism as the core of space-time and the special theory

Craig (2000b: chapters 3 and 4) has argued that, central to the success of the space-time interpretation of the special theory, is the widespread verificationism dominant in physics in the early part of the twentieth century.

the key justificatory factor in Einstein's rejection of Newton's absolute or metaphysical time and space and consequently his reduction of time and space to measured physical time and space was Machian positivism, which eschewed such metaphysical entities as absolute time and space as literally meaningless and which in Einstein's case issued in a verificationist analysis of time and space along operationalist lines. (p.81)

Craig's point in these chapters is that the metaphysics which produced theories such as space-time and relativity is no longer adequate (p. 82) and that we are in need of updating our metaphysics. The consequence of this is that in so doing we undermine

the foundations upon which space-time interpretations of relativity are based. Recall the example given in 3.1.2 concerning the twins, Charles and Elizabeth. The case was set up to show that we see phenomena predicted by the special theory precisely because they are embedded in a space-time. One of the conclusions drawn from this was that there is no such thing as absolute simultaneity. This conclusion followed because at any point in Charles' flight it would not be possible for both Charles and Elizabeth to agree upon the time at which an event occurred. When the first explosion occurred at, say, t_1 for Elizabeth, it *would not* be t_1 according to Charles. When t_1 did occur according to Charles, it would not be t_1 according to Elizabeth. In other words there is no way for us to *verify* whether or not the two events did, in fact, occur at the same time.⁷

It cannot be emphasised strongly enough how heavily indebted the contemporary understanding of relativity is to positivism. Although certainly not a positivist, Einstein (1923) inferred from the fact that,

Observers moving ...[relative to a] moving rod would thus find that the two clocks were not synchronous, while observers in the stationary system would declare the clocks to be synchronous.

to

So we see that we cannot attach any *absolute* signification to the concept of simultaneity, but that two events which, viewed from a system of co-ordinates, are simultaneous, can no longer be looked upon as simultaneous events when envisaged from a system which is in motion relatively to that system. (pp. 42-3)

He inferred from the fact that observers would not declare two clocks in motion to be synchronous, that there is no such thing as absolute simultaneity.⁸ Thus, we move from the claim that we lack an observable feature of reality to the claim that there *is*

⁷ See Rosser (1964: pp. 104-5) for a detailed example that illustrates the verificationist core of the move.

⁸ Craig (2000b: chapters 3 and 4) analyses in much greater detail than I the debt which space-time owes to positivism. Since I take it to be a relatively uncontroversial point that the special theory is indebted to positivism I shall devote relatively scant resources to the task. In any case, although I agree with Craig that the theory probably was based on such foundations the theory is, in fact, simply an inference to the best explanation and, as such, the noting of the foundations serves more as a point of interest than a linchpin of my argument. Note, also, that whether or not Einstein's own arguments are genuinely verificationist might be disputed – e.g. Zahar (1998). However, this would not effect the core of my argument which, ultimately, turns on the claim that the special theory is maintained because it is a good explanation for the observed phenomena.

no such feature of reality; from the claim that we cannot tell which of the two pictures is “really correct” to the claim that neither picture is “really correct.”

The dependence of space-time interpretations of relativity extends beyond its foundation to its acceptance in contemporary physics. Consider the following:

‘Newtonian absolute simultaneity is equivalent to postulating the existence of an instantaneously propagating signal with an infinite velocity.... We have known that there is no any *instantaneous signal* in nature and, therefore, the absolute simultaneity cannot be realized in any laboratory.’ (Zhang 1997: p. 10)

Also,

Before lengths can be measured and spatially separated clocks synchronized, one must decide what is meant by the simultaneity of spatially separated events...Ideally, if signals could be transmitted with infinite velocity, such that they would reach the observer without time delay, then the observer need only note the time of arrival of the signals and equate it to the time of the event. However, there is no way of transmitting signals instantaneously. (Rosser 1964: p. 103)

In all such cases the lack of a signal with instantaneous and infinite velocity is taken to imply that simultaneity is to be defined in terms of the velocity of light and cannot be defined by an abstract concept of an absolute signal.⁹

3.2.2 A move to space-time

From such experimental foundations, specifically from the invariance of space-time separation discussed in 3.1.2, Minkowski (1923) argued that

space by itself, and time by itself, are doomed to fade away into mere shadows, and only a kind of union of the two will preserve an independent reality. (p. 75)

⁹ Even were one to establish the one-way velocity of light it is not clear that this establishes the non-existence of an absolute present since one would need to rule out the possibility of an instantaneous signal to achieve the task.

I take it that this is satisfactory evidence as to the positivism of the theory. Since absolute simultaneity cannot be observed it cannot be included in our ontology, and because the invariance of space-time separation can be observed it can be included in our ontology – thus there is no such thing as an absolute present. The natural conclusion to draw from this is that space-time theories are true, or at the least any theory that includes the unverifiable is false. It may be true that I am making the case rather bluntly here, and I hope that criticisms of this ilk can be rebuffed by the observation that I am not trying to implicate Einstein or Minkowski as positivists; rather, I am trying to point to what appear to be positivistic inferences, quite reasonable inferences, that lurk at the heart of their theories. This is not, obviously, incompatible with the further claim that both were metaphysical realists.

What *is* of issue is which resources are in play when we adjudicate upon what constitutes evidence for a particular theory. My claim is that, at least for Einstein, the resources from which one infers to one's conclusion, are those that are verifiable. One is, then, fully entitled to postulate the existence of those things that cannot be verified if one so wishes, of course. But if there is no verifiable frame of absolute becoming, then such a frame of becoming is missing from the resources with which one is initially equipped. Now this is perhaps unsurprising. Physics, as a discipline, does not tend to deal in entities whose existence cannot be verified. But it is not that the Einsteinian arguments show that there is not an absolute frame – as is frequently supposed – they merely show that we lack the resources with which to verify such a frame. Of course one might suppose (particularly if one is a positivist) that the absence of such a frame from our verifications entails that the frame does not exist.

3.2.3 The weakness of positivism

Now although special relativity and its cashing out into a theory of space-time appears based in positivism, it need not depend upon it as we shall see in 3.3.2. This is just as well, for it has been widely recognised that positivism has not sounded the death knell for metaphysics, indeed one might argue that positivism is simply one particular type of metaphysics. However, positivism is distinct from other types of metaphysics in as much as it denies the existence of those entities whose existence cannot be verified. Other metaphysical pictures disagree with positivism. Some theories take seriously the existence of universals and abstract objects, others still

take seriously the existence of numbers in the Platonic sense. So the premises that one adopts will be influential in determining how one believes reality should be described, and how one believes it to be.

The particular premise I have in mind is the claim that metaphysics concerns itself with delineating the possible. Hence positivism, as a form of metaphysics, delineates one possible description of how we ought to consider reality to be: a reality where we include the existence of only those things that we can verify using physical means. However, if my method is satisfactory then it should be recognised that there are other possibilities. For example, there may be ontology's that posit the existence of unverifiable entities or states of affairs. One such state of affairs could, in principle, include sufficient materials to support the notion that there is a complete description of reality that includes a meaningful definition of absolute simultaneity – albeit a definition that lacks operational significance. But the fact that this view disagrees with the metaphysics of the positivist who admits the existence of only those entities that she can verify, does not preclude this particular picture from being correct, or, at the very least, denoting a genuine metaphysical possibility.

In chapters four and five I argue that we do have metaphysical reasons for such a reinterpretation of relativity and that we can block the move to space-time. In what remains of this section I wish to argue that exponents of space-time do not really adhere to them on positivistic grounds, far from it. My rather simple exposition of the theories would need to be in agreement with the space-time theorist only if they sought to argue that the experimental evidence actually entailed that theories of space-time were true. It seems to me that the best reason for adopting the theory is the completeness noted in 3.1, and the fact that it *seems* to present us with a best explanation of the phenomenon described and, thus, that theories of space-time are not logically entailed by the experimental evidence. However, I also wish to explore the consequences of accepting the claim that the space-time solution is a good explanation. It turns out that the price of accepting that claim, that the space-time solution is a good explanation, may be too high for a philosopher *or* a physicist to countenance seriously.

If what I argue is correct then it should be noted that, as an attempt at an explanation, theories of space-time are open to being challenged by metaphysical arguments which purport to show that they are not, in fact, the best explanation at all. Hence, as well as detailing how theories of space-time are supposed to lead us to the

conclusion that space and time are to be unified into space-time and, hence, that there is no such thing as absolute simultaneity, I shall offer some arguments that, in contradistinction, attempt to point to the fallibility of space-time explanations. If space-time is not a good explanation for the phenomena, then it should not be regarded as a defect of presentism that it requires metaphysical revision to the space-time theory.

3.3 Space-time as an explanation

Few philosophers, if any at all, will be persuaded by the claim that the space-time interpretation of the special theory is true simply because positivism is true (indeed one wonders how many physicists would be so, when pressed). But why is it, then, that the space-time interpretation of the special theory receives such widespread acceptance in philosophical circles? The answer lies, not in the fact that all philosophers are closet positivists, but in the fact that the space-time interpretation of the special theory is reasoned to as the best explanation of the phenomena. It explains why it is that there are apparently different ways reality exists in different frames of reference. It does so by incorporating such differences as mere differences in perspective within a four-dimensional space-time manifold.

Certainly, no “proof” could ever be offered for a principle of special relativity that, ‘A frame in uniform translatory motion relative to an inertial frame cannot be distinguished from the inertial frame by any physical experiment whatever’ (Rindler 1969: p.8). Unless the principle is found wanting, then judging the special theory seems to come down to judging its heuristic value and the success of the theory based upon the principle (Cf. Rindler (1969: p.10) and Goldberg (1984: p. 105)). Patently the success of the theory is undeniable and this is the reason that so many philosophers find themselves under the sway of the space-time interpretation of the special theory.

The space-time interpretation itself appears to run into some heuristic problems of its own; for, although within the context of certain aspects of physics the “static” nature of reality seems sensible enough it seems to run into at least three distinct problems. First, it appears that space-time theories are, in fact, scientifically revisionary with regards to every other scientific discipline (not a good explanation at all – we would surely rather keep *some* of our other theories). Second, that accepting a

representation of a genuinely passageless reality would appear to make the analysis of time and temporality a logically contradictory discipline and, third, if we take seriously the kind of argument employed by space-time theorists then we ought to think that time is unreal.

3.3.1 Bad explanation?

The first point that I should like to make about space-time then, is that it appears to entail that there are an enormous number of coincidences that occur in the three dimensional world that we believe ourselves to perceive. For example, every time I perceive someone kick a football, lo and behold the ball moves away from the foot (assuming that the ball is inflated of course). In what we perceive to be our three dimensional reality we explain this, Humean concerns aside, by saying something like, “the foot causes the ball to move away.” Whether we couch this causal relation in terms such as, “energy is transferred from the foot to the ball,” or something stronger such as, “there is some causal relation between the ball and the foot,” is beside the point here. What is important is that there is, in our every day deliberations, some clear way of thinking about the foot and the ball such that without the actions of the foot the actions of the ball would not have followed.

But under a space-time interpretation we will have to deny that any such kind of relation exists at all. Agent, event and counterfactual theories of causation are all denied to us since each of them entails that some entity or another (an agent, an event etc.) brings about some state of affairs. Plainly in a reality composed out of space-time worms, or even static stages, no such thing can be true.¹⁰ In a four dimensional reality such as the Minkowskian one described above, one which lacks a genuine feature of passage, entities do not move towards or away from one another. My foot does not move towards the ball. Rather, at t1 my foot is located behind the ball, at t2 my foot is located spatio-temporally contiguously to the ball and at t3 the ball is a distance away from my foot. It will not do to object on counterfactual grounds, to argue that had my foot not been in its location at t2 then the ball would not have moved – thus providing an analysis of causation within the space-time – for such

¹⁰ I think that we might even include regularity theorists in our list for even these relatively minimal theories of causation would surely wish to preserve the intuition that there is something distinct about causation as opposed to, say, the claim that two mountains in a relatively small area ‘cause’ a valley.

readings also seem to imply the highly counter intuitive notion that the existence at t_1 of two hills causes a valley, also at t_1 ; for had the two hills not been located at t_1 the valley would not have existed either. Thus, unless one wishes to accept “spatial” causation, one cannot accept a counterfactual analysis of causation within a space-time. Certainly, one is forced to admit that the concept of causation is merely a product of our mode of existence in this particular four-dimensional reality which seems very hard to comprehend.

The obvious reply from the space-time theorist is that I have not told quite the right sort of story regarding a counterfactual analysis of causation, that I have not said anything about the logical independence of my foot and the ball in contrast to the hills and the valley. After all, the valley is logically dependent upon the hills for its existence in a way that the ball and its motion are not dependent upon the foot for theirs. But then we encounter a further difficulty. In 3.4 I argue that the space-time theorist lacks grounds for distinguishing between space and time; this being so it is not clear to me that the ball its motion *are* logically independent of my foot. After all, if space and time are, as Minkowski has it, reducible to space-time, then it seems that any truth applicable to space ought to also be applicable to time. This being the so, if it is the case that the valley is logically dependent upon the hills for its existence, so to is the ball logically dependent upon the foot for its movement. Only if we can distinguish time from space can we make any meaningful remarks concerning logical dependence.

If this claim is true, if causation is not a genuine feature of reality, at least if there is not causation as we recognise it through the preservation of genuinely three dimensional quantities such as energy, mass and the like, then the other sciences appear to stand in direct contradiction to the special theory and the space-time interpretation; for the inferences which they use for explanatory purposes, also inferences to the best explanation, appear not to be viable in light of the foregoing. For example, the suggestion that the heating effect in a piece of wire with a current running through it is proportional to the current multiplied by the square of the resistance of the wire is meaningless because there simply are no such things as current and resistance – it is not immediately obvious that there is the flow of electricity.

We could cite a more commonplace example. Suppose Charles fires a gun at a target. When the bullet from the gun strikes the target we want to say that the bullet

causes there to be a hole in the target. But if the space-time analysis is true then we cannot say such a thing. We cannot say that the best explanation for there being a hole in the target is the firing of a gun, for the firing of a gun cannot meaningfully be thought of as a cause of there being a hole in the target since we have no adequate conception of what it is for one thing to cause another. The fact that space-time might be the best explanation for how it is we come to view reality differently from each frame of reference is indisputable. However, what is disputable is the further claim that the space-time interpretation is compatible with our other “best explanations” for other phenomena from other scientific disciplines. If, as I have suggested, such explanations are not compatible with a space-time interpretation then we must ask whether the evidence for the space-time interpretation is sufficient to be metaphysically revisionary in so many disciplines. I suspect that the answer to that question is worthy of detailed analysis, but I shall not offer it here. I raise it merely as a question for any potential space-time theorist. They must say that the evidence for the space-time interpretation is so compelling that it is sufficient to motivate metaphysical revisionism in almost every other field. Although, perhaps, it might be plausible to do so the bulk of our intuitions concerning reality must be overturned in order for this to be so, and, even if the space-time theorists claims are plausible, seems a high price.

In this regard, however, perhaps the space-time theorist would be quite happy with such claims concerning causation. After all, in endorsing something akin to a spatial variation as change it already appears that they are committed to a very particular view. I suspect, though, that whilst the space-time theorist might be quite happy to acquiesce to this, it should be noted that the space-time theorist appears inclined towards to a reality apparently lacking causation, plausibly lacking three dimensional intrinsic properties and also lacking change over and above spatial variation. The collective impact of these highly counterintuitive views might be sufficient to motivate some to reject theories of space-time altogether.

3.3.2 “Kantian” concerns

Our ability to revise scientific claims four-dimensionally rests upon the assumption that three dimensional perspectives are genuinely informative as to the nature of a four dimensional reality. In claiming that space and time are doomed to

fade away, and that the true nature of reality is four dimensional, Minkowski committed space-time theorists to the view that our perception of the existence of an objective distinction between space and time is fallacious. Whatever the nature of the temporality it appears to be different from the spatial dimensions in that we associate it with the experience of passage. But space-time, as Minkowski defined it, admits of no such distinction between its spatial and temporal components. As Steven Hawking (1988) states, '[I]n relativity, there is no real distinction between the space coordinates and time co-ordinates, just as there is no real difference between any two space co-ordinates' (p. 24). There are two distinct concerns here then: first, that we are attempting to draw inferences from the way the world is to its precise nature in some way other than that which we can observe and, second, that we cannot preserve intrinsic three dimensional properties within a four dimensional account.

It is unwarranted, I contend, to assume that although we are unable to perceive the true nature of things as four dimensional (I do after all perceive there to be a difference in the nature of things' spatial and temporal extension where there is no difference at all), the perceptions that we do have are sufficient to determine enough of the true nature of reality to begin to formulate scientific laws that are, at least approximately, true. Consider the definition of force, in terms of Newtons (N), as Mass (kg) multiplied by acceleration (ms^{-1}). Thus a force of 3 Newtons, and a mass of 1kg will be coupled to an acceleration of 3ms^{-1} . But, in order to recognise that an entity is accelerated at the rate of 3ms^{-1} , one must be able to distinguish successfully between space and time, a distinction that does not appear to exist, at least objectively, within space-time. Moreover, it is from precisely this type of observation that the space-time theorist wants us to draw the conclusion that the true nature of reality is four dimensional. Hence, although our perceptions are illusory (inasmuch as they are not accurate perceptions of what there is), they are sufficient for us to determine the true nature of reality. This seems, at the very least, to be an inference in need of explanation

One might argue that although such intrinsic properties as mass cannot be distinguished in the co-ordinate time, the values which we assign to the temporal location we find ourselves in, there is an objective distinction in the proper time and proper space of any entity. Nerlich (2004) argues for such a distinction, suggesting that such a distinction can be drawn, though only on a local scale (p. 26). This seems obvious. We *do* distinguish between space and time. Even if we cannot extend that

distinction beyond the immediate confines of our own spatio-temporal location, that does not entail that such a distinction is not grounded in reality.

But this simply serves to highlight my second point nicely. Nerlich assumes that our perceptions *are* correct, and that the intrinsic properties of entities are available to our examination precisely because we do distinguish between time and space. But *why* suppose that such a distinction reflects any genuine feature of reality? *Why* suppose that entities really do have mass, acceleration and the other three dimensional qualities that we attribute to them? If the nature of reality really is such that it is four dimensional and we are four dimensional beings who merely perceive reality three dimensionally, then there is good reason to suppose that the objects of our perceptions are illusory since the reality is four, rather than three, dimensional.

Of course, this latter consideration will not impugn the views of B-theorists *if* they can motivate some distinction between space and time such that time is somehow distinct from space within space-time. If that can be achieved then the B-theorist would be perfectly entitled to offer some kind of four-dimensional account whereby four-dimensional entities – e.g. perduring stages or slices – are the truth-makers for what we commonly think of as three dimensional intrinsic properties. But then it remains for the B-theorist to come to some genuine account of what it is for time to be a dimension of space-time that can prove genuinely distinct from space, contra Minkowski's original view. I see no obvious means of motivating such an account (see 3.4 and 3.5).

3.3.3 QM, GTR and the scientific conception of time

Finally, before moving on to attempt to reconcile B theoretic relations to space-time, we ought to note that although so far we have been treating the space-time interpretation of relativity as representative of the “scientific” view of time this is not necessarily the case. Craig (2000b: pp. 92) notes eight different features of time that, in physics, we commonly attribute to time.

1. One dimensional: time can be thought of as a collection of instants which can be arranged in a one-dimensional line
2. Metric: time intervals can be measured such that two intervals can be said to have equal duration

3. Temporally global: the real variable t which we use to denote the measure of time goes through every real value from $-\infty$ to $+\infty$.
4. Spatially global: the time variable can be uniquely defined at all space points
5. External: the flow of time is independent of the specific dynamics of the objects moving in time
6. Unique: there are not many times, but just time
7. Directional: it is possible to distinguish the past from the future of the time-line
8. Present: there always exists an ontologically preferred instant of time, the Now.

Craig goes on to note that these features are referred to by the following ways of thinking of time.

<i>The Notion of Time Used in:</i>	<i>has properties:</i>
Natural Languages	1,2,3,4,5,6,7,8
Thermodynamics	1,2,3,4,5,6,7
Newtonian mechanics	1,2,3,4,5,6
SR	1,2,3,4,5
Cosmology	1,2,3,4
GR – proper time	1,2,3,5
GR – coordinate time	1,3,4
GR – clock times	1,2
Quantum gravity	none

(p. 93)

It is easy to suppose, as Craig himself suggests (p. 93), that if we are to read off from the temporal properties of the theories in order to find out about time that we should conclude that there is no such thing as time. Barbour (1999), for example, maintains that time is unreal on the basis that the time invariant Schrödinger equation makes no reference to the temporal variable (p. 231).¹¹

Whether or not one should endorse such a move is less obvious. For example, the Friedman solutions to the field equations of the General Theory of Relativity

¹¹ For discussion and criticism see Healey (2002) and Ismael (2002).

appear to posit an absolute frame of foliation. Such a frame has been used by Craig (2001: pp. 208-215) and Smith (2001) to argue that physics, rather than supporting a standard space-time interpretation of relativity, actually favours presentism as it seems to delineate a single hypersurface in space-time which appears to be in a continual state of change.¹² My point here is simply that it is not clear that the absence of any reference to time in one theory need not prove decisive, particularly since reference to time does occur in other theories that we also take to be true.

In any case, we need to see what it is that these different modes of reference to time in different theories actually means for this analysis. The different conceptions of time drawn from different physical theories do not necessitate the falsity of the space-time interpretation of relativity or the TTT, or any other theory for that matter. What is entailed is that the scientific arguments carry less weight in support of the TTT than is commonly supposed. It is less than obvious quite what time is supposed to be according to physical analysis – if indeed, time is to be thought of as a real thing at all. There are, after all, reasons from scientific theories to think that space-time is not necessarily “the right answer” to questions concerning the physical nature of time and temporality.

Hence, what we certainly should take from this is that the space-time interpretation of the special theory and its attendant time concept does not entail that presentism is false,¹³ for the concept of temporality offered to us by the special theory and the space-time interpretation finds itself in contradiction with the time concept offered to us by the physical theories, such as the Friedman model of the General theory. Further to this, we should also note that there are a number of technical difficulties (which it may or may not prove possible to solve, 3.3.1-3.3.3) that need to be solved if the space-time theorists are to maintain that their position is coherent. Finally, despite claims as to the granting of operationalist significance to time, there appears to be no single and unified understanding of precisely what time is. Given the

¹² More specifically, Smith (2001) has argued, that because the space-time of the special theory is different to the space-time of the general theory – and not only is the General theory the more fundamental theory it is also the theory that applies to our reality, which the special theory does not – that the special relativistic interpretation of space-time does not go through. Thus, the special theory does not rule out the existence of absolute simultaneity since it is not a theory that applies to our reality. I do not explicitly consider this argument here since the General theory, and its implications, remain largely beyond the scope of this work.

¹³ Especially if, as Craig (2001: pp. 214-5) argues, there are empirical reasons for preferring the Friedman interpretation of relativity.

lack of an orthodoxy it seems paradoxical for the advocate of the TTT to claim that their view is aligned with that of modern science.

It is with this final point in mind that we turn to the last section of this chapter, concerning attempts to reconcile space-time with B theoretic relations, and hence preserving some semblance of the TTT. Within the context of a space-time it should be possible, in principle, to equate temporal relations (roughly) with such physical processes as, e.g. causation, because we have an underlying feature of temporality prior to the physical process. However, as we shall see, although space-time is (possibly) a coherent theory as it stands, it does not appear to be possible to conjoin it to a coherent account of B theoretic relations. Moreover, it is less than clear that B theory, as the third strand of the TTT, is coherent either.

3.3.4 Space-time and B relations

In order to make sense of the B theory one must have some understanding of either what time is, or what temporal relations are. To say that one understands neither is to say that the theory itself is incomprehensible. If the B theorist adopts eternalism then time appears simply to be variation, much like space. But if time and space are so similar, then what is there that makes time sufficiently different to entail the existence of the temporal relations of the B series?

Space-time offers us a way out for the B theorist here, for we can label one dimension of space-time as temporal. If we can do this then *prima facie* we can make sense of what time is. It is one of the dimensions of space-time; a dimension distinguished from the others, at least on a local scale, by the experience of passage which we undergo in accordance with the quantity of the temporal dimension that we traverse. It is perfectly acceptable to distinguish between earlier and later on metaphysical grounds, such that it is a metaphysical, rather than physical, fact as to whether an event is past or future – provided one is prepared to admit that B theoretic relations are simple and unanalysable.

However, in order to accommodate such simple and unanalysable relations within the context of a Minkowski space-time one has to take “ontologically seriously” a view of space-time that is ultimately incoherent, a view that, if accepted, seems to remove the motivation for treating time and space as component parts of the

same reality and hence remove the one of the key motives for endorsing the TTT.¹⁴ The first difficulty that one may come across in imbedding temporal relations in space-time is that space-time is not temporal.

As Craig (2000b) notes,

I think it is clear that the B-theorist will look in vain to relativity theory for justification of his claim that the B-series is a temporal series ordered by *earlier than/later than*. SR does not teach that time is a dimension of space-time; but under Minkowski's formulation one dimension is temporal only because it has already been decided in advance that Minkowski 4-space is to be taken as a representation of spacetime. (p. 162)

Without an account of at least one of these, of either time, or of B relations, we lack a coherent theory. The claim above was that space-time allows us to provide an account of what time is and therefore to provide a coherent theory – time is a dimension of space-time. But the cogency of this line of reasoning can be denied. Theories of space-time do not claim that time is a dimension of space-time, but that space and time are reducible to space-time. There is no such thing within a space-time manifold as a “temporal dimension.” If there were, then we should have some grounding for time, which we do not, and we should also lose any explanatory power that space-time has for us within the context of the special theory. For that explanatory power was based on the claim that there is no such thing as a temporal dimension, and the temporality is simply a matter of perspective, albeit four dimensional perspective. If we are now to say that temporality is a genuine feature of reality then we explicitly deny that claim.

3.4 Evidence for a temporal dimension

There is, of course, nothing intrinsic to the nature of space-time that reveals any one dimension to be the temporal dimension. Were one of the dimensions the temporal dimension we should expect that it would behave differently from the spatial dimensions when treated mathematically. One would expect there to be *some*

¹⁴ There remain arguments from the General Theory that purport to favour the view the space and time are unifiable into a space-time, see Schwinger (1986: pp. 171-187). There are also reasons to suppose that this is not the case, see Craig (2000b: p. 121). I shall not discuss these here.

difference somewhere in the mathematics if space and time are not unifiable metaphysically. The question is, can we find some difference and thus permit the B theorist to say that time just is a dimension of space-time? There is one difference between the dimensions of space and time, but it is unclear that this is sufficient to ground a distinction between space and time in space-time. The following passage, though speculative, is suggestive.

But even though Minkowski spacetime can be described as a four-dimensional manifold, its metric (and hence the topology based on it) is radically unlike that of a Euclidean four-space. The Lorentz signature (+++-) marks a fundamental difference between timelike directions and timelike separations on the one hand and spacelike directions and spacelike separations on the other. Mathematicians are tempted to discount this difference between timelike and spacelike separations – they can transform Minkowski spacetime into a simple four-space by setting $t=ix_4$. True, but that is not a transformation of no consequence; a transformation that converts simple exponential functions into periodic ones is clearly a highly significant one. If there were some fundamental periodicity which underlay the fundamental rhythm of the universe, some ubiquitous chronon, say, then we might look to some $\text{cis}(x_4)$ (short for $\cos(x_4) + i\sin(x_4)$) to explain it in terms of a manifold more fundamental than time. (Lucas 1999: p. 7)

However, the Lorentz signature fails to provide a genuine distinction between time and space, however, since one has, in the formulation of the equation, already set one of the axes as the temporal axis (c.f. Craig 2000b: p. 161). We know this to be true since in a purely geometric case it is still true that the mathematical equations will present one of the axes as the referent of the negative sign. And we are to be able to perform Lorentz transformations, albeit transformations within a 4-space, rather than a space-time. The fact is that the resultant negativity sign is nothing more than a product of applying trigonometry to imaginary four dimensional spaces.

Thus, there are no *grounds* for inferring from the structure of a four-space to the existence of temporality as a component of space-time, though we do have some evidence of said temporality¹⁵ and, thus, we must admit that there is time and hence give some description of it.

¹⁵ Our experience of passage and its correspondence with one of the dimensions of the spatio-temporal manifold should be sufficient to persuade us that one of the dimensions is temporal.

Craig's point (2000b: pp. 161-3), that there are no grounds for thinking that any one of the dimensions is temporal, can be seen here. There is nothing intrinsic to the space-time structure itself, which appears as temporal. There is no objective mathematical distinction to be drawn between the spatial and temporal dimensions. But Craig argues that this lack of grounds leaves us with no reason to suppose that the B theorist has anything more than, 'an effete C-series' (p. 166).

This is palpably false. There is *evidence* to suppose that one of these dimensions is temporal. This evidence is our perceptual experience, and this gives us at least some reason to suppose that the B theorist may employ simple and unanalysable temporal relations within a space-time. Craig prefers the A theory since it can, or so he claims (pp. 149-158), give a reductive account of the metaphysics of B theoretic relations. According to Craig, since the A theorist can give an account of temporal relations which is not simple and unanalysable it is incumbent upon the B theorist to provide some such account.

But one should not endorse Craig's claim. Each metaphysic of time will delineate a different set of irreducible metaphysical components. In the B theoretic case such relations are clearly B theoretic relations. It will not do for Craig to object that such temporal relations can be shown to be reducible to their A theoretic counterparts and are, hence, not irreducible. The B theorist will argue that, if Craig is correct, that this is simply a case of the conceptual apparatus of the A series, which does not correspond to any feature of reality, providing us with the ability to see how we understand these B theoretic relations – not how these B theoretic relations really are. Thus, it is not that the B theoretic relations really are reducible to their A theoretic counterparts, but that the way that we conceive of B theoretic relations is reducible to the way we think about A theoretic relations. Thus tells us nothing about the nature of B theoretic relations at all – only how we think about them.

But the lack of grounding for temporality is certainly a concern for the B theorist. If these simple and unanalysable relations are to be imbedded into the structure of a temporal dimension then we should like to be able to distinguish objectively which of these dimensions is the temporal one. Not to do so would run the risk of not adequately defining the B theory properly. However, if the B theorists are sufficiently swayed by the ability of perceptual experience to delineate one of the dimensions as temporal then it is unlikely that such structural complaints will concern them, for they will most likely move to suggest that temporality be defined, not at a

global level – not in terms of co-ordinate time – but at a local level – in terms of “proper time.” But in doing so it appears that the B theorist, and the advocate of the TTT, loses the support of the arguments from the special theory.

3.4.1 Loss of explanatory power in “proper” quantities

‘Proper quantities emerge if we separate time from space *locally*’ (Nerlich (2004: p. 26). Nerlich’s project is an attempt to reformulate talk about relativity into three dimensional B theoretic language – as opposed to the four dimensional language to which space-time would appear to lend itself. The relevance to our current project is clear: if we can formulate a genuine three dimensional description of reality then it must be the case that we can differentiate between earlier and later (albeit at a local level) and therefore give some account of what time is, and hence, with some account of temporality in mind we can then go on to say that B theoretic relations are simple and unanalyseable and still have at least some understanding of what is at issue. On this account time will turn out to be a local manifestation of one of the dimensions of space-time.

Essentially, then, Nerlich is prepared to ignore the complaint raised in 3.3.3 that there is no feature of the mathematical structure which reveals to us which of the dimensions is temporal. For him, the grounds for labelling one of the dimensions temporal are the local experiences that we have of one of the dimensions of the four-space being consistently equated with the experience of passage. Thus, there must be something to that particular dimension that has these B theoretic properties in order to differentiate it from the dimensions that we refer to as spatial. But there is a price to pay for this move, and the price is the original motivation for thinking of space and time as unified into a space-time.

In 3.1.2 we rehearsed the arguments from space-time separation to the conclusion that space and time are reducible to a four dimensional space-time structure which admitted of no clear distinction between the temporal and the spatial. The move was motivated by the fact that although the spatial and temporal separation of any two events may vary according to one’s relative velocity, the space-time separation between the two events does not change. The value yielded by that separation, and the associated mathematics, is a constant. The spatial analogy considered was that of a homogeneous two dimensional space in which we saw that

the separation of any two events within the three dimensional space can be made to appear to differ according to perspective. However, the total separation between the two events can never be changed. The different perspectives that one takes on the events in the two dimensional spaces merely alter the quantity of separation one perceives there to exist in any one of the directions that one labels a dimension. Once we recognise that the space itself lacks orientation, then we recognise that this is merely a perspectival matter and that there is no real alteration in the separation of the two events.

If we apply parity of reasoning to the spatio-temporal case (which we are invited to do in order to see the cogency of the view)¹⁶, we see that we cannot incorporate Nerlich's view. The use of a space-time manifold to explain the constancy of space-time separation turns on the idea that each of the four dimensions is qualitatively identical. If they are not, if one of the dimensions has a quality that the others do not, then it is difficult to see how one can incorporate the claim that the difference in temporal perspective held by each frame of reference is to be explained, for each perspective must delineate a different dimension as the temporal dimension. Nerlich does seem to imply that there *is* a locally determinable fact of the matter as to which of the dimensions is the temporal one.

Returning briefly to the arguments of the previous section it should be noted that they appear to add strength to the claim that it is difficult to imbed B theoretic relations into a space-time. If each of these space-time perspectives delineates a different dimension of the four dimensional whole as the temporal dimension then there is no fact of the matter as to which of the dimensions is "the" temporal dimension. This is a conclusion which leads us to the fact that there can be none of the "imbedding" of B relations that I called for above, because where one perspective may perceive any two events as temporally separated, another may perceive them to be spatially separated. This would entail that some of our supposedly temporal relations are not intrinsically temporal – they are only temporal from a particular perspective. In such a picture it is hard to see what "temporal" relations could be.

¹⁶ C.f. Taylor and Wheeler (1966: pp. 39-47), Hey and Walters (1997: pp. 62-3).

3.4.2 B theoretic relations within a 3+1 space and time

Suppose that the four dimensional perspective suggested by Minkowski and the space-time interpretation of relativity can be denied and that the B theorist can provide some means for distinguishing one dimension as the temporal dimension.¹⁷ In such a case it seems that the B theorists can imbed their temporal relations perfectly well. If one of the dimensions is distinctively temporal, whatever that turns out to mean, then the B theorist can simply label one of the directions as later, and its opposite as earlier. We are forced to pay attention to this possibility since, although this move is revisionary, so is the theory of presentism, which suggests that the space-time interpretation of the special theory is metaphysically, if not empirically, flawed. It will not do for us to admit metaphysical revisions on behalf of the presentist unless we are also prepared to admit them on behalf of the B theorist. Such conclusions seem perfectly cogent, and would give the B theorist a much stronger position. Although the precise nature of these relations would remain hidden from us their imbedding within a 3+1 framework would permit us to give some account of what time is and thus to have at least a coherent theory.

It is to be admitted by the B theorist though, if they are to take this line, that one of their chief arguments against the presentist, the argument from the space-time interpretation of relativity, is no longer open to them. Further to this, since we denied that the semantic arguments favour either the dynamic or static conception of reality it is unclear now as to precisely what is motivating the TTT, or any B theoretic account of reality. The only remaining argument for the B theorist is the alleged falsity of the presentist's argument (see chapter six, and chapter seven for replies).

3.5 Physical processes as grounding for B relations

The B theorist has two tasks here; first to say what it is about time that differentiates it from space and second to say something about what a B theoretic relation is. The first is necessary to establish that there is anything at all within a static ontology that will mark it out as temporal, as opposed to spatial, and the second in

¹⁷ The motives for doing so could certainly not come from the special theory, denying, as it does, the existence of a genuinely temporal dimension. Indeed, it is unclear to me why one would suppose such a theory to be true.

order to say precisely what the nature of that temporality is. It may be that the B theorist can survive without providing one of these. For example, if the B theorist tells us that time is a dimension, along which change is spread out, and that temporality is, as Oaklander (1996: p. 209) has it, a simple, unanalysable and irreducible component of a *space like* dimension; then it does not appear to me, contra Craig (2001: p. 159), that the A theorist can object.

The only grounds that the A theorist could have for doing so are that the B theorist cannot tell us *how* that temporality, the experiences we have of change and passage etc, arise from the static nature of time; but (provided the move is metaphysically possible) since the B theorist is content to say that the nature of our temporal experiences are akin to the experiences of a secondary quality of passage arising from the conjunction of ourselves and the temporal dimension, it is not entirely clear to me what the B theorist could be expected to say. For whilst the A theorist is entitled to ask the B theorist for more information concerning how the experience of temporality arises I suspect that the B theorist is entitled to point to the difficulty in giving any account of how secondary quality experiences arise be they of colour, smell or temporality. So, provided the temporal structure of a quasi space-time is available the B theorists can construct their position as we saw in 3.4.

3.5.1 B Time

However, it is to be noted that it is not open to the B theorist to say that time is composed of unanalysable B theoretic relations and that, although time is a dimension, we have no way of distinguishing time from space. To do so is, once again, to fail in giving any sort of account of what time is. The most obvious distinctions between time and space come from causation since a non temporal universe is, intuitively, a universe that lacks causality, whereas a universe without spatial extension may still admit of causation between non physical entities. So, armed with the claim that, whatever time is it is a dimension (whatever that may mean), what are we to say about B relations?

3.5.1.1 Causation

The (intuitively) marked distinction between time and space, in terms of causation, makes it clear why causation should be chosen as our first candidate for providing temporal relations within a B theoretic ontology. Causation appears to be an obvious difference between time and space. Thus, a tentative first formulation of temporal relations in terms of causal relations would be

(1) x is earlier than y iff x causes y , and x is later than y iff x is caused by y ¹⁸

There are, however, three distinct problems that can be raised for (1). First of all (1) relies upon a concept of causation in order to formulate the distinction between earlier and later. But what is causation on the B theoretic account? It cannot be that causation is any kind of “bringing about” of an event (that would imply a dynamic account of temporality that is incompatible with B theoretic accounts) such that we could say something like,

(2) x caused y iff, without the existence of x , either: (i) y would not have happened, or (ii) y would have been less likely to happen

Of course, if (2) is right, then x may not be *the* cause of y but instead be a part of the causal structure that leads to y . But this matters not for our account of temporality: provided we have some kind of “arrow” to causation which distinguishes earlier from later then all will be well. Much then turns on whether or not one is prepared to accept the particular account of causation that goes hand in hand with a B theoretic ontology. If one does not, if one believes instead that

(3) x causes y iff x brings about a state of affairs that did not exist and that state of affairs includes y

¹⁸ Here I say nothing about simultaneity. It seems to me that any theory that takes physical processes as prior to time will have difficulty in determining what is meant by simultaneous; certainly on the causal account there is no obvious candidate for the role.

then one will not accept B theoretic temporal relations as being accounted for by causation. However, I suggest that this might be a minor problem for the B theorists since it does not really impugn their position. No B theorist needs to accept (3); they can make do with the kind of account offered in (2). It should be noted, though, that although the criticism of the B theory is not fatal, its incompatibility with certain accounts of causation is certainly a mark against it. One might also note that it is not entirely clear that causation is up to the task of providing an “arrow” of time at all given the apparent lack of asymmetry in time (c.f. Price (1994: pp. 132-161). But these are footnotes to the argument.

What I do not accept are arguments of the sort given by Craig (2000b), that include causality under the heading of “physical process” when used in arguments like the following.

Attempts to ground temporal anisotropy and/or orientation in physical asymmetries are unconvincing even on the level of purely physical time. Physical asymmetries are neither necessary nor sufficient for time’s having an arrow, and the merely *de facto* asymmetries which exist in nature do not serve to distinguish the *earlier than* direction from the *later than* direction. (p. 163)¹⁹

The direction of causality, though unverifiable, may *be* the direction of time; and a genuine metaphysical direction of causation would certainly serve to distinguish one temporal direction from another. Of course it may be that the true “direction” of causality remains hidden from us, that it appears that causation is reversible; but our inability to determine which direction really is earlier does not prevent the causal analysis from giving us an account of which direction really is earlier or later. In other words, it is a metaphysical – rather than physical – fact that causation occurs in one particular direction.

However, and this is a more difficult problem for the B theorist, it does seem that in order to formulate (2) we need some temporal structure first in order to allow the propagation of the causal influences of x. (2) is really (4) in disguise.

¹⁹ Craig does not explicitly include causality under the heading of the physical arrows which he as it such pains to reject – but I suspect that given the forgoing arguments it would seem that the assumption that causation is a physical process is implicit within his argument.

- (4) x at t caused y at t^* iff, without the existence of x at t , either (i) y would not have happened at t^* , or (ii) y would have been less likely to happen at t^*

The addition of the time clauses into (4) ought to be thought of as merely making explicit a part of (2), for without the specification of a time at which the events are to occur it is impossible to formulate any kind of causal relationship. By way of illustration consider any account of causation and the events x – the detonation of a bomb – and y – the collapsing of a bridge. Event x , the detonation of a bomb, does not necessarily contribute to the causal factors that lead to y , the bridge collapsing. It may be that x is too far away to effect y , or that x occurs after y . In order for them to be causally related it must be the case that the events in question are appropriately temporally located, whereby they are arranged such that x can physically influence y given their temporal separation. Thus in order to specify the cause of y , we must also specify the temporal location at which the cause, x , and effect, y , occur.²⁰

But, if the temporal relations earlier and later are to be cashed out in terms of causation, such that “ x is earlier than y ” is dependent upon x ’s causing y , then we will find ourselves unable to formulate a coherent account of said temporal relations. Consider our example of event x – the detonation of a bomb – and y – the collapsing of a bridge. To say that x is earlier than y is to say that x causes y ; that x has the quality of causing y . But, implicit in this account of causation is the notion that x is earlier than y . If x is not earlier than y then x cannot cause y . If we permit backwards causation then we cannot say that x is earlier than y if x causes y , because x can be later than y and yet still cause y . To cash this out in terms of our example, we can say that the detonating of the bomb causing the collapsing of the bridge entails that the detonation of the bomb is earlier than the collapsing of the bridge, only if we accept that the property of being earlier is somehow distinct from the property of being the cause otherwise we cannot determine a direction of causation. If we admit that we cannot determine a direction of causation then we cannot use causation to provide an account of temporality. It is clear, then, that according to this analysis there must be

²⁰ Note that although it might be possible to specify that temporal separation be distinct from temporal order and thus ground temporal asymmetry in causal asymmetry, this is not enough here, for we would still lack an account of temporal *relations* which would remain simple and unanalysable; the mere asymmetry of time as a dimension would not be enough to say what distinguishes time from space– the desideratum mooted at the outset of 3.5. For although one would be asymmetric whether the other would not, this is not to say what differentiates them, merely to say that they are different – something that is not in dispute.

something that we call temporal against which we can decide which direction is earlier and which direction later. Thus it becomes clear that a causal analysis must be imbedded within some kind of temporal structure if it is to yield a distinction between earlier and later.

3.5.1.2 Counterfactuals

David Lewis (1979) maintained that it is possible to ground the temporal “arrow” by recourse to a counterfactual analysis of causation, apparently without further recourse to a temporal structure.

We can ... bring it about that the future is the way it actually will be, rather than any of the other ways it would have been if we had acted differently in the present The future depends counterfactually on the present. It depends, partly, on what we do now.... Something we ordinarily *cannot* do by way of “changing the past” is to bring it about that the past is the way it actually was, rather than some other way it would have been if we had acted differently in the present The past does not at all depend on what we do now. It is counterfactually independent of the present (p. 38)

On the Lewisian account we are to explain the distinction between the past and future in terms of the counterfactual dependence of one set of events, the later events, and the independence of the other set, the earlier ones, on and of (respectively) the present. This provides a clear and concise distinction between time and space since no spatial regions are counterfactually dependent upon one another. It also allows that there is a clear distinction between earlier and later; the distinction between those counterfactually independent of the present, and those that are not.

But once again there are problems. Upon the Lewisian account there are to be only exceptional (thereby allowing for backwards causation) true counterfactuals of the type, “if e_2 had not occurred e_1 would not have occurred,” where e_2 is later than e_1 . To deny as much is to deny the counterfactual orientation of time’s “arrow.” However, as Bennett (2003: pp. 288-91) notes there appear to be cases where exactly this happens.

A competitive runner heads the pack until near the end of the race, when she stumbles, falls, and comes in last. I remark: “If she had won the race she could hardly have climbed the steps to the podium to get her medal, she was in so much pain from that fall.” You reply: “Not so, because if she had won the race she would not have fallen [or: she would have to have not fallen”.] (p. 290)

It would seem that in this case if her loss had not occurred, she would not have fallen. This, being an example where e_2 is later than e_1 where e_1 depends counterfactually on e_2 , appears to undermine what Lewis has to say about the orientation of temporality based on a counterfactual analysis.

Even if we can rescue the Lewisian account from these types of example, which it seems to me one cannot, it still appears that the problem raised in 3.5.1.1 recurs. On the Lewisian account an event is earlier than the present iff it is counterfactually independent of the present. It is reasonable to suppose that, since this makes no explicit reference to any temporal terms, it provides us with a suitable grounding for the directionality of time and, hence, for the distinction between earlier and later. But it would make no sense to speak of the counterfactual independence of those events earlier than the present as being *earlier than the present* unless one already had a clear concept of what it is for an event to be earlier than the present. Consider Joe the machine gun scout once again.

If Joe fails to recognise that counterfactual independence and “earlier” are one and the same he can fail to signal to his machine gunners. Joe may fully recognise that certain actions depend upon certain others, but only if he recognises the direction of temporality can he then decide which direction that counterfactual dependence will take. In other words, Joe may know that the firing of his machine gunners depends solely upon his actions, but he cannot signal to them to make them act unless he first recognises the nature of temporality and *then* the further fact that later actions are dependent upon earlier ones.

One would expect that if counterfactual independence were to fix the direction of “earlier” then that would be sufficient for temporality. Plainly it is not, since Joe can be aware of the counterfactual dependence of the firing on his actions and be unsure as to whether or not to act if he does not also know that counterfactual dependence and temporality have the same direction. Thus, whilst the direction of counterfactual dependence may be sufficient to give an orientation to time there does

not appear to be any obvious way that this also cashes out into an account of the nature of temporality. Without some concept of what temporality is, it is insufficient to say that temporality has a direction since we do not seem to know what temporality is!

3.5.2 Irreducible B relations

It is easy to see why, according to some B theorists, temporal relations are, as Oaklander (1996) claims, ‘primitive and unanalyzable relations, and the difference between spatial and temporal relations is an irreducible qualitative difference’ (p. 209). What are we to say about such claims as these? They say little more about time than *it just is this way* and offer us little, if any, explanation for the temporal phenomena such as passage and the appearance of change. Nor do they offer us any good reason why we should have tensed beliefs. They do not tell us which feature of reality gives rise to such beliefs, or of what use they are in a reality that is not really dynamic.²¹ Obviously, a theory such as presentism that incorporates genuine change can easily make sense of such tensed beliefs and attitudes and it can also provide a coherent account of temporality (see chapters six and seven) and as such are to be thought of as superior.

If the B theorists are to formulate their position though, they *cannot* rest here. Although it might be acceptable to declare that the distinction between time and space may not be clearly articulated, it will not then do to say that the temporal relations within that theory are also mysterious and incapable of definition. To say so is simply to throw one’s hands up in the air and say that the whole thing is just beyond comprehension. One of the problems we shall come across later on in chapters six and seven are arguments from opponents of presentism who claim the theory to be either unintelligible or a mere triviality. If we lack a coherent definition of both what time is and what temporal relations are, then I would suggest that the B theory also is unintelligible. It would be reasonable to suppose that a theory could give us *either* an account of what time is *or* what is meant by temporal terms; but a theory that tells us the meaning of neither, tells us nothing at all. Hence, although *prima facie*, it might

²¹ Dyke’s (2002) argument that it is evolutionarily advantageous to have such attitudes is questionable since this does not explain why it is evolutionarily advantageous to have such beliefs if they do not accurately reflect the true metaphysical reality.

be sufficient for the B theorist to tell us that time is a dimension of a 3+1 space-time all that the B theorist has really told us is that time is a bit like space and is also somehow sufficient to account for the nature of our temporal experiences!

3.6 Conclusions

In 3.1 the arguments from the special theory to the existence of space-time were rehearsed. It was argued in 3.2 that there may be a positivistic tone to some of these arguments. But it was also argued that simply because we cannot verify the existence of absolute simultaneity does not *force* us to conclude that absolute simultaneity does not exist. In section 3.3 we saw that the reason for the widespread success of the special theory is not that it relies on positivism, but that it provides a powerful and heuristically useful inference to the best explanation for many relativistic phenomena. The legitimacy of these explanations was then challenged. It was pointed out that although the space-time explanations of the special theory function extremely well within the context of relativity physics, once we move outside these small areas of explanation the space-time explanation is a very bad explanation inasmuch as it cannot be reconciled to other scientific views.

In 3.4 it was argued that theories of space-time cannot accommodate genuine B theoretic relations and are, hence, incompatible with the TTT. It remains possible for us to reconstruct the space-time interpretation into a space and time, a 3+1 model. Finally, in 3.5, it was shown that physical processes cannot provide a grounding for B theoretic relations and, hence, that it is not at all obvious that one can coherently formulate a B theoretic account of time. One certainly cannot say that the TTT has any motivational support at any rate.

The current state of play then, is as follows. In order to ground B theoretic approaches to time we need some clear notion of either time or these B relations. We need some notion of what time is; B relations will have to remain “simple” within the context of whatever we take to be time. However, space-time has not proved able to give us an account of what time is because theories of space-time deny that there is any component dimension that is time. B theories in general may be salvaged if we can find some 3+1 interpretation of space-time, the space-time interpretation of time may stand itself as a separate theory of time (though this would serve to go against the TTT as a whole), or we may opt for presentism. The upshot of this is that B theory is

not supported by arguments from relativity. The TTT as laid out in chapter 2 *is not* a strong theoretical whole since theories of space-time are not compatible with B theories, nor are there semantic arguments that favour the TTT. In chapter two I cited three main strands to the arguments in favour of the TTT: cohesion, science and the falsity of presentism. It should be obvious now, that there is no such cohesion and that the arguments from science do not favour the TTT. Moreover, it seems that the B theorist, quite independent from their concerns in trying to preserve the TTT, have other difficulties in defining the time and temporality of the B series.

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Chapter Four

In chapter four I:

- *Detail the claim that temporal passage is mind dependent and make some critical observations of Grunbaum's argument (4.1);*
- *Argue that the neither Grunbaum, nor Dobbs et al., have decisive arguments on the issue of passage (4.2);*
- *Argue that the experience of temporal passage is such that although it may be possible to account for it with static theories, it is unclear, given the forgoing arguments, why one should wish to do so (4.3);*

4.1 The phenomenology of temporal experience

Herein I provide arguments against *all* static theories of time. I argue that the nature of temporal experience, of the elusive sensation of passage, is very difficult to accommodate within static accounts and given the forgoing discussion as to the failure of the TTT it is not clear to me why one should wish to support such an account of temporal experience. There are a number of problems that await our attention in this chapter, their common feature is the cognizance of *nowness* and passage. To put it in terms borrowed from Falk (2004) (who in turn borrows them from Williams (1951)), how do we get to the whoosh and the whiz that is a common to our phenomenological experience of time? There are two distinct avenues of enquiry explored in this chapter. First whether or not physics operates in a B theoretic manner, and second the viability of B theoretic accounts of the phenomenology of temporal passage.

To begin with we turn our attention to Dobbs (1969) in his reply to Grunbaum (1971)¹ and his claim that the secondary quality account of temporal experience is not viable. It might, after all, be supposed that if physics *shows* reality to be static that we could endorse a B theoretic account of the phenomenology of temporal passage. What, then, is entailed by the claim that temporal passage is mind dependent?

¹ A reprint of a paper that first appeared in 1967.

4.1.1 Mind dependent passage

Adolf Grunbaum (1971) argued that the temporal becoming that we consider to be so basic a facet of temporal experience is, in fact, mind dependent and not a genuine feature of reality.² In much the same way as experiences of colour, texture, taste and the like can be taken to be Lockean secondary qualities, so Grunbaum maintained that becoming is dependent upon a cognizant mind.

It is apparent that the becoming of physical events in our temporal awareness does not itself guarantee that becoming has a mind-independent physical status. Common-sense colour attributes, for example, surely *appear* to be properties of physical objects independently of our awareness of them and are held to be such by common sense. And yet scientific theory tells us that they are mind-dependent qualities like sweet and sour are. (p. 196)

So passage is purely mental, there is no physical reality to which it corresponds. Those who reason from the tensed nature of natural language to the conclusion that reality is dynamic, reason fallaciously according to Grunbaum.

we must realise that some important *seemingly* tenseless uses of the term ‘to exist’, ‘to occur’, ‘to be actual’, and ‘to have being or reality’ are in fact laden with the present tense. Specifically, all of these terms are often used in the sense of to occur NOW. And by tacitly making the *nowness* of an event a necessary condition for its occurrence, existence, or reality, philosophers have argued fallaciously as follows. They first assert that the universe can be held to exist only to the extent that there are present events. Note that this either asserts that only present events exist now (which is trivial) or it is false. They then invoke the correct premiss that the existence of the physical universe is not mind-dependent and conclude (from the first assertion) that being present, occurring now, or becoming is *independent* of mind or awareness. (p. 205)

If we accept the thesis that becoming is mind dependent then we accept something like the following negative thesis:

² A thesis to which the TTT is committed, as are theories of space-time, since neither of the above theories incorporate genuine passage.

‘what qualifies a physical event at a time t as belonging to the present or as now is *not* some physical attribute of the event or some relation it sustains to other *purely physical* events. (p. 206)

And the following positive thesis:

what is *necessary* so to qualify the event is that at the time t at least one human or other *mind-possessing* organism M is conceptually aware of experiencing at that time either the event itself or another event simultaneous with it in M 's reference frame. (pp. 206-7)

Hence, for Grunbaum, it makes perfect sense to say that without at least one human or other mind-possessing organism M there would be no temporal passage.³ Said passage is, literally, an illusion. Although this is a surprising conclusion, indeed one that is difficult to take seriously (c.f. 4.2.3), there is nothing *prima facie* incoherent about temporal passage being illusory.

4.1.2 The nature of temporal experience

Further to this, Grunbaum also details the nature of that perceptual experience of temporality. He says of an agent M 's temporal experience at time t :

M 's experience of the event at time t is coupled with an awareness of the temporal coincidence of his experience of the event with a state of *knowing* that he has that experience at all. In other words, M experiences the event at t and knows that he is experiencing it. Thus, presentness or nowness of an event requires conceptual awareness of the presentational immediacy of either the experience of another event or, if the event is itself *unperceived*, of the *experience* of another event simultaneous with it. (p. 207)

There might be a worry as to the use of the present tense in the above formulation, but as Grunbaum argues this is nonviciously circular.

³ This organism need not be human.

For it serves to articulate the mind-dependence of nowness, *not* to claim erroneously that nowness has been eliminated by explicit definition in favour of tenseless temporal attributes or relations. (p. 209)

We should also make explicitly clear that Grunbaum is not committed to the claim that the experience of temporal passage *is* a secondary quality, but that there is an analogy between secondary qualities and the experience of temporal becoming, *viz.* their mind dependence. Writing in defence of Grunbaum, Baker (1979) notes:

The disanalogies, whatever they are, do not detract from the important but limited way in which nowness and redness are claimed to be analogous. The similarity is that the grounds for holding redness to be mind-dependent are analogous to those for holding nowness to be mind-dependent. (pp. 345-6)

The key similarity, the one upon which Grunbaum and Baker take the analogy to turn, is that scientific theories fail to find either passage or colour in the external world. Physicists will, after all, be able to measure the wavelength, frequency and intensity of a beam of light, but there is no account within any scientific theory of the nature of light as we perceive it, or of a qualitative analysis of the sensation of “redness.” Likewise, although our experience of temporality may include a sensation of passage, this is not something that any scientific theory will take into account. Science is interested in quantities, not qualities.

4.1.3 Some notes on Grunbaum’s method

Grunbaum’s reasoning for supposing that the B theory of time is correct, and that temporal passage is mind dependent will become clear as we proceed through our analysis. By and large the structure of his argument is sound, contra Craig (2000b: pp. 127-45). One aspect of his positive arguments that I do not consider until 6.1 is his claim that the A theory (presentism) is incoherent.

They first assert that the universe can be held to exist only to the extent that there are present events. Note that this either asserts that only present events exist now (which is trivial) or it is false. (p. 206)

If presentism did turn out to be false then I would suggest that Grunbaum may well be correct, temporal passage might have to be mind dependent. Although even this is far from clear; certainly there might be some doubts as to the veracity of such a claim in light of the incompatibility of static theories of time with our experience of temporality laid out in 4.3.

Grunbaum's own positive arguments are something that we shall come onto in greater depth in a moment. It should be pointed out that the mind dependence of temporal becoming is normally seen as a solution to the problem of temporal experience within the context of the TTT. Now, however, we are forced to see the experience of temporal passage within the context of *either* theories of space-time *or* B theories of time since it was shown above that theories of space-time are not compatible with a B theoretic ontology (3.4 and 3.5 above). In order to pursue Grunbaum's avenue of explanation, one must be suitably persuaded and motivated, by the arguments from physics laid out (and argued against) in chapter three, or favour a B theory.

It becomes incumbent on the B theorist, then, to motivate this account of the mind dependence of becoming. The space-time theorist has at least some support from physics (though see 3.3 and 3.4). With the semantic arguments ruled out as such a motive in 2.4.3, and the arguments from physics shown not to favour a B theoretic account, the B theorist rather needs Grunbaum's arguments to carry some weight otherwise, although their claims as to the mind dependence of passage may turn out to be plausible, there does not seem to be any good reason to support them. There would be no arguments to motivate the B theory in the first place – unless of course presentism can be shown to be false. My purpose below is two-fold. First to show that no such motivation is forthcoming from Grunbaum's style of arguments (4.2) and, second, that the mind dependence of becoming should only be accepted *if* one can find reason to endorse a B theory. With no such reason forthcoming I argue that arguments to the mind dependence of temporal becoming should be rejected (4.3).

4.1.4 A critique and criticism of the method

But before proceeding to this analysis there are some observations that might be made against Grunbaum's mode of argument. A particular structure of argument

was noted above. It was claimed that arguments from the fact that physics does not reveal to us a dynamic reality entitle us to claim that reality is, literally, static. This mode of argument has been carried one stage further by Julian Barbour in *The End of Time*. He argues from the fact that the most fundamental equation that we have, the time independent Schrödinger equation, does not include a temporal variable, to the conclusion that time is not a real quality of the universe (p. 231). We can see this as a natural extension of the kind of arguments employed by Grunbaum since both infer, from the basis that physics can be constructed without the aid of a particular facet of temporality, to the conclusion that the facet in question is not real.

However, if we are to take Barbour's and Grunbaum's argument seriously then we should also note that belief in God should be ruled out on similar grounds. Ultimately I believe that these types of argument leave us with a pseudo dichotomy. Either we must believe him that time is unreal *and so is God*, or that God might be real and, hence, that time might be real. The dichotomy is not genuine though. Since the arguments presented by Barbour are insufficient to show that God is unreal it can be seen that the same arguments do not rule out the existence of time at least as a collection of metaphysical qualities and / or relations.

This is because looking carefully at the structure of Barbour's argument reveals something like the following:

B1) Time does not reveal itself to us in the equation that gives us a complete description of the most fundamental level of reality

B2) If Time were real then it would reveal itself in a description of the most fundamental level of reality

B3) Therefore, time is unreal

It seems to me that if Barbour is going to argue along such lines then the following argument should also go through:

G1) God does not reveal Himself to us in the equation that gives us a complete description of the most fundamental level of reality

G2) If God were real then He would reveal Himself in a description of the most fundamental level of reality

G3) Therefore, God is unreal

There are several further observations that we should make. Neither argument makes reference to the fact that Barbour believes temporality to be mind dependent. Barbour argues that, although time is unreal, the perception of temporality is mind dependent. Without cognizant agents there would be nothing like the temporal passage that we believe ourselves to undergo. Hence, in order to represent the structural isomorphisms of Barbour's arguments concerning time accurately, one might wish to replace (G3) with (G3)*.

(G3)* Therefore, God is mind dependent

The surprising conclusion that God is unreal seems to follow from the fact that He does not reveal himself to us in the most fundamental equations that we have available to us. Since such arguments are clearly false in their quest to determine the existence (or otherwise) of a God, it would seem inappropriate to suppose that they can determine the existence (or otherwise) of time as constituted by the qualities or relations of either the A or B series, or of time as construed as anything other than a physical entity of some sort. So before we can even begin to evaluate the content of Grunbaum's arguments from physics to the conclusion that the "now" is not privileged, we should note that the type of argument being employed is unsound.

Although I think that this line of investigation is important we shall put to one side the claim that this type of argument does not aid the B theorist because the presentist position that I think needs to be defended does not obviously include temporal passage as metaphysical, but temporal passage as change in the physical. Hence, the view of presentism that I adopt requires there to be change of the sort that Barbour believes himself to have ruled out.⁴

4.2 Grunbaum and Dobbs

Moving on, then, to an analysis of the content, rather than structure, of Grunbaum's arguments we see that the first of Dobbs' (1969) objections is that,

⁴ Although as I have already suggested in chapter three I do not think that one needs to be unduly concerned by Barbour's arguments.

contra Grunbaum, an important part of physics *does* pay heed to the significance of the “now.”

there is a very large and important body of physical theory which deals with *prediction* in which the concept of ‘nowness’ is basic. (p. 318)

This, according to Dobbs, is of particular relevance to our arguments since Grunbaum attempts to motivate the need for a tenseless account of temporal becoming on scientific grounds.

This consideration must weigh against Grunbaum’s approach: since he says that it seems to him ‘of *decisive* significance’ that ‘no cognizance is taken of nowness (in the sense associated with becoming) in any of the extant theories of physics (p. 319)

Note that if Dobbs is correct, if physics does have a cognizance of “nowness,” then this does nothing to repudiate the second theme that we are exploring, the claim that a tenseless account of time *can* give a coherent account of temporal experience (for Dobbs is merely arguing here that there is no motivation from physics for thinking that temporality *is* mind dependent), although it will be of note to our first theme, the attempt to motivate a B theoretic account of temporality. If physics does not have a cognizance of “nowness” then its absence from such an analysis might be taken as suggestive of “nowness” not being a genuine feature of reality; thus, we should have to give some account of temporality that does not include a “moving now.” A B theoretic account.

4.2.1 Physics and “nowness”

Dobbs argues that the nature of this “nowness” in physics must be such as to permit the intersubjective agreement as to which moment *is* “now.” Without such a “now” it would not be possible to formulate predictions as to what *will* happen. This follows from the fact that if there is no privileging of the “now” given to a particular moment at which we wish to make a prediction as to the nature of the future, then it is not at all clear that we *are* predicting at all, for the future is simply “out there.”

Furthermore, if there were no intersubjective agreement as to which moment is “now” we would lack the capacity for making predictions since we would never agree from which moment it is that we are supposed to be predicting. In other words, there would be no “now” from which to predict the future.

Grunbaum’s (1969) reply is that,

Dobbs’ objections ..., which invoke... temporal asymmetries, rest on his failure to heed my explicit *caveat* not to confuse the tenseless ‘past-future’ asymmetry of earlier and later than t_0 with the tensed one associated with the ‘now’ of becoming. (p. 151)

This is perfectly cogent.⁵ Grunbaum is quite right to object to Dobbs, but only if Dobbs’ argument is read as proving that Grunbaum’s thesis, that physics *does not* take cognizance of “now”, is false. What Dobbs’ argument *should* be taken to show is that Grunbaum does not show that physics does not take cognizance of “nowness,” but that it is possible that physics *is*, in fact, constructed in such a manner as to not have a cognizance of “nowness.” After all, if we do not agree with Grunbaum that the past-future asymmetry or tenseless temporal relations should not be associated with the “now” of becoming, then it seems unlikely that we should agree with Grunbaum that Dobbs has committed an error. Why should we heed Grunbaum’s caveat and admit that we have committed the apparently confused act of equating the tensed “now” of becoming with the tenseless earlier-later asymmetry? The only reason that I can see to do so is to assume that B theoretic accounts of temporality are correct and, hence, that we should construct physics in such a way as to pay no heed to “nowness.”

But this is a quite different claim. If Grunbaum’s arguments were to show that physics does not take cognizance of “nowness” then we should have an argument to motivate the B theoretic account (provided of course we can construct a coherent 3+1 temporal structure into which B theoretic relations are to be embedded). If we must first accept B theoretic accounts that pay no heed to “nowness” themselves, then it is unsurprising that we should come to an account of physics that does not have a

⁵ C.f. Ferre’s (1970) remark that,

The mental events of several percipients, if *ex hypothesi* caused by practically simultaneously by intrinsically tenseless physical events, should be expected to show inter-subjective agreement on matters of tense. (p. 278)

cognizance of “nowness.” Such arguments would do nothing to motivate a B theoretic account of temporality, unless, of course, it can be shown that physics is incompatible with presentism or that presentism is false. But that is a quite separate matter and it should be clear that Dobbs’ objection, whilst insufficient to repudiate the B theoretic approach, *is* sufficient to remove one of the points of motivation for the B theorist. There is nothing on this evidence that is incoherent about a physics that *does* treat the now as ontologically privileged. Such a physics is merely one that takes ontologically seriously the tense built into acts such as prediction and observation.

4.2.2 Physics treats the past as different from the future

In a similar vein to the arguments discussed in 4.2.1, Dobbs also argued, contra Grunbaum, that physics does treat the past and future differently. In 4.2.1 we noted that in order to be able to make predictions physics must recognise the now as privileged in some sense, as the point from which we are to make predictions about the future. If we pursue this to its logical conclusion then it also becomes apparent that the future must be different from the past, and must be treated as such, otherwise physics would have no objective grounds for making predictions about the future but not the past. A contradiction would then ensue: we would be required to think of the future both as fixed, as we do of the past, and open to prediction, and of the past as open to prediction, as we do of the future, and fixed. Since physics does treat the past and future differently (after all we only make predictions about the future) it seems reasonable to suppose that physics does have cognizance of a distinction between the past and future.

Grunbaum’s (1969) response to this is the same as his response to the arguments discussed in 4.2.1. He argues (p. 151) that to think that physics does differentiate between past and future is to confuse the earlier / later distinction (the legitimate tenseless distinction) with a tensed distinction between past and future. Grunbaum’s inference then continues that since no such distinction can be found in physics, no such distinction exists. But, as was noted above, to stipulate that physics is to be constructed along B theoretic lines *and then* to stipulate that the past / future distinction is not a genuine feature of reality because it does not appear in physics is entirely, and viciously, circular. If physics can be founded along A theoretic lines, and I see no reason that it may not, then it seems perfectly reasonable to suppose that

these differences mentioned in 4.2.1 and 4.2.2 *should* be taken as indications as to the nature of reality. The only reason that one would suppose that no such difference *does* occur in physics is if one has already decided on the veracity of a B theoretic construction of physics.

But, perhaps the more pressing point here is not that physics treats the past as different from the future, but that those engaged in physics, e.g. the physicists themselves, treat the past and future as if they are distinct. After all, it is not that the laws of physics themselves are being used to help articulate a distinction between the past and the future; rather, it is being suggested that those engaged in the acts of physics, the acts of experimentation, prediction etc., behave in such a way as to lend support to either a dynamic or static approach to time. It is physics *qua* method that is at issue here, rather than physics *qua* content. Of course if we accept such claims then it is unclear that we have achieved any more than a restatement of the stalemate above when considering the need for an intersubjective agreement among experimenters.

As with the arguments from semantics, then, there appears to be (certainly with the arguments presented thus far) nothing decisively in favour of either a dynamic or static model of time. In the semantic case we noted that it is unclear whether or not the ineliminably tensed nature of beliefs and attitudes ought to be taken to imply that reality is itself dynamic, or that our beliefs and attitudes are “tensed”. In the arguments just presented there is an obvious parallel: physics (or at least physicists) like natural language, gives the appearance of including a distinction between the past and future and also appears to privilege the now. But whether this distinction is merely empirical or in fact ontological, does not appear to be revealed by the debate between Grunbaum and Dobbs.

What Grunbaum’s arguments do show is that it is possible to construct physics along lines that are essentially B theoretic. They do not show that physics *is* B theoretic, for all that Grunbaum does is give us a cogent account of physics that already presupposes a B theoretic ontology and then explains how the apparently ineliminably tensed statements of physics can be reduced therein. But, a neo-Dobbsian needn’t be satisfied by such arguments. Although Grunbaum’s account is perfectly cogent, so would be an account that accepted that the statements of physics *are* ineliminably tensed, and that the distinction between prediction of the future and recording of the past points to a legitimate ontological distinction between the past and future, and that the apparent privileging of the now is a genuine feature of physics

and all the sciences. As with the semantic arguments discussed in chapter two there is no obvious motivation for favouring either side.

4.2.3 Grunbaum's theory is "silly"

The third of the objections Dobbs raises for Grunbaum is the first to be considered that can actually be said to actually weigh in on either side of the debate. Dobbs argues that Grunbaum's notion, that reality lacks an objective distinction between the past and future and also the quality of "nowness", is silly, in Broad's sense. By "silly" what we mean is a theory that is not taken seriously by non-philosophers or, indeed, philosophers themselves outside their technical deliberations. Dobbs argues that Grunbaum's account of temporality is just such an account, since physicists themselves behave in such a manner as to make one suppose that there is an objectively existing property of "nowness" and a distinction between the past and future.

Grunbaum's reply is interesting. He notes that Dobbs is correct, that his is not a theory that takes seriously our pretheoretical beliefs and intuitions, but that this *is not a problem*. For, argues Grunbaum (p. 151), his task is not to describe a metaphysics that accords with our pretheoretical beliefs and intuitions, but to describe a metaphysics that has the ability to make sense of the reality of time *if* it turns out that time is a static ordering of B theoretic relations. To make sense of such an account one needs an account of temporal passage that does not entail genuine change and, hence, Grunbaum attempts to provide one.

Although there is nothing *prima facie* wrong with developing this line of response to Dobbs, it is to be noted that this is the first point which can be seen as at all instructive in our attempts to construct a metaphysic of time. Dobbs' objection, that Grunbaum's view pretty much contradicts our pre-theoretical beliefs about time, is a first point from which to begin to attack the theories opposed to presentism.⁶ The notion of temporal experience arising from the nature of our existence in the world, rather than the world itself, is a highly counterintuitive belief that is hard to accept. This is not to say it is false; far from it. But to say that the view is counter intuitive *in the extreme* might sow the seeds of rejection in our minds, as might the absence of

⁶ Both theories of space-time and genuine B theories are prone to this line of objection.

any discernible motivation for accepting the theory. Of course, it might not! A view that I claim to be counter intuitive may appear as clear and obvious to another. But there does seem to be something highly out of the ordinary about prescribing that temporal experience does not arise from change in what there is, but from our mode of being in reality.

Equally, the analogy with secondary qualities does not hold true here, as I suspect that Grunbaum and Baker might admit.⁷ For where in the case of colour we now know that “colours” do not reside in entities themselves, but in the mind, and it is the property of reflecting light of a certain frequency that is held by the object, there is no obvious parallel with the temporal case. There is no causal mechanism through which we can explain away our intuitions about reality and so these intuitions and pre theoretical beliefs remain as nagging doubts in need of some more structured explanation. For in the temporal case there is no “time signal” to impart the properties of temporality into the mind, nor is there any other signal or mechanism. The proponent of the mind dependence of temporal becoming has to stipulate that somehow the experience of temporal becoming *just does* happen.⁸

Given the lack of structural isomorphism between the secondary quality cases and the temporal case there is a suspicion that there is no real explanation that is being offered here. What we are being told is that the B theory of time is correct (although there appears to be no motivation for it), and, since temporal experience is a phenomenon in need of explanation, that temporal experience arises from our mode of being in that reality is simply a brute fact. Such claims serve to exacerbate the concern that the notion of mind dependent temporal passage is a “silly” theory.

4.2.4 Mental becoming necessitates physical becoming

The fourth, and final, objection that Dobbs raises for Grunbaum is the most problematic, though it too can be solved.

‘unless this [intersubjective] agreement is founded on some objective common counterpart to the mental ‘now’, which *causes* our individual brains to register

⁷ Their claim is not, after all, that temporal experience *is* an experience of a secondary quality, but that the two experiences are analogous inasmuch as neither reports a genuine feature of reality.

⁸ Although see Falk (2004) and 4.3 of this chapter. This line of objection should only be taken as a criticism of the early B theoretic accounts, e.g. those of Grunbaum and Baker.

‘now’ with practical simultaneity, it is impossible to see why *I* should not be contrary, and hold that ‘now it is twelve noon on Queen Anne’s birthday in the year 1700’. In other words, unless the *mental becoming* of the experience of the specious present is occasioned by the *physical becoming* present of the neurophysical events underlying the consciousness, the fact of intersubjective practical simultaneity would be explicable only in terms of a miraculous pre-established (spiritualist) harmony (pp. 321-2)

In essence, Dobb’s claim revolves around the notion that mental becoming necessitates physical becoming. As with each of the previous cases Grunbaum (1969) has a response; but in this case his reasoning is questionable.

I had noted that a physical event *tenselessly* occurring at time *t* can readily produce effects in each of several percipients such that at practically the time *t* *each* percipient is first aware of its occurrence. (p. 152)

An agent M, at *t*, will be aware of event E, as will another agent, N. At *t**, M and N will not be aware of E, but of E*, because M and N will be simultaneous with E or E* respectively.

But Grunbaum’s pattern of explanation is faulty as was noted by Ferre (1970).

A₁, exists (occurs tenselessly) at clock time *t*₁, and that it is also true in my life’s career that a different “now” – awareness event, A₂, exists (occurs tenselessly) at clock time *t*₂. In the universe depicted by Grunbaum both events have equal claim to existence; neither clock time *t*₁ nor *t*₂ has any intrinsic claim to privileged status as more “really” now (...) than the other. Suppose, further, that it is a phenomenological fact that A₂ fills my subjective field of awareness, not A₁. Why?

It will not do for Grunbaum to answer that I am uniquely experiencing A₂ simply because it is clock time *t*₂. Objectively speaking, on his view, it is (tenselessly) no less clock time *t*₁, and at time *t*₁ a “now” –awareness event A₁ no less genuinely exists (occurs) for me. Yet I find myself involuntarily discriminating against time *t*₁ and its associated event A₁ *with no objective ground whatever* to account for this. (p. 279)

Thus, it *appears* that the experiences that we each have of mental becoming necessitate a genuine account of physical becoming.⁹ There is nothing in the Grunbaumian account to explain the apparently unique nature of each moment of my temporal experience.

4.2.4.1 Mental becoming *does not* necessitate physical becoming

But, in a stay of execution for static theorists, there is an important point missed by Ferre (and Craig) in arguments from the appearance of mental becoming to the reality of physical becoming. Ferre reasons as follows:

(F1) At time t_1 , X experiences A_1

(F2) At time t_2 , X experiences A_2

(F3) At time t_2 , X discriminates against t_1 ‘*with no objective ground whatever*’ (p. 279)

To the conclusion that

(F4) There *must* be objective physical becoming to account for this

But the move from (F3) to (F4) is fallacious. It fails, I suggest, to take into account the fact that discrimination between times is reflexive, or at least would be on a B theoretic account. At time t_1 , X discriminates against t_2 , in the same way that, at time t_2 , X discriminates against t_1 . But that does not entail that there is physical becoming, but that at each time at which a cognizant agent is located that they will discriminate against other times on the entirely objective basis that they are not simultaneous with that temporal location.

The falsity of Ferre’s argument rests upon the assumption that the perceived uniqueness of X’s mental experience at t_1 or t_2 represents a genuine feature of reality – that it really is a unique mental experience. If we allow that such experiences exist [tenselessly] at all times at which they are located then it is perfectly plausible that

⁹ C.f. Craig (2000b: chapter 7)

one will be able to build up an account of the mind dependence of temporal becoming.

The following consequences, then, are the relevant ones for us to take away from this discussion of Dobbs and Grunbaum. Dobbs' arguments do not prove the impossibility of the mind dependence of temporal becoming – though they do point to the difficulty that many will have in accepting this as a serious metaphysical possibility. Equally, however, none of Grunbaum's arguments should be seen as decisive in proving that the B theoretic mind dependent account of time is true. If we pause briefly in order to weigh up the pros and cons of the arguments for the space-time, or the B theoretic approach to time, then it should be noted that there are *no* motives for accepting a B theoretic version of the TTT. We cannot move from the claim that semantics is tenseless to the claim reality is B theoretic. Nor can we derive any motivational support from science, since theories from space-time appear to be in opposition to the TTT. And, as we have seen here, the structure of science favours neither view since both the presentist and B theoretic approaches to time could be made to fit with the acts commonly associated with science.

What I argue in 4.3 is that, given the state of affairs described, it seems unreasonable to ask that we go so far as to accept the B theoretic account of the mind dependence of passage. Thus, although such theories *may* remain as genuine metaphysical possibilities, the existence of an explanatory gap in the B theoretic account should be seen as a reason not to accept the TTT either in part or in whole. Further, in chapter five I show why such theories have been supposed to be viable when they are not so.

4.2.5 Can physics coherently deny the reality of time?

A question for the space-time theorist who denies the independence of time from space-time is that it very much appears that they are denying the reality of time. This inference may appear confused but does, I think, prove acceptable. If there is no such dimension of a space-time which *is* time, then there *is* no such thing as time. Rather, the time of our perceptions will turn out to be a secondary quality – as with the B theory accounts – but unlike the B theory accounts there is no distinct thing that time is. Put another way, since space-time is, presumably, not space and time, but

something more fundamental, i.e. a space-time, then it follows that neither space nor time are real.

The question is, then, can physics coherently maintain such a position? I think that the answer is yes, but that one has to be more careful than some physicists and philosophers have been. Healey (2002) argues as follows:

H1) There can be no reason to accept a theory that does not fit the evidence (p. 299-300)

H2) Part of this “evidence” is our experience of some events occurring after others (e.g. predictions and *then* tests)

Therefore,

H3) To deny the reality of time is ‘epistemically incoherent’ (p. 300)¹⁰

Healey is right, but only in part. One cannot infer directly from experimental outcomes, which appear to require temporal passage, to the conclusion that time is unreal. But what can be done, and what I suspect that physicists take themselves to be doing, is to infer from the results of experimentation to the best explanation for the observed phenomena. Thus, the physicists *can* coherently deny that time is real. But it remains open, then, to the “tensed” theorist to argue that the so-called “timeless” solution *is not* the best explanation, and it is also open to the tensed theorist to make a metaphysical case against the timeless solution since an inference to the *best* explanation must take all factors into account, not merely non-metaphysical factors. To put the point simply, any metaphysics that takes time to be real seems preferably to an ontology that does otherwise – at least, that seems to me to be the most obvious approach.

4.3 Temporal experience.

Within a static theory such as the TTT there is no sense in which the year 3000 will come into existence, or that it is marked off from us by some ontological

¹⁰ Healey’s own view seems to be that this suffices to do away with quantum mechanical cases such as those proposed by Barbour, but not the General relativistic case which claims time to be unreal. However, in order to circumvent the question Healey proposes a redefinition of motion from being a primary to secondary quality. Thus, in the General theory, motion (change) *is* real, but is a secondary, rather than primary, quality.

division; the year 3000 simply exists [tenselessly] standing in a “later than” relation to our current time. If we adopt any so-called static approach to time then we appear to have a problem of temporal experience. We do, or so it seems, have certain experiences of time that are suggestive of passage; thus, when I am sitting by a river it appears to me that the river is passing me by. It seems insufficient to say simply that I am located at the river in state s , at time t , and I am also located at the river in state s^* , at time t^* and I am also located at the river in state s^{**} at time t^{**} and so on. It is insufficient because I have a sensation of passage from one moment to the next. Such an experience is a problem for the B theorist because the B theorist claims that *everything* stands in the permanent relations of the B series. *Nothing* is really doing the moving that I believe myself to perceive on the river, nor is one time mysteriously slipping past only to be replaced with another. The B theorist cannot even grant the concession that the mind is moving from one time to another – providing that sensation of passage – for the B theorist claims that absolutely everything that there is exists tenselessly and stands in the earlier than and later than relations of the B series. Likewise, if our static theory is of a non B theoretic type, perhaps a theory of space-time, then there is no room for this genuine change either, as this would contradict the claim that all entities exist [tenselessly] within a space-time manifold, or in some C series. Thus, the core thesis of static time theories is that they do not take seriously the notion of becoming. But how, then, are we to make sense of experience temporal becoming?

The traditional, and well documented (see 4.1), view is that the perception of passage is purely psychological and that it can be explained by simple recourse to an analogy between our perception of colour and our perception of change. When I see the table before me to be brown I know, or so it is argued, that the table itself is not really brown, but my neurological interpretation of the particular light waves that reach my eye from the table is such as to represent to me the colour brown. Brownness inheres, not in the table, but in my mind. The static theorist argues that there is an analogy here, or at least the potential for one if one accepts the motivations for B or C theoretic understandings of temporality. In the same way that the perception of a particular colour inheres only within my mind, impinging in no direct fashion upon the nature of the object of my perception, so the phenomenology of temporal passage

is to be explained, not by reality of temporal passage itself, but by my perception of it at each time that I exist.¹¹ Dainton (2001) puts it well when he says;

The pain I felt on my last visit to the dentist a year ago is every bit as real as the pain I will feel on my next visit, six months from now. Since pain exhibits phenomenal passage, both of these pains, past and future, possess this characteristic as and when they occur. In talking of 'passage' I am referring not to any coming-into-being and departing-from-being that experiences undergo, but to an intrinsic feature that experiences possess as they occur: for example the characteristic flow internal to auditory sensations. The four-dimensional world-view is quite compatible with experience possessing these phenomenal features, provided that experiences always (in a timeless sense) possess them at the times when they occur. (p. 178)

Thus our sense of temporal passage is not a genuine feature of reality, but mind dependent.

As has already been noted, the static theorist purports to be able to explain the experience of temporal passage by the existence of secondary qualities in what is in fact a changeless, permanent reality. There are already criticisms of this mode of explanation in the literature, see e.g., Ferre (1970), Dobbs (1969), Zwart (1973: p. 131) Capek (1961: pp. 164-5), Schuster (1986), Hestevold (1990), Craig (2000b: chapter 7), though none of them strike me as fatal to the TTT theorist's view. In 4.3 I want to draw attention to the following claims. In Grunbaum's account, what we might think of as the standard B theoretic account, there is a problem. The arguments taken to favour B theory might be said to take the following structure. First we claim that reality is static, we claim that for some reason or another reality is B theoretic.¹² Once we have accepted this claim, we are then left in the problematic position of explaining why it is that we perceive there to be temporal passage, if such passage is not a genuine feature of reality. Now, if one can motivate the B theory then it might be sufficient for us to simply claim that the mind dependence of passage, although perhaps unpalatable and counterintuitive, is a necessary consequence of a theory that is obviously correct. In other words, given the power of the TTT as an explanatory model, we should find it within ourselves to forgive it this one small deficiency; the

¹¹ C.f. the 4.1. Here, though, I am less interested in the method employed by Grunbaum et al., and more interested in the consequences of developing their line of thought.

¹² Once again I ignore the possibility of a C theoretic account.

counter intuitiveness of the mind dependence of passage. But, as I have shown above, the TTT is not the explanatory model that it was supposed to be when it was laid out in chapter two. Instead of forming a coherent and powerful whole, the various components of the TTT now appear unrelated at best and, at worst, to be disparate and contradictory. Hence, it is unclear why we should accept the problem that I will now outline.

There is an explanatory gap that we should not wish to endorse right at the heart of B theoretic explanations of the sensation of temporal passage. It can also be shown that those models that purport to close the explanatory gap fail to do so, and that they fail is due to the shared claim that reality is B theoretic. What this then leaves us with is something like the following: there are no good reasons for supposing reality to be B theoretic, and yet we must – according to the B theorist – endorse an account of temporal experience that entails an explanatory gap where, if we accept a dynamic theory of time, no such gap need exist.

4.3.1 The explanatory gap¹³

The explanatory gap I have in mind here is how we are to move from the static ontology of the B theory to the phenomenology of flux and passage.¹⁴ The precise nature of said passage is notoriously difficult to pin down. Perhaps Williams (1951: p. 299) puts it best when he says, ‘[W]e *find* passage,... we are immediately and poignantly involved in the whoosh of process, the felt flow of one moment into the next’. The core of the concept of passage is, I think, that we experience what we believe to be a continual state of change, both within ourselves and without. We experience a succession of thoughts as well as a succession of perceptual inputs and, in addition, we seem to somehow experience their motion and change. It is not, for example, that we simply perceive there to be a number of distinct states of affairs in the world around us, nor is it that we come upon a number of distinct thoughts and impressions. We need to build into these distinct thoughts and impressions some notion of passage. However we are to couch this claim, that there is passage, it must

¹³ The term was originally coined by Joseph Levine (1983). Most commonly the notion of an explanatory gap is used to argue against a physical reduction of consciousness, see McGinn 1989, Chalmers 1996 and Nagel 1998. I use the term here in a slightly different fashion as will become clear.

¹⁴ As it turns out there are two explanatory gaps here, but whereas presentism is prone to only one, the TTT is prone to both.

surely be acknowledged that these distinct states of affairs, thoughts and impressions, are related to one another through their succession. What is at the heart of the matter is that these states of affairs, internal and external, give at least the appearance of being in a continuous state of change and that these changes occur in succession with change from one state of affairs to another.

The explanatory gap in this context is the gap between the fact that reality is B theoretic and does not admit of passage, and the phenomenology of passage that we experience. On the one hand it seems that reality is static, and on the other we experience succession and change. In claiming that the quality of such perceptions is mind dependent the B theorist commits to the view that, in much the same way as red is to colour in the world, so the phenomenology of passage is to time. In the case of the perception of redness, we commonly accept that redness is not something that literally inheres within the object of our perceptions, but that it is the conjunction of various factors that gives rise to the experience of redness. Those factors may include the arrangement of photo reflective particles on the surface of an object, the internal structure of light and the firing of appropriate nerve endings within the brain. In the same way some objective feature of the temporal direction, whatever it is that *makes* things earlier and later than one another, must give rise to the feeling of succession where there are mere static relations.

One might note that there is an immediate objection to the B theorist here. In the case of redness there is a clear and discernible physical mechanism that gives rise to this sensation of redness. Hence, even though there may be an explanatory gap between the physical explanation and the qualitative sensation, it is still clear that there is *some* kind of explanation in play here. Matters are not so simple however and as we shall see below there are creditable attempts to close the explanatory gap.¹⁵

4.3.2 Attempting to close the gap

The most recent, and extensive, attempt to explain the experience of temporal passage comes from Falk (2004). Falk argues, contra Mellor (1998: pp. 68-9), that the phenomenology of temporal experience must be directly related to the sensory apparatus with which it is perceived as opposed to being extrinsically dependent upon

¹⁵ C.f. the line of argument developed against Grunbaum and Baker in 4.2.3.

factors such as A theoretic beliefs. His argument is founded upon the claim that Mellor's type of explanation fallaciously imports beliefs into the account where none are needed. As Falk puts it, 'I for one cannot have non-A-perceptions' (p. 221). If it is not possible to have non-A-perceptions, when it seems reasonably clear that I can take no A *belief* toward a particular perception, then Mellor's claim is false.

Falk attempts to provide a biological explanation for the production of the sensation of temporal passage and, thus, attempts to provide a similar kind of explanation of temporal passage to that which can be given to the perception of colour. There are two thought experiments that Falk would have us entertain, one in which we think of the self as a negative feedback system, and another where we think are to empathise with an hypothetical scheduler.¹⁶ The first of the two experiments proceeds as follows. Most, if not all, biological entities constitute what we might call negative feedback systems. Falk cites the example of a bacterium that has the capacity to activate a gene if an enzyme's concentration falls too low (p. 223). The point of Falk's arguments is to get us to think about the act of sensing time. It could be that we perceive time indications (whether the action is now, past future etc.?) as a result of some feature of the feedback that we observe through our perceptions, or it could be that our perceptions themselves convey the time indication.

The time of the information is not conveyed in the way the rest of the information is, that is, by representational content. Rather, the time of the information, as well as the sequencing of the bits of information, is represented by the time of *the receiving* of the information. (p. 222)

Noteworthy is the claim that such representations are objectively untensed as can be seen from the fact that, according to Falk, the terms 'I' and 'now' function in the same manner. 'Calendar time theorists can maintain that perceptual direct attribution creates nowness just as it creates I-ness (p. 224).

If this is true, if the nature of the indexical terms is so similar, then we must find some way of how we perceive this "whoosh and whiz."

The capturing of temporal information by direct attribution has the effect that information must be continuously *flushed* from the rudimentary feedback system

¹⁶ It is the first of these experiments that will occupy our attention here.

and replaced by the information appropriate for the new time. For, in order for the perception to be true of the time it is about, it can only last as long as that time does. If the perceiver is not to be deceived, the information about a date can only *be* information for it when (i.e., at the same time as) the perceiver is *at* that date. (p. 225)

This “flushing” is, apparently, what generates our sense of passage. Falk asks us to imagine what it would be like to *be* a negative feedback system and then to ‘momentarily endow it with a what-it-is-like-to-it-for-it-to-collect-and-flush-information and then empathize’ (p. 225). In Falk’s opinion the only way we could imagine such an act of collecting and flushing is of imagining a sense of passage.¹⁷

However, Falk is wrong. If I go into the “inner life” of such a being then I do not need to imagine myself with such an experience. If I am a being whose inner life can be described tenselessly then what I must imagine is an act of flushing and an act of collection. The two acts will either have to be contemporaneous, in which case the existence of two said acts will merely [tenselessly] appear to occur at the same time and at said time some data is lodged into memory and replaced by new, or they will both occur within such a short interval of time of one another that both occur within the same specious present. But in this latter case it is no more clear that the twin acts of flushing and collecting will provide an experience of passage than it was above. All that needs to be perceived by a being undergoing such a perceptual change, if the tenseless theory is correct, is the acquisition of a particular set of data at the expense of another set of data.

There are two things to say about Falk’s account, other than to observe its ingenuity. First we might note that it does provide something akin to the type of explanation that we are able to give in the case of colour discussed above. In the same way that we talk about colour perception being due a range of physical features such as the photo reflective qualities of the surface particles of entities, the structure of light radiation and appropriate neurological activity, talk of the mind dependence of temporal passage can now be described in terms of the nature of biological negative feedback systems. However, contra Falk, there remains an explanatory gap of the sort noted above. The existence of this gap is due to the fact that Falk is wrong inasmuch

¹⁷ I ignore the remainder of Falk’s elucidation of his position from pp. 226-237, since, although it is essential to his position, it is not obviously relevant to my argument.

as the being described above does not need to undergo the experience of temporal passage. The biological description that he offers, although more advanced than a mere statement of fact concerning the mind dependence of temporal passage, does not succeed in actually giving an explanation of the nature of said experience in wholly biological or physical terms because it is not clear that the being described would undergo the experience of temporal passage. This differentiates it from the colour case. In such a colour case one might ask someone to imagine the effect of realising the neural state in which they perceive something to be red. In imagining such a state one is invited to conceive of a particular neural state that produces the colour sensation. In being invited to carry out the experiment Falk discusses we are being invited to imagine a collection and a flushing. I can imagine a collection and flushing without conceiving of passage whereas I cannot conceive of experiencing the neural state that will bring about the colour perception of redness without conceiving of redness.

It might be objected that the account offers begs the question, that I could be asked to imagine the neural state that brings about passage. In successfully conceiving the neural state that brings about passage I prove the point of the static theorist precisely because I can conceive of such a state of affairs.

The second thing to note then is that, pre-theoretically, we would explain this sense of “whoosh and whiz” as being due to a genuine feature of passage in reality. If the negative feedback system we have been invited to empathise with exists in the purely tenseless fashion that Falk takes it to then, as we have seen, it is possible for me to empathise with the being without myself experiencing any sense of passage. But, if we empathise with the negative feedback system as-if-it-were-an-agent-of-the-sort-we-are, then we reach the inescapable conclusion that the negative feedback system described does experience the same sense of temporal passage that we do. But this is entirely unsurprising. For in empathising with the negative feedback system we import a whole host of notions one of which is the sensation of passage. Thus, when Falk says that, ‘information must be flushed soon after it is received’ (p. 225) we may latch onto the temporal terms and empathise with a being that is undergoing temporal experience. But to then say that a negative feedback system can generate the experience of temporal passage is false, all that we can say is that *if* the system described is sufficient to generate the sensation of passage where passage is not a genuine feature of reality, *then* I can empathise with what that sensation would be

like. But we are still left without any motivation for thinking that I am such a being. And since, as I have argued above, it does not appear that Falk's account needs to give rise to temporal experience in the negative feedback system there is very little motivation for accepting the account at all.

4.3.3 This very different gap

But how fair an objection is this really? In the case of colour perception the explanatory gap objection, roughly stated, is that our colour terms and concepts are not readily reducible to our physical terms and concepts.¹⁸ In this case the dynamic theorist is surely in the same position as the B theorist. For although it may be the case that reality is objectively tensed, these goings on and changes in what there is do not go any further towards giving us an account of how we *feel* that whoosh and whiz than the tenseless accounts do. Well, not really. This is a very peculiar sort of explanatory gap, as was intimated above, quite different from the explanatory gap oft discussed in the philosophy of mind. In fact, there are two explanatory gaps. The first is the oft cited problem of how to realise a physical account of a particular phenomenology and second is the reduction of a dynamic phenomenology to static influences. It is not that, as in the case of colour perception, we have no terms and concepts that can make sense of the experience of temporal passage. For if there is genuine temporal passage then it is easy to see what it is that gives rise to the experience of passage within us – the self same passage that exists in the rest of the world. Now although in this latter case there is an obvious mechanism that gives rise to temporal passage it may be that we still have a kind of explanatory gap, because we still have a gap between the physical facts of passage, the motion of the relevant physical features, and the experience of passage. But this problem is common to any non-dualistic account and is not specifically a problem for the dynamic theorist, but nor, then, is it a problem specifically for the B theorist.¹⁹ The real problem appears to be providing an account of how the sensation of transience is to arise from the static and that makes it quite a special kind of gap. It is this further conceptual gap that the static theorist must endorse.

¹⁸ C.f. Heil (2003: pp. 235-6)

¹⁹ Of course if the dynamic theorist is also a dualist then the problem disappears altogether.

In order to empathise with a being that may veridically be described tenselessly, it must be true that I can empathise with said being as having, amongst other things, the experience of temporal passage. Thus, it must be true that at a given time t , x exists and experiences passage p . Hence at t , x has p . Now in saying such what is the B theorist committed to? In the first instance let us be clear on the nature of the specious present. The perceptual awareness we have of the present is roughly equal to 30 milliseconds. So what we are really saying, then, is that at time t , x has an experience of p as being flow between t and $t-30\text{ms}$. I say -30ms , rather than $\pm 15\text{ms}$ because, presumably, in our static reality causation is still to be regarded as a temporally oriented type of thing, and hence may only propagate in the forward direction. Thus it cannot be that the consciousness at t is aware of perceptions of $t+15$. So the specious present is a product of the perceptions, and perhaps the time taken to adequately process the perceptions in the lead up to t .

But what the above does is give an account of the specious present in terms that would be equally acceptable to a presentist. How do we get from here to the claim that the phenomenology of temporal passage is to be explicated in wholly tenseless terms? So far as I can see the only thing that one can say is that as a result of the kind of processing that the brain is taken to carry out we do, at any one time, feel as if we are moving from $t-30\text{ms}$ to t .²⁰ Perhaps, then, we might say that at t , the brain processes information from $t-30\text{ms}$ to $t-1\text{ms}$ (no less since causation is not instantaneous, certain quantum phenomena notwithstanding).

Problematically, such an account does not help. For then, all that we should need to say is that at t , x [tenselessly] processes information from $t-30\text{ms}$ to $t-1\text{ms}$. But this is a tenseless fact, with a tenseless description. It is simply true that x , at t , processes [tenselessly] some information. If the facts of the matter are tenseless, then why is it that we need to think of this as giving rise to the phenomena of the experience of temporal passage? What is happening in the B theoretic account, is the same thing that I suggested was happening with Falk's account mentioned above. The B theorist is taking a tenseless description of reality, and then supposing that some irreducibly tensed component of it, such as the experience of temporal passage can be explicated in tenseless terms. But in their chosen method of execution the B theorist attempts to smuggle tensed experience into the example before proving the account

²⁰ This is, I think, a sufficiently broad definition to capture most, if not all, B theoretic accounts of the phenomenology of temporal passage.

viable. They ask us to imagine that our experience of temporality is due to a specific set of factors, rather than showing that the set of factors lead to the experience of temporality. But since I can conceive of being exactly the kind of organism that the B theorist says I am (either a being that flushes and collects, or processes a given set of information), and still not have temporal experience, it is not at all clear to me that their explanation is correct.

However, all I have really done here is to introduce an explanatory gap; a conceptual gap between the nature of reality and the nature of experience. The gap may be a wide one, though whether or not one views it as such is likely to be dependent upon one's views about the metaphysics of time in general. If one is an ardent B theorist then one might suppose that the gap is bridgeable in much the same way that an exponent of a physicalist account of colour perceptions will believe the gap between the physical and the mental to be bridgeable. And to argue such would be all well and good. The key question that one is obliged to ask is why on earth should one wish to endorse such an account? It seems fairly obvious that a B theoretic account of the perception of temporal passage is not necessary. It could be the case that the perception of temporality we have is due to a genuine ontological becoming. The question then remains, why would one suppose that reality is B theoretic? Granted, if one can show theories that take such passage as described by the presentist to be impossible, then one might have sufficient motivation for adopting a B theoretic account. But unless such arguments are forthcoming we simply lack any good reason to suppose that temporal passage is mind dependent. And since such accounts require, as we have seen, that the experience of passage is roughly akin to the "springing forth" of some kind of flow from something that is essentially lacking in flow, the case against the TTT theorist appears to be mounting.

Before we close this discussion of the phenomenology of temporal experience, I should like to say a little more concerning the force of the explanatory gap objection. My arguments above should be read as arguments demanding a coherent explanation of the phenomena of temporal passage. I am not arguing that the B theoretic explanation is false because tenseless language lacks the tools with which to describe the nature of temporal experience, nor am I arguing that the fact that our tensed concepts cannot be reduced to their tenseless counterparts is a point against the TTT. What I do take myself to be doing is showing that even the most ardent advocate of a tenseless description of reality needs to observe that there is an explanatory gap

between the tenseless description of reality and the experience of temporality. In a discussion of the concept of colour it would be unreasonable to suppose that simply because our talk concerning colour perceptions cannot be analysed into talk about neurological states that neurological states are not the truth-makers for our talk about colour perceptions.²¹ In our discussion of the phenomenology of temporal experience we cannot suppose that simply because tensed experience cannot be analysed into talk about static neurological states that static neurological states are not the truth makers for the phenomenology for temporal experience. However, the claim being made is that the current modes of explanation only function if one presupposes the viability of said mode. If I imagine myself as a genuinely tenseless being then I experience no passage, unless I presuppose that said passage somehow arises from the processing or the flushing. Hence, I do not attempt to show that the gap is unbridgeable, but that it is unclear to why one should want to bridge it.

4.4 Conclusion.

What has been shown over the course of chapters two, three and four, is that there is no discernible positive reason for adopting a B theoretic account, and that it is not altogether clear that one can formulate such positions coherently in light of the existence of an explanatory gap in our account of the phenomenology of temporal experience. In all, the picture painted in chapter two of the TTT as a great explanatory force has been destroyed. However, what remains a puzzle worthy of our exploration is why such a theory should hold such sway if it is as flawed as I claim it to be. Unless it can be explained why such pictures of reality have been so successful, both technically and in capturing the imagination then we are left with in the somewhat puzzling situation of having debunked a very powerful theory without knowing why it is that the theory has captured the imagination so, or why it has been so successful. Thus, in chapter five I offer some reasons why the TTT has been accepted so open heartedly, and why it has led to such great technical strides if it is, in fact, false. These arguments are of great importance since the advances made by the TTT might be seen as good reason to preserve as much of it as possible when what is needed is a wholesale change of direction. If we can understand the success of the theory in terms

²¹ (C.f. Heil 2003: p 236)

that point away from its accuracy or truthfulness then we have greater reason to suppose that such a change of direction is necessary.

Chapter Five

In chapter five I:

- *Argue that the B theory is founded on the mind dependence of the “time concept” that we have which is quasi spatial*
- *Suggest that the quasi spatial time concept arises from a collection of psycho-linguistic influences*
- *Suggest that there are also mathematical influences that have developed alongside our time concept that has exacerbated the contemporary illusion that time is spatial*

5.1 Where does the illusion of the B theory come from?

The question, then, that is in need of an answer, is why are eternalist ontology's so persuasive? What is it about eternalism and B theory that is so appealing if they are not genuine options? The answer is two-fold: on the one hand we lack a coherent “time concept”, that is, independent from our understanding of space, an understanding of what time is – a time concept that eternalism seems ready suited to providing. In addition, various psychological influences and the predominance of mathematics have developed our pre-theoretical understanding of time to a very particular way of thinking about time and temporality.

In exploring these two themes, the development of the “time concept” and the predominance of mathematics, it will become evident that the ontology constructed by B theorists, space-time theorists and other eternalists is largely due to the way in which we commonly think about time. I suggest that we naturally make use of a quasi spatial time concept for which we lack an objective basis. Second I offer psychological / linguistic explanations for the prevalence of these models, and, third, I argue that the prevalence of mathematical analysis with regards to time leads, when coupled to the quasi spatial understanding of time, to the unjustified conclusion that time is a dimension. With these distinct strands in place it will become clear that the success of the TTT and its various components should not be seen as due to their accurately reflecting reality, but in their capturing the way that we commonly conceptualise time.

In chapter five of *Human Knowledge: Its Scope and Limits* Russell draws a distinction between our perception and conception of time. He does little with this

distinction once it has been elucidated, at least in so far as to how we should think of it informing our thoughts on time and temporality.¹ I think that such a distinction is both important and informative. Our ‘perception of time’ is not a perception of time at all; I do not perceive things as past, or as future, and, unless presentness is a property, I do not perceive entities or times as having presentness either. What I do perceive is entities undergoing change. For example, I may perceive movement in the hands on a clock. Now, it may be that, ultimately, the correct explanation for this rests upon successive states of affairs having the property of presentness (though see 1.3), but, pre theoretically, there is nothing about the nature of the experience that gives rise to such a supposition. Intuitively, what happens is that the hands on the clock move about the face. Let us suppose for a moment that this is correct. If it is then our ‘perception of time’ is not a perception of time at all; it is a perception of change. Nothing more than change is being perceived.

Our conception of time seems to be markedly different if, in fact, we have a coherent concept of time at all. For, (with a nod to St Augustine) although I believe myself to know perfectly clearly what time is, if asked, I find that I do not know. Although it may be that an individual, when pressed, will find it difficult to express exactly what it is they refer to when they talk of time, there are, or so I claim, certain features of our contemporary time concept that can be brought out, even though we may be said to lack a complete and detailed understanding of what time actually is. The central, if not only, component of the contemporary time concept is time’s dimensionality or its extension, which is not so much a concept of time *qua* time, as a conception of time *qua* space.

Although we think of time as being fundamentally different from space we assume that time can be thought of as a dimension because it *is* a dimension. But, as I show in 5.1.1- 5.1.3, the idea of time as a quasi spatial thing, as the sort of thing that might be attributed with spatial properties, is not new. In fact such a notion is prevalent across a large and varied cross section of societies. What has drawn out this feature in contemporary analysis is the prevalence of mathematics and mathematical analysis. For, as I show in 5.3, the geometric description of time as a component of a space-time rests, already, upon the assumption that time is the kind of thing that could be a dimension. As I have shown in chapters two through four, there appear not to be

¹ Russell’s own aim seems to have been to determine what we *know*, or take ourselves to know, about time, see, esp., p. 246.

any philosophical reasons to suppose that this is the case, and, hence, I suggest that we spatialise time as a result of factors discussed in 5.2. In light of such claims the mathematical analysis detailed in 5.3 should be seen as exposing and bringing to light our limited and incorrect way of thinking about time, and showing that we place it at the heart of our metaphysics of time.

5.1.1 The History of the Time Concept: Greece

First of all then, to the Greeks. As the forebears of our own civilization it would perhaps be unsurprising to find that the Greeks share a quasi spatial conception of time. However, what is striking is the extent to which we can draw parallels between our own view of time and the Hellenistic conception. We must be careful not to misrepresent the varied nature of the Greek concept of time (c.f. Lloyd 1976: p.117), but there are two features that can, broadly speaking, be said to unite Greek thought on time. The features I have in mind are the cyclical nature of time (though we must be careful to acknowledge that this meant different things to different authors), and the notion that time (as an entity) can be thought of in a similar way to eternity, such, that when we speak of “the thing time” for the Greeks, we are thinking of “the thing eternity.”

Largely, the spatial nature of time in Greek thought is implicit in the metaphors used. Whitrow (1975) quotes Nemesius, the fourth century bishop of Emesa,

...Socrates and Plato and each individual man will live again, with the same friends and fellow citizens. They will go through the same experiences and activities. Every city and village and field will be restored, just as it was. And this restoration of the universe takes place not once, but over and over again – indeed to all eternity without end. Those of the gods who are not subject to destruction, having observed the course of one period, know from this everything which is going to happen in all subsequent periods. For there will never be any new thing other than that which has been before down to the minutest detail. (p. 17)

There is nothing explicitly spatial about the metaphor, but it is at least plausible that time, as a cycle, lends itself to being thought of as a thing. There is a cycle of events

which the gods perceive, and that cycle is time. To the gods looking in at the cycle it is merely there. Consider also the Aristotelian understanding of time as like a line.

For the line to be divided by the point, the rest of the line either side of the point must exist – must be real. If time is to be thought of both as cyclical and like a line, then the easiest way to think of time is as extended, as a quasi spatial entity. None of this is to say that the Greeks thought of time as being like space, but that the way in which they thought about time makes use of spatially loaded concepts. A point that can be further illustrated by a brief delve into Greek literature. As Romily (1968) has argued the role of the song in Greek tragedy is of importance – especially for our understanding of time in Greek tragedy (pp. 25-27). There is a sense in which the concept of past and future is manifestly different from our modern concept,²

what is not modern is that past actions or dead persons not only provide a clue for understanding what rancours or obligations weigh upon the present time: these past actions or dead persons, for Aeschylus, are still alive and active; and one can acknowledge their presence in what is actually going on. In other words, the past is not wholly past. (op. cit)

But there is also some sense, then, that past events are not gone, they are still important and still part of reality. Firstly, time can be seen as the personification of fate, as playing some role in the way reality unfolds.³ However, time may also be thought of as, ‘holding all events in stock, known and unknown’ (p. 50). Time, on this latter view, is that which reveals to us the events of the future – events that are already there awaiting our discovery. For example,

Even if things are supposed to exist through all eternity and to have been decided regardless of time, it is with time and in time that they come to be. He *uncovers* them. As Sophocles’ Ajax says, “he makes them grow up when they were invisible and covers them once they have appeared”. (p.50)

Compare this with,

² Though see Baars (1997) for some observations regarding the personification in our modern concept (p. 286)

³ This is a little different to the concept of fate in the Middle Ages which is, as Gurevich (1976) has it, ‘irrevocable since, in a certain sense, what is come to pass is already a fact’ (p.232). In the Greek concept fate appears to be active, capable of altering the way things will be.

Sophocles ‘in fragment 832 N, 918 P, uses the verb *ekkaluptein*, to uncover: “Time, uncovering all things, brings them to light.”’ (p.51)

It is not difficult to see that there is some sense in which events are out there waiting to be revealed by time. However, although this notion is not of itself explicitly spatial there is a sense in which the spatial enters into the mode of consideration. Given that these events are just *there*, there is a sense in which they could, at least in principle, be seen. To put it another way, if time is revealing these events to us then time is, apparently, doing something that sounds, from a natural language point of view, to be something inherently physical. Time makes them grow up, covers them, brings them to light. These metaphors are all suggestive of a sense in which the Greeks thought of time as in some sense being *like* a mode of extension – a mode of extension for which the paradigm is space. And this is my point. It is not that all societies think that time *is* spatial, but that the understanding of temporality in cultures is suggestive of, and implicitly entails, a spatial metaphor.

5.1.2 The History of the Time Concept: Maya and India

Although of relatively little interest to the history of the development of the western time concept, a dimensional time concept, it is interesting to note that time concepts other than our own appear to be underpinned by spatial metaphor. Mayan time, much like its Greek counterpart, was cyclical. Further, the Mayans also viewed time as ‘magical and polytheistic’ (Whitrow 1975: p. 12). Rather than give time the role of discovering, or uncovering events, the Mayans saw time as a road and as qualitative.

Although the road along which the divine bearers marched in relays had neither beginning nor end, events moved in a circle represented by the recurring spells of duty for each god in the succession of bearers. (p.12).

For the Mayans, the Aristotelian distinction between past, present and future, as essentially linear would have been problematic. Given their religious view that the world instantiated the same type of events every 269 years, a major part of their belief

centred around the notion that there was no distinction between past, present and future. Given the lack of any such distinction, the apparent *thereness* of events in time, and the use of the metaphor of time as a road, or a path, upon which the gods marched, it is not difficult to see the spatial underpinning of such a metaphor.⁴

Similarly suggestive are various tracts of Indian philosophy. As Dasgupta (1932) notes, there is a suggestion that there is no distinction to be drawn between the different regions of time (p.266); further, that the self is free to roam those different regions being, as the self is, eternal, and time being capable of reversal in thought.⁵

I am at pains here not to argue that such cultures think that time is spatial (the post 19th century western time concept seems to be individual in this respect), but that there is a quasi spatial understanding of what time is. Thus, the use of spatial metaphor is prevalent in nearly all societies because we lack an understanding of what time is – St Augustine’s now infamous point. We use analysis of spatial metaphors to begin to understand more about time, but in doing so we may, in fact, be simply revealing more about how we think about time. There is nothing in the nature of time, *qua* change, that is even remotely spatial, *unless* one presupposes that time is spatial.

5.1.3 The History of the Time Concept: Medieval Philosophy

Much like the Greeks, the philosophers of the Middle ages lacked a single, unified, concept of what time might be. However, the increase in speculation as to how reality might appear to God throws some light on the issue. As Boethius (1999) had it:

But if it is appropriate to compare the divine present with the human, then just as you men see certain things in this temporal present of yours, so God sees all things in his eternal present. Hence this divine foreknowledge does not change the nature and character of things; God sees them as present before his eyes as they will emerge at some time in the future. (p. 112)

⁴ Furthermore, it is difficult to conceive how qualitative distinctions could be drawn between regions of time unless the different regions of time existed in something akin to a spatial sense, at the very least the understanding is suggestive of a spatial metaphor.

⁵ For an alternative account of temporality in Indian philosophy see Hiriyana (1967) or Potter (1977). In both of these texts, as in Indian philosophy in general, the challenge is to extract a single coherent view of time as opposed to a mass of contradictory views. In any case all views of time that I have found are compatible with a spatial metaphor.

For any human agent the perceptual field is equivalent to a spatial field, thus, for God, it seems, his “seeing” of all things at the very least implies a spatial character of time.⁶ If these entities are to be before the eyes of God, then they must, at least in some sense, be presented to Him as entities in space are presented to us. Since God perceives things *as they truly are* it follows that time *is* the sort of thing that admits of a comparison with physical space.⁷

5.2 The mind dependence of spatialised time

The time concepts discussed, in brief, all share the common feature of being quasi spatial. They also share another common feature; that of not being justified. In all of the literature on the various time concepts there is never any justification given for thinking time to be quasi spatial.⁸ Why should this be? Why should it never be the case that such moves are justified – at least not until the 19th century? My belief is that we think of time as being spatial as a result of three independent factors: linguistic, psychological and mathematical.⁹ It will be argued that it is a natural tendency, explicable through psychological and linguistic factors, to think of time as spatial.¹⁰ When physicists suppose that space and time are unifiable into a space-time whole they are mistaken. Instead, they are surmising from the fact that their natural concepts of space and time are similar (and that the two may be mathematically described in

⁶ Consider also:

When you observe at the one time a man walking on the earth and the sun rising in the sky, even though you see them simultaneously, you distinguish them, and you judge the first movement to be voluntary and the second to be necessary. So it is the same with the divine vision, as it looks out on the whole world; it certainly does not dislocate the nature of those things which for God are in the present, but which in their temporal aspect are in the future. (op. cit)

See Barrendon and Lunscombe (2003) for an analysis of Boethius’ understanding of the relationship between time and eternity. Though they do not explicitly consider the spatial language and metaphor underpinning Boethius’ time concept, much of what they have to say is enlightening on how time and reality are related.

⁷ For arguments to the effect that all such time concepts are essentially spatialised see Whitrow (1980) where the ideas are explored more fully.

⁸ For example, Aristotle offers no justification for comparing time to a line. There is simply an implicit assumption that such a comparison is meaningful.

⁹ Since my arguments to the latter are less bound up with the issues concerning the other two, I shall detail these in a separate section (5.3).

¹⁰ My own view is that the linguistic factors are probably reducible to psychological factors but this is not a claim that I pursue here.

the same sort of fashion) to the conclusion that space and time are the same inasmuch as they can both be correctly thought of as dimensions.

5.2.1 Linguistic factors

I shall restrict myself to an analysis of English here, and, although the point itself is quite brief, the argument is worth making. The language that we employ to speak about time and space is surprisingly similar given the different experiences that we have of the two. I take it to be relatively uncontroversial that there are such differences. For example, I perceive time, or at least temporal passage, to be associated with change in the physical, whereas there are no such associations to be made with space.

But despite this a variety of what we would naturally think of as spatial terms are applicable to time. In each of the cases cited below I have underlined the part of the statement that is “spatially suggestive.” My suggestion is not that these terms are spatial and hence that we think of time as spatial. All that I want to suggest is that the duality of uses given to these terms *might* be suggestive of the conceptual similarity afforded to time and space.

- (1) In the middle of the night
- (2) How long do we have to wait?
- (3) At seven o'clock the bell will chime

It might also be added that the permanency of B theoretic locutions is suggestive of a space-like representation of reality since our paradigm of variation, as opposed to change, is intrinsically spatial. Talk of “variation” implies, conceptually, a spatial arena over which some quantity or other is arranged – as was noted in chapter one and organised into a pre theoretical objection to the B theory.

What I am suggesting is that the reason for this similarity is that we conceptualise space and time in similar ways; we think of both as being spatial in some sense. I do not mean to suggest that philosophers move from the natural language similarities between time and space to the erroneous conclusion that time and space *are* similar; rather, that the surface similarities in the grammatical structure

of sentences concerning time and space are puzzling given their distinct appearance to us. One *possible* explanation for this is that we conceptualise the two in similar ways.

5.2.2 Psychological factors

There are two points to be made here: first I will show that memory, observation and anticipation (MOA) play an important part in covering up the existence of any potential ontological distinction that may lie between the past, present and future; and, second, I will show that the natural tendency, once this distinction has been removed, is to treat what is left as spatial. This is no “proof” that we spatialise time; such a proof is already evident in theories like space-time and the manifest spatial metaphors used to describe time. What I am doing here is providing an explanation for why we spatialise time if it is not, in fact, spatial. It should be noted, then, that in stating that the dimensionality of time is mind dependent this explanation is the mirror of Grunbaum’s account of how temporal passage is alleged to be mind dependent. The distinction being made is that the account I offer is complete whereas Grunbaum’s was shown to entail undesirable explanatory gaps.

This is, then, an underdeveloped counterpart to Falk’s explanation of how temporal passage might arise phenomenologically without necessitating genuine passage. Sadly the account I offer falls short of offering a complete causal mechanism as biologically complete as Falk’s. However, I do not believe that this distracts from either the plausibility or comprehensibility of the view since it remains clear how the illusion of the extension of time can arise for beings who occupy a reality where such extension is not a genuine feature.

5.2.2.1 MOA

The crux of the MOA account is that our concept of self leads us to erode any potential distinction between past, present and future; this, coupled to the predominance of the visual mode of perception, leads to the natural tendency to spatialise (hence dimensionalise) time. Memory provides a means of linking between our understanding of the past and the present and our anticipation of the future – of those things that are still to come. As Cohen (1989) puts it:

In the real world, memory acts as a bridge between the past, the present, and the future. It stores retrospective information, monitors current input and output, and constructs and stores future plans. This integration of past, present, and future in a unified personal history is achieved by interactive processing. New memories are stored within pre-existing knowledge structures; old memories are modified by new ones; prospective plans out of elements of past experience. This intricate interaction of past, present, and future allows us to maintain a coherent identity and to develop flexibly and adaptively in knowledge and experience. (p. 156)

Now there is no obvious use of a spatial metaphor here. But what there is, crucially, is an erosion of any objective distinction (that may or may not exist) between those things that have been, those things that are, and those things that will be; for, in the interaction of past, present and future beliefs, desires, memories (of the past) and anticipations (of the future), one can easily see that any ontological distinction between the past and the future, and indeed the present, could be lost. The act of integration takes anticipations of the future, awareness of the present and memories of the past and lends “existence” to all three. Hence all three distinct times which the thoughts are about are brought before the mind and each of the times are presented as being ontologically equal.

It has also been suggested in the literature on the psychology of the self, that the conception of the past, present and future as forming part of an existential whole is essential to the self (see e.g. (King 2000: esp. p. 2), (Cottle 1976: pp. 85-87) (Baars 1997: esp pp. 290-293)). The particular feature of such accounts that is of interest to us here is of the self existing *in* time. Plainly, this idea of being *in* time, not merely being subject to the experience of change, entails that the concept which we have of time differs radically from our experience of temporality – e.g. change. There is an extent then to which we conceive of ourselves as *changeless*, as opposed to the way in which we perceive the world around us to change. This kind of changelessness must surely lead to the quasi spatialisation of time since we must, in our somehow unchanging state, navigate our way *through* this time.

5.2.2.2 Visual Predominance

It would seem reasonable to suppose, then, that the conjunction of memory, awareness and anticipation will tend to blur any objective distinction between past, present and future, and that there seems to be a sense in which we view ourselves as “in” time in a changeless sense. I assume here, for the purpose of discussion, that there are no objective features of reality which give rise to these conceptions. Certainly there are no obvious reasons for them to arise in this way given our experience of time as closely related to change. First, then, I show that vision is the dominant sense, and then say how this leads to a spatial concept of time.

My arguments on this first point will not need to make use of psychological case studies or points of logic. It is the simplest that I will have to make. It is surely obvious that the sense made use of most frequently, emphasised the most, in society – indeed in all societies – is the sense of vision. I am not sure how to argue for this point any further, though perhaps a smattering of remarks made by philosophers concerning memory will serve to further my point. In section 1.1.1 of *A Treatise of Human Nature*, the majority of Hume’s remarks concerning memory are of visual memory (indeed there is only one other sort mentioned – that of taste – and that is given a minor role). Furlong (1951) considers only vision. In the *Leviathan*, Hobbes (1881) too deluges us with a primarily visual notion of memory. Perhaps the exception to prove the rule is Mill (1967), who provides us with a much more rounded understanding of memory as encapsulated by all the senses. But consider, too, the philosophy of universals and tropes; how many of the examples therein are presented as universals of hearing, smell, taste or touch? By far and away the majority of cases presented are of visual examples of apparent similarity. The only reason that I can think of for this trend is that sight is indeed the most dominant of the five senses.

But why move from a supposition that sight is the most dominant of the sense to the conclusion that we unwarrantedly spatialise time? The answer lies, partly, in an analysis of memory. When discussing multi channel testing (psychological analysis of inputs via different types of data streams, e.g. audio, visual etc.) Murdoch notes,

The general point is that space and time are two separable dimensions of stimulus presentation. Also, they have a natural correspondence with visual and auditory presentation. That is, in a very general sense audition is a temporal-distributed

modality and vision is a spatially distributed modality, and these dimensions are surely represented in memorial processing. (Murdoch 1974: p.194)

Thus, as a result of the alleged predominance of vision over the other four senses, especially in regard to our ways of thinking about the past and the future, it seems only natural that we should automatically spatialise time. First we have memories of times and a concept of time. As naturally visual creatures, such memories and concepts tend toward the visual, and with a visual concept of time (as an entity) we come to the idea of it being spatial, and hence dimensional. It is unsurprising that beings who operate primarily in the visual mode will conceptualise something such as time visually. Of course in doing so the notion that time is quasi spatial is implicitly smuggled in because the only types of entities that can be visualised are spatial entities.

In the next section I will chart the development of the time concept in line with the prevailing mathematical paradigm with the intention of showing that the two develop hand in hand; further, that the supposition that time is spatial is never fully explored. I argue that there is no reason to suppose that time *is* spatial therefore, since we can show how easily our conceptual apparatus lends itself to a spatialised representation of time and temporality. We should not suppose that time is spatial, but that the success of space-time theories, as well as other eternalist approaches to time, lies in their ability to give us *some* conceptual means by which to analyse time and that some conceptual means are better than none, even if they are not entirely accurate in this case.

5.3 Time and mathematical analysis¹¹

In any case our attention now shifts to four-dimensional mathematics and the structure of our own time concept. The mathematics of the nineteenth century was rich and diverse, containing many disparate views. The move that is of particular interest to us is the advance made in geometry, particularly the work of Gauss and Riemann. Gauss's primary contribution was to recognise the role of Cartesian

¹¹ The first author to offer an implicitly mathematical graphical analysis is widely thought to be Nicholas Oresme, see Clagget (1959). However, it is not until the nineteenth century that it can really be said that the mathematical analysis of time began to have serious implications for our thinking of time as spatial.

coordinates when applied to curved surfaces. In a Euclidean space one would think of the Cartesian coordinates as giving us the determinate location of any given entity. However, in Gaussian (curved) space things are a little different. The most obvious example to be given is that of longitude. If, at the equator, one travels one degree of longitude then the distance that one will travel is equal to approximately 110km. However, if one travels the same distance (in longitude) at, say, the latitude of New York (41'), then one will travel only about 83km. Further still, at the North pole one degree of longitude is a mere 1.9km (c.f. Schwinger 1986: p. 172).¹² Following on from Gauss came Riemann, who developed Gauss's work on intrinsic geometry of two dimensions, into a potentially infinite number of dimensions:

He extended Gauss's intrinsic geometry of two dimensions, requiring two coordinates, to spaces any number n of dimensions, and coordinates: $n=2,3,4\dots$. The metric of these spaces, which is specified by three quantities for $n=2$, requires six for $n=3$, ten for $n=4$, and so on. To see this for $n=3$, add a third coordinate to a two-dimensional space. The square of the distance between nearby points now contains the square of the change in the third coordinate, with a multiplicative coefficient, along with the products of the change in the third coordinate by the changes of each of the first two coordinates. That is three additions to the initial three coefficients, giving six quantities for $n=3$. Proceeding to $n=4$, we must similarly add one plus *three*, or four coefficients, to the six of the $n=3$, giving ten in all (p.176)

Thus, at the dawn of the twentieth century four dimensional mathematics was in its heyday. However, although the 'time concept' of those such as Lagrange and Lavoisier was making use of the dimensionality of time (Whitrow 1980: p.3), this was still based partly in the Newtonian notion of time as a dimension. That is, although time was viewed by Lagrange as spatial in character, its precise nature was vastly different from that of space. The homogeneity of the mathematical structures of

¹² Schwinger defines the role of coordinates in a Gaussian space thus:

The surface as a whole can be described by some kind of Gaussian coordinates, which we call u and v . Within the small area we can also adopt a pair of Cartesian coordinates, x and y . Now let us move from one point to another within the small area. The displacement can be expressed either by a small change of x and y or by a small change in u and v . The small changes of x and y are related by certain multiplicative factors to the small changes of u and v ... The square length of the straight line that connects the initial point to the displaced point is the sum of the squares of the changes in x and y . And that sum in turn can be written as the sum of *three* contributions: a multiple of the square of the small change in u ; a multiple of twice the product of the small changes in u and v ; a multiple of the square of the small change in v . (p.172)

Riemann is reproduced in its entirety in the bold, if rather vague and mysterious, infamous statement of Minkowski's (1923) in which he introduced the notion of space-time claiming, 'space by itself, and time by itself, are doomed to fade away into mere shadows, and only a kind of union of the two will preserve an independent reality' (p.75). This is, of course, an entirely natural supposition to make *if* one accepts that the structure of the mathematics of four dimensions is an accurate representation of our own reality.

It is easy to see, then, how it is that these mathematical developments fuelled our implicitly spatial conception of time. With a psychology that is naturally predisposed to spatialising time, an analysis that fits with that conception is likely to prove popular and successful as a heuristic. And note, once one has a conception of the sort of thing time might be it becomes far easier to subject it to mathematical analysis. Hence, even though the time concept given to us by the mathematicians is not necessarily correct, it is of heuristic use. But there is no reason given, at any stage, by any philosopher, that mathematics, more specifically geometry, reveals the nature of time. Instead, we find texts like Nerlich's *What space-time explains*, giving an excellent explanation of how we may read geometric patterns into the nature of events and occurrences in what we believe to be space-time; but we are not presented with good reason to make the conceptual link between time as we perceive it – time as change – and time as we conceive it – time as studied by geometers. It is not enough to be told by mathematicians that the geometric model of space-time explains a great deal, since, or so it appears, thinking of time in spatial terms is a natural thing to do but one that lacks an objective basis. What needs to be explained, then, is not why a geometric explanation of time works – that has been explained above as psychological – but why we think of time geometrically at all. For, given the above discussions of the forgoing chapters it does not appear apposite to adopt a spatialised account of time.

Even if the forgoing seems like a large conceptual leap, that it is possible that space and time could admit of space-time analysis without being such, this is not sufficient to begin to motivate a B theoretic account. There is a sizeable gap between admitting that the mathematics that describes space and spatial relations also describes time and temporal relations, and admitting that the two are the same sort of thing, such as modes of extension. This important point is often missed in analysis where we suppose that since we may represent the two in the same way that it follows that they

are the same. Of course we only make such suppositions in the case of space and time. Obviously we would make no such conclusions in the case of other mathematically similar quantities, such as temperature and pressure. I suggest that, just as we do not believe that simply due to the similarity of mathematical analysis we should condense temperature and pressure into temp-pressure, so we should not unify space and time into space-time.

5.4 Conclusion

At the start of chapter five it was suggested that, in reflection of Grunbaum's suggestion that the experience of becoming was mind dependent, the extension of time into a quasi spatial sort of thing is mind dependent. Even if one were unpersuaded by the arguments in chapter four then much of what is said here in chapter five serves to further erode the foundations upon which static theories are founded since an alternative explanation is offered as to why theories which spatialise time are successful, even if they are not true. They are successful because they make use of a latent time concept that we already have. And given that the mathematical descriptions of the two are so similar it is hardly surprising that we should suppose the two to be the same.

The existence of a quasi spatial time concept was explored in section 5.1 and it was argued that there does seem to be a shared feature of time concepts across many cultures. The feature in question is that all regions of temporality are ontologically on a par. It was also argued that, conceptually, the best handle we have of things that are devoid of ontological distinction, is that of space. Thus, it was suggested that we can explain our natural tendency to spatialise time through our natural tendency to think of time in the way we do. It was also argued that the history of this time concept suggests that theories of space-time are not so powerful as we may have thought.

In section 5.2 the apparatus that explains our conceiving of time as a dimension was explored. It was argued that the MOA account, in which we treat memory observation and anticipation (and the times at which the events in question will occur) as a part of our concept of self, is plausible and that this would explain why it is we conceive of time as spatial if it is not. It was also argued that linguistic factors, such as the implicitly spatial nature of much temporal language may have an influence on such concepts, though it was recognised that such claims would be

limited to languages in which the phenomena occurred – English was the only language explored.

In 5.3 we explored a different tack and suggested that it is the coupling of this latent time concept to the rigours of mathematical, particularly geometric (in other words spatial), analysis that renders the arguments for space-time with the appearance of being all the more persuasive. But this is a mere illusion. Given that we have no reasons to suppose that time is quasi spatial, from chapters two through four, and we now have an explanation of how it might be that we come to think so successfully of time in such a fashion, it seems only reasonable to bring to an end the analysis of the TTT. Hence, in chapter six we must see what it is about presentism that seems so problematic to its opponents.

Chapter Six

In chapter six I:

- *Argue that presentism fails to give a sufficiently good answer to the problems of tensed reference and tensed quantification (6.1);*
- *Note the difficulties in adequately formulating presentism (6.2);*
- *Note the problems from the special theory of relativity (6.3);*
- *Argue that Craig's and Smith's versions of presentism are unworkable (6.4) and (6.5);*

6.1 Presentism

In light of the problems faced by eternalism and B theory, presentism presents itself as the natural solution to McTaggart's paradox. However, as with any philosophical theory there are a number of problems that beset it. In chapter six I detail these problems and reject some of the contemporary solutions to these problems, not necessarily because I believe the solutions mentioned to be faulty, but because the type of solutions examined do not meet the objections raised in the manner sought by opponents of presentism. With this achieved it is incumbent upon me to provide technical solutions to these problems, the beginnings of which I sketch in chapter seven. I also detail two of the more prominent presentist positions, those of Craig (6.4) and Smith (6.5), both of which are found to be wanting.

6.1.1 Tense: Language

It was argued in 2.4 that the applicability of a tenseless semantics does not motivate a B theoretic ontology. Normal arguments taken to favour presentism infer from the fact that tense is irreducible to the conclusion that it represents some feature of reality.¹ Suppose, then, that we accept a tensed semantics, does it follow that reality itself is dynamic? Well in 2.4.3 I argued that the tensed (or otherwise) nature of language, or the account that we give of truth conditions, does not reveal to us the nature of reality unless there is some further way to show that the perspicuity of the

¹ Those contemporary philosophers who have used inferred from presentism to tense include Ludlow (1999), Smith (1993) and Craig (2000a).

tense in such constructions reflects a feature of reality as opposed to a feature of thought. Hence, it is not necessary that a tensed semantics/language entails a dynamic reality. Now, such arguments might be considered somewhat problematic since presentism is generally motivated on semantic grounds, hence my raising it here under the list of potential problems for the presentist.

However, we saw in chapter one that McTaggart's arguments gives us a choice between presentism and a C theoretic ontology. Throughout the intervening chapters I have attempted to give an account of why a B theoretic ontology (the C series with temporality somehow infused) cannot be motivated and attempted to point out some of the inconsistencies of the TTT. This, then, proves the new motivation for adopting some form of presentism. If we have a choice between presentism and C theory and C theory is false then we must explore presentism. Of course, one of the motives for accepting the TTT itself was the accusation that presentism is not itself a coherent theory and since we have not yet done so it is to proving this last thesis false that we must set our minds.

6.1.2 Tense: Quantification

There is a very real technical problem for presentism, that of quantifying over those things that are non-present. It seems, drawing a modal analogy, that the presentist can make some sense of quantification over singular times in the same way that we can quantify over merely possible entities if we are not modal realists. The problems set in when trying to quantify over a plurality of times.² Provided one can accept a tense quantifier of the form, "it was the case that (there is x)" and, "it will be the case that (there is x)," there will be no problems in quantifying over singular times.

But things become rather more complicated in cases where we have more than one time over which we need to quantify. Consider cases such as, "there have been three kings called Charles." Assuming that these three kings have not existed simultaneous with one another we cannot use (1)

- (1) It was the case that (there exist three kings called Charles)

² See Lewis (2004: esp. pp. 4-6), Adams (1986: p. 321).

At no point has the assertion, “there exist three kings called Charles” been true, so the quantifier phrase fails to capture all of the relevant entities within its scope since the present tense operator can range only over those things that exist at one time.

Lewis (2003) explores three possible solutions to this problem, each of which he finds unsatisfactory.

The first strategy Lewis suggests is brute translation (pp. 6-7), such that “there have been three kings called Charles” entails

- (2) It was the case that (there exists a king called Charles) and, it was the case that (there exists a king called Charles) and, it was the case that (there exists a king called Charles)

The main problem with this strategy, according to Lewis, is that it implies a potentially infinite number of nested quantifiers. If, for example, one were to consider the assertion, “there have been an infinite number of seconds” (supposing time not to have a beginning), then we would require an infinite number of nested operators to quantify successfully over all of these seconds. Adams (1986: p. 321) suggests that such complications might be acceptable if the metaphysical arguments are strong enough.

I think that the metaphysical arguments are strong enough, at least inasmuch as B theories are not a genuine option. Indeed it might be questioned whether or not it is entirely inappropriate that an infinite number of nested quantifiers are needed to quantify over an infinite number of times. But, problems from reference (see below) suggest that in order to construct a viable theory we need more than simply nested quantifiers to explain quantification over many times. To say that we can quantify over times that do not exist, simply in virtue of nesting present tense quantifiers within the scope of a past tense operator does little, if anything, to assuage the concern that our quantifiers are ranging over non-existent entities. Furthermore, it is less than clear how (2) allows us to quantify over three different kings. Nor is it clear how we are to do so within the confines of a Presentist metaphysic since the problem turns on the fact that the kings do not exist at the same time.

Hence, such options might be endorsed if we have absolutely no other option, but they are at best unpalatable in the extreme.

The second strategy suggested by Lewis is to make use of the shadows of existent entities to make sense of non-existent things such that, ‘the nonexistent golden mountain has as its shadow the existent property-bundle of goldenness and mountainhood’ (p. 7). Thus, there might exist, in the present, three surrogates. one for each King Charles. Lewis considers various options and comes to the conclusion that there are no sensible candidates for such surrogates.

By and large I think I agree with Lewis on this matter. Further, the mechanism by which past entities cast their shadows will be very different from the way in which non existent entities cast their shadows through their property-bundles and it seems incumbent on the presentist to offer a more detailed account of how such a mechanism might function in the temporal case. I also fail to see how, in the case of temporal quantifiers, this really helps us. In the case of the Kings Charles, I might quantify over the property of being a king, and being Charles, but how does this help us to quantify over different kings called Charles at different *times*? At the very least a fuller account of this strategy is required.

The third strategy that Lewis suggests is that the presentist could take quantification to be primitive and unanalysable. The presentist could claim that tensed quantifiers cannot be understood to be quantifiers because there are no past and future things over which to quantify. The presentist might argue that this should satisfy the opponent of the B theorist because this move renders such quantifier phrases unanalysable. Tensed quantifier phrases give the appearance of being real quantifiers because they behave in the same way, semantically, as genuine quantifier phrases. But they do so without being quantifiers in any metaphysical sense. This would explain why tensed quantifiers do not need to have entities within their scope.

Lewis gives this latter option some serious consideration. I do not. This account does not give us a good account of why certain types of quantifier phrases are not really quantifiers where others are. What is it about temporality that requires of us that we use quantifier phrases but without ontological entailment? Perhaps we might be able to get away with such a position if we have no other options, but, as I shall make clear in chapter seven we do have another option. In many ways it seems that the presentist might get away with any of these options if we are so restricted in our metaphysical account of time that these are our only choices. Perhaps it is the last ditch nature of these explanations that explains the reluctance that there seems to be to

endorse them. Certainly I do not find them *persuasive* as accounts of tensed quantification and I do not see why they should be thought of as such.

One could compound the difficulty for the Presentist by raising a further technical problem. It seems that from the principle of existential generalisation ($Fa \rightarrow \exists xFx$), the obvious tensed version, ($P(Fa) \rightarrow P(\exists xFx)$) is without a logical connection to relate it to the general principle. This would, of itself, be a problem for the Presentist though, once again, whether the Presentist would be forced to give up their position is less clear. After all, they might be able to say that the general principle is, itself, tensed disjunctive. Hence, where $\lambda = Pa$ or P or F or true where there is no time³, $\lambda(Fa) \rightarrow \lambda(\exists xFx)$ is the *actual* principle of existential generalisation and this clearly *is* related to ($P(Fa) \rightarrow P(\exists xFx)$), because P falls within the scope of λ . Depending on what metaphysical commitment should be read into the conjunction of the quantifiers into λ would determine the plausibility of the view.

6.1.3 Tense: Reference

In a similar vein to the problems of quantification we have the problem of truthful reference. What is it that makes past and future tensed propositions true if the entities to which they refer do not exist? An assertion of “Elizabeth is tired” is true, iff Elizabeth is tired. Hence if Elizabeth does not exist then an assertion of “Elizabeth is tired” is false. There are three options in the literature that suggest themselves (the suggestions of Smith and Craig will not be considered here since I entertain independent problems with their specific ontology’s later on).

- 1) That past and future tensed sentences are true in virtue of some presently existing state of (physical) affairs
- 2) That past and future tensed sentences are “true” in virtue, not of propositions successfully referring, but in virtue of the fact that they are “quasi true”
- 3) That past and future tense sentences are true in virtue of the fact that they have “grabby” truth conditions⁴

³ This is clearly desirable since we would presumably want the principle to stand even if time were unreal

⁴ (2) is due to Sider (1999) and (3) to Markosian (2003). It is to be recognised that (3) entails a variation of truth, and quasi truth, closely related to (2) (c.f. Markosian (2003: p. 69, see footnote 36).

Each of these views has received some attention in the literature, but none is, ultimately, of any use to the presentist. According to (1) a past tense sentence (4) is true if there is some existing state of affairs in the present upon which we can ground the proposition.

4) Dinosaurs roamed the earth

Thus, (4) will be true if there are fossils that exist in the present to make the proposition true. But this seems implausible. It is possible that there existed some state of affairs that has left no causal trace in the present. Although unlikely and difficult to conceive of, such a state of affairs could have obtained. We would want to be able to say that statements about such states of affairs would be true; but on this account they cannot be so.

Further to this it is not clear that presently existing physical entities can be truth makers for past tense propositions at all. Consider again the case of the dinosaurs. Ludlow's suggestion is that what makes it true that Dinosaurs roamed the earth is the existence of fossils. But this is not so. The existence of fossils makes it true that fossils exist and, to be sure, the fossils got there *somehow*. But without the truth of the claim that dinosaurs existed and left behind fossils it is impossible to claim that the fossils are a result of the existence of dinosaurs. Hence, to say that the fossils are the truth makers for past tensed sentences seems inappropriate. To put it another way: the truth conditions for "The Dinosaurs roamed the earth," are that, the Dinosaurs roamed the earth, and the truth conditions for the existence of fossils are the existence of fossils. But the conditions under which the Dinosaurs did roam the earth are not necessarily coextensive with those under which fossils were created. It is quite possible that fossils exist without the past existence of Dinosaurs, or that Dinosaurs existed without the creation of fossils.

What, then, of the suggestion that past and future tense claims can only be quasi true? Sider (1999) argues that there is a sense in which past and future tense propositions may not *really* be true in the same way as Elizabeth being tired (now) is true. There is a distinction to be drawn between truth as we normally think of it and truth about the past and future. To see this some background is necessary. We would normally say that sentences are true if they pick out true propositions about some

relevant state of affairs. Now, clearly in the present tense mode there will be sentences that pick out propositions that are about some presently existing state of affairs. However, in the case of the past- and future-tensed sentences, it is not so clear that there are existent propositions since there are no non-present entities for the propositions to be about. This obviously causes substantial problems for the Presentist because, as we have seen, it seems that there are truths about the past and future and if there are no propositions about the past and future then it is less than clear how there can be truths about the past and future.

Instead of claiming that past or future tense statements are true, on Sider's view, we claim that they are (metaphysically) false for they do not refer to a singular proposition because past (and future) propositions do not exist. But what we can say is that such sentences have linguistic meaning, they clearly still mean something even if the proposition to which they formerly referred no longer exists (or does not yet exist). In such a case, rather than demand that the sentence pick out a singular proposition (which it cannot do), we ask merely that it be quasi true, that the meaning of the sentence is such that it is satisfied by the way that things were. Even the presentist will agree that it is true that things *were* some way or another. They merely dispute the existence of any past thing to *make it true*. Denying the need for past- or future tensed propositions, and adopting the notion of quasi truth for such sentences can apparently, circumvent the problem of reference.

The first thing to question is whether or not the presentist is, or perhaps should be, satisfied by this significantly watered down conception of truth, since when we say of a tensed sentence that "it is true," we signify quasi truth, when surely what we mean is simply that the tensed sentence is true. I do not, after all, suppose that my sentences about the past are somehow different in their truth from sentences about the present. Where a sentence is true, it is, quite simply, true. I do not suppose that it is "differently true," or that it is true in virtue of some mechanics other than those that are sufficient for other true sentences. Such a notion seems nonsensical.

Furthermore, if any sentence is to be said to be true, then paradigmatically, it must be a past tense sentence. We cannot dispute that a sentence about the battle of Hastings, such as "Harold was slain at the battle of Hastings," is either true or false. Certainly, we may never know whether the sentence is true or false. It might be the case for instance that Harold had a body double at the battle of Hastings, and that it was he who was shot in the eye with an arrow, or that the very tale of Harold being

slain in such a manner is a fiction. But such matters are epistemic and revolve around our ability to verify them. Metaphysically it *is* either true or false that Harold was slain at the Battle of Hastings.

Our third option is to change how we think about truth conditions. Markosian (2003) has developed and extended the notion of quasi truth through the addition of “searchy” and “grabby” truth conditions. When we are analysing past tensed sentences Markosian suggests that we often conflate

(TC1_g) ‘Socrates was a philosopher’ is true iff $(\exists x)$ [x is the referent of ‘Socrates’ and $P(x \text{ is a philosopher})$].

With

(TC1_s) ‘Socrates was a philosopher’ is true iff $P(\exists x)(x \text{ is the referent of ‘Socrates’ and } x \text{ is a philosopher})$. (Markosian 2003: p. 70)

The difference between (TC1_g) and (TC1_s) lies in the scope of the formally expressed past tense operator. As Markosian has it (TC1_g) is “grabby”; it wants to “grab” some presently existing entity and to give the conditions under which ‘Socrates was a philosopher’ is true in terms of such presently existing entities. Obviously then, if we assume presentism to be true, then any past (or future) tensed sentence will be false because there are no presently existing entities which can serve as a truth maker for the past tense sentence ‘Socrates was a philosopher.’

However, (TC1_s) is a “searchy” truth condition. It, ‘tells us, in effect, to go back to past times, and to search for a thing that is the referent of ‘Socrates’ and that is a philosopher’ (p. 70). Markosian’s position does not fall foul of my objection that there should be no difference in how sentences are true, since present tense sentences are also true in virtue of “searchy” truth conditions. In the case of past tense reference we have to go back to the past time, but in the case of the present tense we have, in effect, already sought out the time that is being referred to. For example in,

(TC2_s) ‘Tony Blair is Prime Minister’ is true iff $\text{Pr}(\exists x)$ (x is the referent of ‘Tony Blair’ and is Prime Minister

we are invited to “search around” the present time for the referent of ‘Tony Blair’, grab onto it, and see if it is Prime Minister. If it is, then ‘Tony Blair is Prime Minister’ is true, and if not, then ‘Tony Blair is Prime Minister’ is false.

Markosian’s “searchy” and “grabby” account of truth conditions is promising. It is intuitive, as he notes, because a past tense sentence is true, not in virtue of something that exists now, but in virtue of something which has been the case – which seems to fit our intuitions well. However, there remains one problem for his account. The “truth maker” thesis which seems to be prominent in contemporary philosophy requires of us that any account that we give of reference, at least true reference, must include some entity which exists. As Markosian notes, his thesis is not one that entails truth in such a fashion. Hence, for Markosian, there will be singular propositions about presently existing entities – in addition to which we can give an account of their “searchy” truth conditions – but there are no such singular propositions about either past or future entities. Without the existence of such propositions, and without the existence of the entities themselves, it seems unlikely that the foe of the presentist will be persuaded of the need for this distinction in truth conditions, or by the claim that entities need not exist in order to have true sentences about them.⁵

And this is the root of my discomfort with contemporary presentism. As it stands it simply lacks the metaphysical resources to make sense of reference to, and quantification over, times other than the present. Perhaps such criticisms are wrong headed. Perhaps we should be enquiring as to how past and future tense sentences are true rather than detailing how present tense sentences are true and then trying to make the rules for present tense reference apply to past and future tense reference. As I suggested in the introduction to this section, my objection is not that such formulations of presentism are impossible, but that they will fail to persuade those who think that we need non-present entities to act as truth makers for trans temporal reference and quantification. What I want to try and offer is a theory that accommodates the presentist intuitions with the metaphysical resources to meet these problems head-on rather than trying to circumvent them.

⁵ Assuming of course that we want to maintain a distinction between tensed sentences and fictions, which seems reasonable, since there *is* a distinction in reality between that which a fiction refers to and that which a tensed sentence refers to. The difficulty for the presentist is cashing this out.

6.2 Formulation and the problem of change

However, the problems raised in 6.1 may turn out to be academic for the presentist, since it has been argued that there is no intelligible way to formulate the presentist thesis in the first place. In fact there are three distinct problems raised with the formulation of presentism. The allegations against presentism are that it cannot be coherently formulated in any such a way as to avoid either triviality or a contradiction, that it cannot be meaningfully distinguished from eternalism and that in order to define presentism one must begin with existent entities at times other than the present.

As we shall see the solutions that can be given by the presentist move us from one objection to the next, solving one problem, but only at the cost of inviting the next. Hence there appears to be a substantial problem for the presentist.

6.2.1 How to read ‘exists’

The problem is quite hard to see for it does seem that nothing could be more easily understood than the claim that nothing exists other than the present. Much of the difficulty for the presentist depends on how we read tensed statements (e.g. Grunbaum (1971: p. 205), Schuster (1968: p. 459)). If we read “exists” as tensed, then all that we say is that:

a) $\text{Exist}_{\text{tensed}} = \text{Only Present things exist now}^6$

which is nothing more than a triviality. Obviously if something is now, then it is now. and, more importantly, both the eternalist and the presentist would agree on (a), thus (a) does not distinguish presentism from eternalism and hence cannot serve to define presentism. Formulation (a), then, though true, is devoid of metaphysical interest for us.

If, on the other hand we read “exists” as a tensed disjunctive – such that we mean that for any entity x , x either has existed, does exist or will exist – then we commit ourselves to a contradiction since

⁶ My (a), (b) and (c) are identical to those offered, and considered, in Crisp (2004a, 2004b) and Ludlow (2004)

(b) Exist_{disjunctive} = Only present things existed, exist or will exist

is obviously false. For example, Crisp (2004a: p. 18) gives the example of the Roman Empire, which plainly has existed, but does not exist now and thus is not a present thing. Various readings of (b) commit us to one of the three following options, all of which are problematic. First, the presentist might choose to accept the existence of *x* as a past entity, such that there is an entity *x* that is past, and is present in the past. But this contradicts the core thesis of presentism, the claim that only the present exists. Second, the presentist might choose to deny that the Roman Empire existed, which again seems to be, at best, foolish, since the Roman Empire *did* exist. Failing either of these options the presentist might choose to say something like, “The Roman Empire *did* exist, now”. The advantage of such a move being that it seems to preserve the notion that only present things exist by claiming that whenever an entity exists, it does so now.

However, such a formulation is inadequate as a formulation of presentism as it fails to distinguish between presentism and eternalism. As Callender (2000)⁷ has noted, to say that whenever an entity exists, it does so now, does not serve to distinguish between eternalism and presentism because even the eternalist will agree that if an event is past, then it is “now” at whatever point in time it exists; this is simply a thesis upon which both sides would agree. And, on this reading, it does seem that (b) borders upon being a truism since (b) would be true even if one assumed that times other than the present existed. In order for the Roman Empire to exist it must be present on one of the disjunctive counts; that is, it was present, is present or will be present. Thus, this particular definition invites Callender’s (2000) objection that there is nothing in their definitions to separate eternalism from presentism since both agree that only those things that are present, exist (p. S589).

The third reading of the existential quantifier that one might offer, one supported by Ludlow (2004), though for different reasons, is that one might read exist as tenseless such that

⁷ See 7.2

c) Exist_{tenseless} = Only present things (tenselessly) exist⁸

The thesis that the presentist is driving at is obviously something like (c), since the desired claim is that our most liberal quantifiers range over all things and only those things that are present exist. In other words the presentist claims that the terms ‘present’ and ‘exist’ – whether tensed or untensed – are co extensional.

However, (c) runs into problems too. The presentist, in defining presentism as the thesis that the past and future *are not real*, appears to be defining those things that are real, i.e. the present, by referring to those things that are not real, i.e. the past and future. There appears to be a move to say something like the following from Prior: ‘... the present simply is the real considered in relation to two particular species of unreality, namely the past and the future’ (Quoted in Smith 2002: p. 123). But then the question due to Smith (2002: p. 123) arises, namely how is it that reality can be defined as standing in relation to that which is unreal?⁹

This problem can be cashed out in two ways. The first is to say that the presentist is giving a definition of the present in terms of the non-existent past and future, and the second is to say that the presentist requires there to be a metaphysical relation between the past and future in order to formulate their position. The second of the problems is fallacious, since it is possible to give an account of temporal relations that does not require the actual existence of the past and future. Such a reductive analysis is proposed by Craig (2000b: pp. 149-58). However, the first problem, the problem of definition, remains with us.

Here is the problem. Time is real. Things are past, present and future. We know what these terms mean and we know that there are things that are past and future. However, we must then commit to the claim that the present is to be compared to the past and future in order to see what kind of thing that it is. But if the past and future are not real then how are we to gain any further understanding of what is meant by present?

⁸ Provided one does not read the tenseless quantifier as a tensed disjunctive.

⁹ This is just as much a problem for the proponent of (b), e.g. Crisp, as it is for (c). The (b) presentist claims that the most unrestricted temporal quantifier ranges only over those entities that are present, and that those things that are not present are not real. In doing so it does seem that the presentist is giving a definition of the present in terms of the non-existent past and future.

6.2.2 Unreal Change

Oaklander (2002) has urged that presentism be rejected on the grounds that it appears to entail that change is unreal. Oaklander's concerns stem from the fact that any account of temporal relations (i.e. being earlier than or later than) appears to imply the existence of times other than the present and that an account of presentism that restricts the existential quantifier to the present moment appears to represent to us a static conception of reality. Oaklander argues (p. 75), that in the absence of persistence through time (time not being a thing at all according to the Presentist), the Presentist is in difficulty for they lack any *thing* that is changing. They must, Oaklander argues, look elsewhere for their account of change – though this too proves problematic.

‘But if only the present moment exists without qualification, then in order to generate change the presentist must introduce tensed propositions that change their truth value at different *times* depending on what exists *simpliciter* at those times as time passes. Of course, if a tensed proposition changes its truth-value at different times, then there must *be* those times at which the proposition changes, and in order to be the genuine *times* they must be members of a temporal series whose generating relation is earlier/later than. But if there exists only *one* time, the present time, then how can any time be earlier or later than another and how can a proposition or anything else *change* from *one time to another*? (Oaklander (2002: p. 75)

The problem being that in order to account for propositions about change, the Presentist needs existent times to which the propositions refer, to exist. Without times to refer to, it seems that there can be no such propositions and, hence, we cannot formulate an account of change. For example, if I were to say that an oar did have the property of being bent but has changed, then it seems that in order to describe this change the oar must exist both straight and bent in order for there to be propositions about the oar in both conditions. This problem can be met and in chapter seven I show how.

The final problem that faces the presentist, happily one that the classical presentist can rebut – though none has done so as far as I am aware – is due to

Schuster (1968). In constructing the presentist ontology, the claim that only the present exists, the presentist has argued that there are all of these distinct times, the past, present and future, but that only one of them – the present – is real. On what grounds can the presentist justify the rejection of the existence of these times when it appears that they have been included in the initial formulation?

Our point is just that temporally prior events have ceased to be. All existence is thus confined to the present moment, and it is this truth which is communicated by coupling the present tense with the expression, ‘the sum total of existence,’ in the statement ‘The sum total of existence at t^2 does not include E’ ...In other words, the [presentist] grants – he must grant – that things and events existed at prior times; and having posited such existents, he cannot then disregard them. He must find some way to deny their existence before he has any right to claim that nothing exists outside of the present moment, or before he can legitimately link the present tense to the expression, “the sum total of existence.” (p. 459)

Fortunately, the presentist can show metaphysical reasons to make the claim that the sum total of existence is to be limited to the present. It was suggested in chapter one that McTaggart’s argument forces us to choose between presentist and C theoretic (with temporality somehow infused) ontology’s. Since the latter have been rejected on the grounds that they are found wanting for the reasons detailed in chapters two through five, it follows that the presentist metaphysic is the only one remaining to us if we are to explain this time and temporality. Thus, the presentist has good reasons to suppose that the past and future are not to be included in an account of temporality, since theirs is the only solution which can solve the paradox.

There are two presentists in particular who have done a great deal to clarify issues concerning these problems, Quentin Smith and William Lane Craig. However, I shall not explore their proposals since these hinge on their ontological commitments and it is these commitments that are found wanting in 6.4 and 6.5 respectively. Obviously, what the presentist wants to do is to find some way of restricting the tenseless existential quantifier to the present without defining the present negatively in terms of the non-existent past and future. But what is unclear is how this is to be achieved, since time is taken to be that to which the temporal locutions of the A series apply.

6.3 SR

The third and final problem for presentism that will be considered here arises from the special theory of relativity. This is, arguably, the greatest problem for the presentist to overcome. As Saunders (2002) has it,

If presentism is a thesis about ontology, and says that existence consists of a three-dimensional spatial reality; if in elaboration of this thesis, it opposes the tenseless view of time, and denies that talk of events as past, present or future is elliptical talk about the relation of events to our momentary selves: then it contradicts special relativity. It contradicts it in the sense that it implies that special relativity is badly deficient as a fundamental theory of the world. (p.279)

The view that presentism is contradicted by the special theory of relativity is commonplace.¹⁰ To begin with, note that the special theory is standardly imbedded into a space-time. If such a metaphysical construction is accurate then presentism is ruled out *tout court* since all times exist. However, since we have found the means, in previous chapters, for denying that space-time is the correct means for conceiving of time, such considerations can be put on one side for a moment.

The more pressing issue for the presentist is the claim that there is no such thing as the absolute present, for although the imbedding of the special theory into the context of a space-time can be resisted, it seems rather harder to resist the claim that there is no such thing as an absolute relation of simultaneity across great distances and at high velocities.¹¹ If there is no such thing as a global hyperplane of simultaneity then it is hard to conceive of what the presentist means when she claims that only the present exists. At any point in time there cannot be a set of points that is to be called “the present.” Which events are present will depend upon the frame of reference that one inhabits. But that means that events that are present in one frame of reference will not be present in another frame of reference, which appears to imply the existence of times other than the present.

¹⁰ See variously, though not exclusively, Weingard (1969), Putnam (1979), Savitt (2000), Callender (2000) Sider (2001: pp. 42-52) and Saunders (2002).

¹¹ See section 3.1 and the presentation of the special theory therein.

Sider (2001: pp. 42-52) has done more than most in an attempt to explore the options for the presentist. He explores 5 hybrids of presentism that might each make a claim to be solutions to the problem for the presentist. Although, there is, he claims, no plane of absolute simultaneity, there are several features of the special theory that are of interest.

(1) the *absolute future* of p : the set of points that could be reached from p by a signal travelling at or below the speed of light; (2) the *absolute past* of p : the set of points from which p may be reached by a signal travelling at or below the speed of light; and (3) the set of points *spacelike* separated from p : those points that cannot be connected to p by any signal travelling at or below the speed of light. (Sider 2001: p.43)

From these three features Sider derives five hybrids.

Hybrid 1: Here-now-ism: only a single point in space-time is real.

Hybrid 2: Retain an arbitrary hyperplane and declare that *those* events are simultaneous with one another

Hybrid 3: The existence of a “point” p present, and the absolute past of that point: the set of points from which p may be reached by a signal travelling at or below the speed of light

Hybrid 4: The existence of a “point” p present, and the absolute future of that point: the set of points which may be reached by a signal leaving from p travelling at or below the speed of light

Hybrid 5: The existence of a point p present, and the set of points that are *space-like* separated from p

Sider then discusses the defects of each position.¹² Hybrids 3 and 4 can be ruled out since they are incompatible with presentism – they include the existence of the past and future respectively – and, in doing so, fail to provide us with a solution to McTaggart’s paradox. Hybrid 2 is, according to Sider, scientifically revisionary (p. 47) and so is to be tentatively rejected (p. 52).¹³

¹² I will return to hybrid 1 later since it is defended and explored rather more thoroughly by Hinchliff (1996, 2000)

¹³ In actual fact Hybrid 2 is *metaphysically* revisionary. The argument there turns on the claim that the metaphysical claim that rules out the existence of an “arbitrary” hyperplane is verificationist – if we

Hybrid 5 is interesting, though it too is to be rejected. Rather than supposing the existence of an absolute present we include the existence of all things that are merely space-like separated from a point p and those entities that exist at p . Sider's point against Hybrid 5 is that it, 'implies the existence of an implausibly distinguished point' (p.52). Surely the existence of just one such point in all reality is too arbitrary an addition to our scientific theories to countenance seriously? Perhaps, though, it might still be the case that Hybrid 5 offers us a genuine metaphysical possibility.

The greater problem for Hybrid 5 is that it is not presentism at all. Hybrid 5 is not presentism because it admits those things that might be earlier than or later than the point p . All that we are saying when we say that an event is space-like separated from p is that it is not possible for causal influences to propagate to p from the event in question, or from p to the event in question. This being so it should be clear that such a view is akin to an eternalist ontology, admitting as it does the existence of more than one time. Given the forgoing arguments in previous chapters concerning eternalist ontologies it should be clear why I do not favour such an interpretation of the special theory.

6.3.1 Here-now-ism

So far as I am aware no one has seriously entertained any of Sider's Hybrid's with the exception of Hybrids 1 and 2. Hinchliff (1996, 2000) has proposed and defended a variation of Here-now-ism. Hinchliff's account of presentism is motivated by a particular handling of the problem of temporary intrinsics and will not be discussed here. I will suppose that the arguments which he presents are sufficient to

cannot verify the existence of absolute simultaneity then it cannot exist. Arguments are presented therein to show verificationism to represent *one* metaphysical possibility. Since verificationism is incompatible with presentism – the only solution to McTaggart's paradox – verificationism does not represent a genuine metaphysical possibility. Since Sider's claim turns on the notion that, 'the present discussion will assume that consistency with something fairly close to current physics is a constraint that must be met by any adequate theory of time' (p.42), it follows that if metaphysics rules out verificationism then the scientific picture presented by Sider, and noted in 3.2, is open to revision from metaphysics since the metaphysics propounded herein rules out the metaphysics that supports Sider's contemporary science. Of course if science is about best explanations then there is no reason at all that the empirical implications of the special theory cannot be reworked to fall into line with presentism which is, I suggest, our best metaphysical explanation.

motivate presentism; even if they are not, then we have ample arguments here to do so.

The obvious advantage of here-now-ism over other theories which may require (apparently) arbitrary revision to our scientific theories is that fewer revisions are necessary. In arguing that only a single point in space-time exists – is real – the here-now presentist is still committed to thinking of space-time as little more than a convenient fiction.¹⁴ However, the here-now presentist does not have to revise scientific claims as to the lack of absolute simultaneity since all that exists, or at least all that we can talk about, is the here-now. Since here-now-ism is compatible with the claims made in chapter four concerning the nature of temporal experience and does not require scientific revision, here-now-ism is, *prima facie*, by far the most appealing of Sider's Hybrids.

However, here-now-ism will not do. There are three, related, problems that can be raised with the view: first, it is unclear how the here-now-ist will make sense of quantification – notwithstanding the problems raised for quantification mentioned above – second, truth appears to be denied to us and third, the view is so solipsistic I am unsure as to its actual coherence. The first charge, then, is that the here-now-ist cannot make sense of tensed quantification.

It is to be admitted by the presentist (supposing that they *can* make sense of trans temporal quantification) that a time, whatever that may turn out to be, will be something over which a tensed quantifier will range. Let us also suppose that quantifiers range over all times. Since according to here-now-ism only one point in space can exist, let us call this s_1 , quantification over spaces other than s_1 , say s_2 , can be shown to be impossible. Suppose that the point in space that exists, s_1 , is located in Hastings. This would allow us to claim that we can quantify over the Battle of Hastings in 1066, because we can define *what the time is* at Hastings.¹⁵ But suppose, then, that we want to be able to quantify over events in Durham in 1066; if here-now-ism specifies that “the present” exists only at the “here” of Hastings, then we cannot determine what the time is in Durham when it is 1066 in Hastings. Indeed, there is no fact of the matter as to what the time is in Durham when it is 1066 in Hastings. This

¹⁴ It may seem inappropriate to think of here-now presentism in conjunction with space-time at all, since such a conjunction seems to imply that certain regions of space-time – the non-here-now – exist, as space-time, but are not real. Unless the presentist wants to make use of some Meinongian distinction between existence and reality (c.f. Sider 2001: p. 46) the conjunction appears ill founded.

¹⁵ I am assuming that in order to quantify over something we must, at the very least, know either what time it is, or where it is.

would appear to rule out trans temporal and trans locational quantification completely since there *is* no here, nor any time, other than there here-now.

Second, it was claimed that here-now-ism denies us truth. It certainly denies us truth-makers for sentences about anything not located both at the here and the now, and supposing that we want to retain any version of, or variation upon, a correspondence theory of truth – truth as corresponding to some feature or other of reality – then we need existent entities to which propositions can refer. Here-now-ism, by denying the existence of everything other than a single point, denies itself the resources with which to say that any singular proposition about the most everyday occurrences can exist.

Finally, and on a related matter, here-now-ism is absurdly solipsistic. Savitt (2000) is too kind when he asks, ‘is it not at least a little discomforting to the presentist to restrict reality to just one point of space-time?’ (p. S568). It is not just discomforting, the view is bordering on the ridiculous. A theory which restricts itself to only a single point of existence can make little sense of reality, it lacks almost all of the resources to explain perceptions (of all kinds) and a technical account of truth or any other philosophical concept will be impossible. It is, to use the term as it was discussed in 4.2.3, a “silly” theory.

If the presentist is to find a theory that is compatible with the special theory, then the special theory must be reinterpreted so as to include the existence of absolute simultaneity. If the presentist cannot make this move then, as the discussions here have shown, the special theory *does* rule out presentism as a viable metaphysic.

6.4 Craig’s Ontology

In order to make sense of some of the problems mentioned above William Lane Craig has developed a particular strand of presentism. His solution to McTaggart’s paradox is ontological. He argues that the past and future are to be thought of as possible worlds, existing in the present. Obviously, if Craig’s arguments go through then we can refer to the past and future in the same way that we refer to possibilities and we can quantify in the same way that we quantify over possibilities. However, Craig’s view succumbs to a number of problems and his modal solution does not provide us with a genuine metaphysical possibility.

Craig has in mind a very particular view of possible worlds. He eschews the Lewisian notion, opting instead for Plantinga's (1974) account.

Following Plantinga, we may conceive of a possible world as a maximal possible state of affairs, where a state of affairs s is maximal if for every state of affairs s' , s includes s' or s precludes s' . (Craig (2003: p. 397)

In order to have temporal passage Craig notes that one must understand possible worlds tenselessly; to do otherwise would be to invoke McTaggart's paradox. As Craig has it,

So conceived, possible worlds and the states of affairs that constitute them are normally understood to be tenseless states of affairs; otherwise, we could never speak of events' occurring at different times in a possible world, since, as McTaggart's paradox discloses, there is no maximal or complete description of a temporal world over time owing to tensed facts. (p. 397)

Although there is nothing obviously problematic thus far a simple note on facts may be worth making: we might, perhaps, be wary of including tensed facts into our ontology. Indeed, it is not clear to me that we need to include facts into our ontology at all, let alone tensed facts. What we might say instead is that there are tensed sentences (propositions?), the truth of which may vary over time.¹⁶

It is to be noted that Craig's position does *prima facie* avoid the paradox as it does, in principle, deny the existence of the C series. However, as well as these tenseless states of affairs, Craig needs something else – something in virtue of which we may be justified in including tense. In order to achieve this Craig admits the existence of tensed states of affairs; the distinction between tensed and tenseless states of affairs lying in the fact that

A tensed possible world is a maximal possible state of affairs at some time t of arbitrarily stipulated duration, whether an instant, an arbitrarily brief moment, an hour a day, and so forth. (p. 397-8)

¹⁶ At any rate we should have to have good reasons for including such entities into our ontology.

At this point, then, it seems that we ought to raise a problem. What is the distinction between a tensed and tenseless possible world? Craig's clarification on this matter is less than illuminating.

To say that a temporal entity x exists in a tenseless possible world w is to say that if w were actual, x would exist (tenselessly) at some time t ; or again, x exists in w if it is impossible that w obtain and x fail to exist (tenselessly) at some time t . Analogously, to say that x exists in a tensed possible world w^t is to say that if w^t were actual, then x would exist (present-tensed). To say that x exists in a tensed actual world α^t is to say that when α^t becomes actual, then x exists (present-tense); it is impossible when α^t obtains that x not exist (present tense). (p. 398)

Recall our discussion of how to read tense in 6.1.1. Obviously we cannot read "exists" as a disjunction of tensed locutions or tenselessly, since to do so would fail to distinguish between a tensed and a tenseless possible world. However, to read "exists" as present tensed would fail to distinguish between tensed possible worlds and tenseless possible worlds that include only a single time.

If, for example, world w exists and is such that it includes only a single [tenseless] time t , then, it would be true both that it is impossible for w to obtain and x fail to exist [tenselessly] and for α^t to obtain and x not exist. Since such a possible world would be tenseless it is not clear that Craig's account of possible worlds is sufficient for him to proceed with a clear notion of what distinguishes tensed and tenseless possible worlds.

Further, it is not clear what makes these possible worlds *tensed* possible worlds. Craig's claim that to have been is just that – to have been – is insufficient here, for in order to be able to distinguish, in order for there to *be* any difference, between tensed and tenseless possible worlds, there must *be* some difference between the two. In other words, if some worlds are tensed and others tenseless, in virtue of what feature is this true? It is this that Craig owes us an explanation of. Without some account of the "tensing" feature of a possible world I fail to see how we can proceed.

Although I agree with Craig that all there is to saying that a past event is past, is simply to say that it has existed – that there is something irreducible about the notion (something I shall return to shortly) – if we are to distinguish between possible worlds, those that are tensed and those that are tenseless, then there must be some feature in virtue of which a tensed possible world is just that – "tensed". But the only

other candidates for this role, for “tensing” a possible world, are temporal relations or properties. Neither of these are available to Craig. Thus, at the very least, Craig owes us some account of what is meant by tense and whatever this is must then provide us with an account of temporality that is not prone to McTaggart’s arguments.

However, there is a further problem. Craig makes the following claim.

The actual world α is the maximal state of affairs that obtains (tenselessly). Were some other world actual α would not obtain, but would still exist as a possible state of affairs. Since only α is in fact actual, none of the other tenseless possible worlds is actual, but each one is actual in or at itself. Each world w has the property of actuality in w and in w alone. That also goes for α . But α is not merely actual in α ; in fact it is actual *simpliciter*. Thus, α is uniquely distinguished as *the* actual world, the one tenseless possible world that obtains. Analogously, each tensed possible world exists in each such world. The tensed actual world v is the maximal state of affairs that obtains (present-tense). Were some other tensed possible world actual, then v would not obtain, but it would still exist as a tensed possible state of affairs. Since v alone is (present-tense) actual, none of the other tensed actual worlds (not to speak of tensed merely possible worlds) is (present-tense) actual, though they either were or will be actual. Still, each tensed world, including v , is actual in itself. But v is not merely actual in v , but also actual *simpliciter*. Thus v is uniquely distinguished as *the* tensed actual world, the one tensed world that obtains (present-tense). (pp. 398-9)

I suggest that this is either inconsistent, paradoxical or leads to the collapse of Craig’s brand of presentism into eternalism.

If, at each tensed possible world that world is actual, then it is true to say at world y , irrespective of whether or not y is actual *simpliciter*, y is actual at y .¹⁷ However, at world y it is also true to say that world v is actual, supposing that v is present – actual *simpliciter*. If it is not true to say that world v is actual *simpliciter* at world y , then I fail to see what Craig is driving at, for to be actual *simpliciter* is to be actual irrespective of the perspective taken. But now consider the following: if worlds v and y are co-actual, that is, at world y both worlds are actual, then we have a

¹⁷ Note that even if Craig’s solution to McTaggart’s paradox is viable it still leaves us with the problem raised by Bourne (2002), discussed in 1.4.4, namely how to distinguish between present and *present*. One would simply recast the problem as one of how to distinguish between when one was actual at one’s own world and actual *simpliciter*.

problem. If world y is taken to be a tensed future possible world and v the present actual world, then we have a case whereby both v and y are actual.

But such a position is not a presentist position, for on this reading where both v and y are actual, the past, present and the future are actual. Further, given the above claim that both worlds are actual it would appear that we are going to encounter McTaggart's paradox as those things that are past, present and future will all be co-actual.

It may be objected that although world v is actual *simpliciter* and hence actual at world y , the fact that world y is only actual at world y precludes there from being a problem. It is only possible to generate an infinite series of hyper times (or McTaggart's paradox) if those things that are past, present and future co-exist in some manner. Since Craig's take on possible worlds denies that y is actual *simpliciter*, there is no sense in which v and y co-exist, at least not in such a fashion as to entail McTaggart's paradox. This 'solution' to the problem is intriguing. It means that for any occupant of the tensed world y , v is actual *simpliciter*, but only y is actual at y . Although this reading does not entail McTaggart's paradox it does entail a rather peculiar consequence; namely, that the present is actual in the future even though the future does not exist (at least not according to presentism)! For y may be actual at y whilst v is actual *simpliciter* and thus we can see that the future is actual at itself, at world y , and v is actual *simpliciter* for it is present. Hence y is actual at itself even though it does not exist according to presentist mantra.

Although I do not think that Craig's version of presentism is ultimately viable I do think that it is suggestive of the way forward. In Craig's presentism only the present is real – only those things that exist now exist at all. Craig's view is, then, a Hybrid view – it unites genuine becoming and possible worlds. But in light of the problems raised above I remain unconvinced by Craig's view.

The final problem I raise centres on the suspicion that Craig's view collapses back into eternalism – that the definition that he gives is inadequate. In any world α only α has the property of being actual, though in some other world φ , φ has the property of being actual. However, it might also be the case that as well as having the property of being actual at φ , φ is actual *simpliciter*. Thus, at α , although φ is not actual at α , φ is actual *simpliciter*. But this is just to say that at some time t a particular state of affairs is actual, but that it is actual in such a way as to distinguish t to itself, but that times other than t , e.g. t^* , also exist. So far as I can make out this is

simply eternalism dressed up in presentist language. Craig can object that times *other than the present* do not have the property of being actual *simpliciter* and, hence, are not concrete entities, and that *at* α we can distinguish φ from α (where φ is present – actual *simpliciter*) on the basis that φ is concrete where α is not. But I fail to see how this will work since *at* α , α *will* be concrete (otherwise it will not be actual at α) and φ will be actual *simpliciter* and so both will be concrete and actual.

6.5 Quentin Smith – Degree Presentism

Quentin Smith has argued, in various papers (e.g. 2002, 2003), for a position which he refers to as Maximalism, or Degree presentism. His claim is that although everything that exists does so presently, both abstract and concrete objects also exist exemplifying the monadic properties pastness, presentness and futurity (e.g. Smith (2002: p.126), thus distinguishing his view from the more familiar presentism as proposed by, e.g. Hinchliff (1996, 2000), Craig (2000a, 2004) Bigelow (1996) and Zimmerman (1998). In this section I wish to raise three problems for the view espoused by Smith; two metaphysical and one phenomenological. Considered as a critical whole these views should be sufficient to motivate a rejection of Maximalism. To further this analysis a brief explication of Smith's work is befitting and I shall concentrate my efforts on his most recent development of Maximalism in *Reference to the Past and Future* and *Degree Presentism*.

Being presently present is the highest degree of existence. Being presently past and being presently future *by a merely infinitesimal amount* is the second highest degree of existence... The degree to which an item exists is proportional to its temporal distance from the present (2003: p. 381)

Hence, for Smith, although only the present exists, there are clearly two senses of the term present: the sense in which the present is used to indicate the possession of a monadic temporal property and a second sense which is rather unclear. This second sense is worthy of explication since both metaphysical problems turn on how we might interpret this second order presentness. It appears to me that Smith means something along the lines of it being possible for the property of being present to be presently attributed to a particular entity.

I shall use a temporal term with a ‘one’ in subscript to denote first order temporality – time as denoted by first order monadic properties. e.g. $Past_1$, and a temporal term with a ‘two’ in subscript to denote second order temporality. e.g. $Present_2$. As I said above, although the precise nature of this $present_2$ needs to be elucidated further it seems possible to see what it is that Smith is driving at. Where I wish to use a temporal term as we might in common parlance I shall simply use the term, e.g. ‘present’. In the quotation above, note that it is possible for an entity to be “presently present”, that is, for the entity to somehow exist in the now, *in the now*. We may explicate this notion more clearly by noting that on Smith’s view an entity may be $Presently_2 Past_1$, $Presently_2 Present_1$ and $Presently_2 Future_1$. An entity may for example exist in the $Present_2$ with the monadic property of $Pastness_1$. In common parlance we might say that an entity would presently have the property of being present.

To further explicate Smith’s view we might note the following. Given Smith’s claim that an object is $Present_1$ precisely if it possesses the monadic temporal property of $Presentness_1$ this will surely lead to a contradiction since the temporal properties of $Pastness_1$, $Presentness_1$ and $Futurity_1$ are incompatible; for an entity may be $presently_2 past_1$ if it currently has the property of being past. If this is true, that an object is required by Maximalism to bear the properties of pastness, presentness and futurity, then Maximalism is clearly false.

However, Smith may reply that although the first sense in which the term ‘present’ is used in the above is to denote a monadic property, the second sense serves to indicate a form of ‘present’ which *is not* denoted by a monadic property; that this second use of the term ‘present’ – $Present_2$ – serves to indicate the state of affairs when an event e is $Present_1$. Such that when e is $Present_1$, e^* may be $Past_1$ and e^{**} $Future_1$, reality admits of the existence of only the $Present_2$ (as opposed to $Past_2$ and $Future_2$) which, at e , is defined as the time when e has the property of being $Present_1$, e^* the property of being $Past_1$ and e^{**} the property of being $future_1$. Thus e is $Present_1$ only when e is $Present_2$ and vice versa. Thus it appears that Smith can circumvent Craig’s criticism that his explanation of Presentness is vacuous (2003: p. 404).

Hence when Craig asks, ‘How can a substance that existed, but no longer exists, now possess properties?’ (Op. Cit) the answer is, clearly, that although, say, Plato does not exist₁, he does exist₂, where exist₂ is understood as the totality of existence (including those things that possess the temporal properties of $Past_1$ and

Future₁) at the point in time when e is Present₂. There just *is* another sense that can be attributed to the term 'present' i.e. Present₂. It is certainly a little unclear as to precisely what Smith means by Present₂, and I think that we might ultimately raise serious problems for Maximalism as the only way of cashing out second order temporality, e.g. time₂, appears to lead us into contradiction.

There are two metaphysical problems that I wish to raise with this view of time. The first is that it is unclear what precisely is intended by Present₂ and that the only plausible analysis that I can think of appears to entail an infinite regress of hyper times. The second problem is that quantification over times₂ appears to also entail a contradiction. Our first complaint, then, is that it is not clear what distinguishes second order temporality from its first order counterpart? If something is temporal₁ only in virtue of bearing an appropriate monadic property, then it is difficult to make the case for Maximalism. Although second order temporal properties would not necessarily entail a contradiction since it is not clear that, for example, the first order property of Pastness₁ is incompatible with the second order property of Presentness₂, it appears unclear precisely how we may refer to this second series as temporal.

If, in order to be Present₁, an entity must bear a temporal property of Presentness₁, then surely in order for an entity to be Present₂ it must also possess the temporal property of Presentness₂. However, if we are to refer to this second order notion as temporal, if Present₂ is to be a temporal term, then it must do something *temporal*. Smith remarks of the ontological commitments of Craig (2001) and Plantinga (1974) that the states of affairs which they make use of, 'must include some temporal component that makes it [a past tensed state of affairs] a past tensed state of affairs' (Smith (2003: p. 371). Likewise, then, for e to be Present₂, there must be some feature of reality in virtue of which e is Present₂. If we were to declare Presentness₂ a temporal property then this would appear to imply the existence of other temporal₂ properties. If Smith denies this then it is not clear to me what the addition of Presentness₂ adds to a state of affairs.

However, the Maximalist will only be able to incorporate passage through the continual acquisition and loss of temporal₁ properties, in virtue of a change in that which was Present₂. Hence, e is Present₂ when e has the property of Presentness₁, e^* has the property of Pastness₁ and e^{**} has the property Futurity₁ and what exists – what is Present₂ will change as entities change their temporal₁ properties. Thus there will come a time₂ when e^{**} is Present₂. The only way that I see open is to invoke a

further notion of Present – Present₃ – in which e is Present₃ if e is Present₁ and, hence, Present₂. But then we shall run into the same problem with defining what is meant by Present₃ as we did with Present₂ and so on ad infinitum. If there is no feature of reality, in virtue of which we may declare e to be Present₂ then it is unclear to me how, following Smith's schema we are to attribute Presentness₂ to reality.

This leads us onto the second problem: how we are to read the existential quantifier in second order presentness? The most likely move for Smith is simply to say that Present₂ is designed to act as a placeholder for what exists when e is Present₁, thus circumventing the problems raised for Maximalism above. I say that this route offers a solution, for if the Maximalist can use Present₂ as a placeholder for 'exists' then we have found the feature of reality in virtue of which we may attribute Presentness₂ which was lacking above, i.e. existence. However, the move to render Present₂ as a placeholder for what 'exists' when e is Present₁ will not do on the grounds that the various readings we may make of 'exists' are such as to imply a further contradiction. Smith himself distinguishes three different ways in which we may read the existential quantifier, two tensed and one tenseless reading (p. 377).

- (1) In one sense, it [the term 'exists'] is logically equivalent to 'has the property of presentness' (op. cit)

This reading will not help the Maximalist, for Present₂ then becomes a temporal property. If it is correct to treat second order temporality as a property, then, as we saw above, it would appear apt to include in one's ontology the second order temporal properties of Past₂ and Future₂ otherwise it is manifestly unclear what the property Present₂ is, since Smith argues that to have a temporal property is to add something to a state of affairs. Surely presentness may only be a temporal property of any order if it distinguishes those entities which bear it from those that do not, in other words if it attributes something different to an entity than "past" or "future".

Of course, as we saw above, once we acknowledge the existence of a complete hyper time₂ (e.g. past₂, present₂ and future₂) in which the change of the lower series time₁ is to be accounted for, we arrive back at the infinite regress of temporal series since we will need a further higher series to account for change in every lower series. Thus, the first reading of 'exists' does not appear to favour the Maximalist.

- (2) it [exists] can also be equivalent to ‘presently possesses some property’... If Jones now has the property of having been born 500 years ago, Jones presently possesses the property of having been born 500 years ago. Jones ‘exists’ in this second sense of ‘exists’, but he does not exist in the first present tensed-sense of ‘exists’ (op. cit)

Hence, if Present₂ itself means ‘presently possess some property’, then this must in turn entail the existence of a sense in which Present₂ is ‘present’ in some higher time series, i.e. is Present₃. This follows since the claim being made is that Present₂ means, ‘presently possess some property of present₂’. If temporality is to be considered in terms of monadic properties then the first ‘present’ in that quotation must also be a bearer of monadic properties, i.e. Present₃.

Of course if Present₃ is also to be declared Present in the sense that the existential quantifier is read in (2), then Present₃ must also entail a higher time series. Again this can be shown to be an infinite regress thus making temporal passage incompatible with Maximalism. Reading (3) fairs little better.

- (3) If ‘exists’ is tenseless it is in effect, disjunctively tensed; that is, it is equivalent to ‘has existed, exists, or will exist’ where the middle ‘exists’ is equivalent to ‘has the property of presentness’. If we say, ‘Socrates exists’, we mean that Socrates either has existed, or exists (presently), or will exist (op. cit)

The tenseless reading of the existential quantifier over temporality₂ implies the existence of all times₂. If all times₂ exist, *simpliciter*, then, again, one is committed to temporal passage occurring in some further time series – time₃. But once again, unless one can find some way of cashing out what is meant by a temporal predicate within a higher time series it is unclear how Maximalism will function. We simply return to the question of what kind of things Smith entails the existence of when he uses tensed temporal predicates. Of course all of these readings have been based on the assumption that Present₂ is merely a placeholder for ‘exists’ and it may be that Present₂ can, in fact, be cashed out in some other way which does not entail an infinite regress of temporal series, but Smith certainly owes us an explanation of how this is to function, for as it currently stands he appears to be prone to contradiction.

In each of the objections above it has been noted that a contradiction only arises only if one insists that temporal passage be incorporated. It would be perfectly plausible for one to construct a second order time series in conjunction with a lower order time series and not entail temporal passage. However, such a view seems difficult to motivate since it will satisfy neither the A nor B theorist.

The third problem that I should raise for the Maximalist is one from phenomenology. Smith claims, '[t]hat existence is degreed explains our phenomenological experience' (p. 381). Smith's argument turns on the claim that, '[t]here is a difference of degree and not of kind between the Present₁ and what is no longer Present₁ or not yet Present₁' (op. cit) [I have substituted Smith's 'present' with my 'Present₁' in the interests of clarity.] Smith argues that our inability to differentiate, precisely, the moment which is Present₁ from that which is infinitesimally Past₁ and Future₁ can be explained by Maximalism since there is only a slight difference of degree between that which is infinitesimally Past₁ or Future₁, and that which is Present₁. However, this phenomenological claim implies that we are unable to recognise the distinction between that which is significantly Past₁ and that which is Present₁.

But is this true? On Smith's account my experience of an event which is twenty minutes Past₁ *should be* qualitatively distinct from my experience of an event that is Present₁ (or at least only infinitesimally Past₁ or Future₁). But plainly this is not true. I may *remember* the event of twenty minutes ago, remembering being a polyadic relation (p. 378) for Smith, but that is also a Present₁ act. My objection is not that there are Past₁ events to which I do not have epistemic access to [e.g. the dinosaurs roaming the earth] despite the fact that they share the property of pastness with me, since the possession of a property is plausibly sufficient to render an entity unobservable. One might suppose that pastness is relevantly like spatial distance, if one becomes sufficiently past it cannot be seen. My objection, rather, is that there are events to which I *have had* epistemic access, such as my drinking a cup of coffee, that I do not appear to be experiencing now₂.

Of course, Smith will object that I am not experiencing the drinking of the coffee as a Present₁ experience, but as a Past₁, Present₂ experience (a presently past experience in common parlance). But in as much as Maximalism does explain our inability to distinguish between the infinitesimally Past₁, Present₁ and Future₁, it does not explain why I never have the experience of Presently₂, Pastly₁ drinking a cup of

coffee; all that I do have are memories of having drunk the cup of coffee in the past. If all entities exist with these gradations in temporal properties, in existence, then it should be the case that I have experiences of Presently₂, Pastly₁ or Futurely₁ doing things. Since I do not, it seems inappropriate to suggest that temporality is merely a composition of temporal properties for the view does not conform to our experience of reality. A similar line of objection is raised by Bourne (2002) to Tooley (1997) and McCall's (1994) Hybrid theories of time, as was noted in 1.4. Bourne's point is that we lack the ability to distinguish between times as *present* (metaphysically present) and present (present to the experience). He argues that it is a deficiency of explanatory power of both Tooley's and McCall's models that they fail to provide any way of distinguishing between the two uses of the term 'present'. One could raise this line against Smith too, since one's experiences will be Past₁, Present₁ and Future₁ within the same Present₂. The more pressing line seems to be the lack of Past₁ and Future₁ experiences, despite the existence of the Past₁ and Future₁ in the Present₂, particularly given Smith's claim that we *do* have such experiences which we assimilate into our specious present. Why do we not have other such experiences of events that are just a little more Past₁ or Future₁?

6.6 Conclusion

What we have seen, then, is that a theory of presentism must expand upon the rather meagre slogan "everything that exists does so now." However, it must do so in such a manner that does not engender any of the problems with formulation that were discussed in 6.1. The main problem seems to be that our definition of presentism tends toward the trivial or unravels into eternalism, or is absurd; either it claims that at every moment at which an entity is present, it is present, or it claims that past tense entities have never existed, which is false. Further, we have seen that the presentist faces problems in how exactly she is to construct true reference to other times and quantification over times past and future. If there are no entities that are past and future – which the presentist claims – then how is it that any reference can "correspond" to some state of affairs that will make it true? Similarly, quantification over times that do not exist should be seen, at best, as a peculiar exercise.

Possibly the most pressing problem for the presentist comes from the special theory of relativity. Each of the solutions put forward by the presentist was shown to

be in conflict with some feature of either our philosophical theory or scientific theory. Since McTaggart's paradox appears to require of us that we accept a presentist ontology we shall have to make sense of Hybrid 2 despite Sider's misgivings about accepting a theory that may be scientifically revisionary

At the current time we should note that presentism is not yet a coherent theory. Since it is not we have no coherent theory. What we need is some account of temporality that can make sense of these problems, both those with presentism and those raised by McTaggart. In the following chapter my goal is as follows. In Chapter 7 I will lay out an ontology which I believe is capable of meeting each of the philosophical problems mentioned in chapter six. I will not explicitly argue *for* the ontology. Since presentism is the only solution to McTaggart's paradox that accords with our experience of temporality, and each of the solutions surveyed (in brief) has been found wanting, any theory that solves these problems should be seen not only as a metaphysical possibility, but also as a good candidate for our *best* metaphysical solution to the problems raised.

Chapter Seven

In chapter seven I:

- *Lay out the metaphysical commitments of temporal minimalism (7.1);*
- *Argue that temporal minimalism can deal with the problems of quantification and reference raised in chapter six (7.2);*
- *Argue that temporal minimalism can be defined adequately and note the implications of this definition for accounts of persistence (7.3);*
- *Argue that the physics necessary for temporal minimalism to be true are compatible with current scientific findings (7.4);*

7.1 Temporal Minimalism

In what follows I lay out the ontology behind temporal minimalism and show how this deals with the problems mentioned above in chapter six. Key to this approach is the fact that there are two distinct ways in which we may think of time: as conventional and epistemic (the values that we attribute to physical states of change) or we may think of time as divided into the incompatible categories of past, present and future (for reasons given in earlier chapters I do not consider spatial understandings of time). Temporal minimalism denies the cogency of the latter view. It denies that temporality should be thought of in terms of distinct metaphysical qualities, and, in addition, it denies that we should think of time as akin to any sort of entity. In doing so, it provides an obvious solution to McTaggart's "paradox" since the core thesis of temporal minimalism is that we lack the materials with which to formulate the necessary arguments. It is not possible for an entity to have pastness, presentness or futurity since there is no such thing as past or future – nor, for that matter, is there such a distinct "quality" presentness.

The title "temporal minimalism" may seem to be overstating matters since the lack of what would classically be conceived of as temporal appears to render temporal nihilism more appropriate. However, there is temporal passage (of a sort) included in temporal minimalism. To be present is, according to temporal minimalism, merely to be simultaneous with that which exists. As the ontological commitments of temporal

minimalism are only to those things that can be said to exist in this “simultaneous with” relation, only those things that exist “now,” exist.¹

Note that this differs from traditional formulations of presentism in so much as classical presentism claims that the past and future are unreal. Temporal minimalism argues that, in the sense of reality being carved into metaphysically substantive categories, *time* itself is unreal. Time in the sense of being extended or including distinct ontological categories is unreal, although in arguing such I should not be grouped with McTaggart or Parmenides, with their claims as to the illusory nature of temporal passage, since the temporal minimalist will admit that things change. The claim is merely that there is no need for this to be cashed out in a metaphysically substantive – or spatio-temporally extended – fashion. Change, in this case, is simply to be thought of as change in the composition or location in physical things.

There are a number of points that need to be made in clarification. First of all temporal minimalism is appropriate as a name for the position inasmuch as the ontological resources committed to that are themselves temporal are just that, minimal. As we shall see later on, I do not hold that temporal relations need to be thought of in any very strong sense. In fact they turn out to merely be due to the conjunction of change, certain logical relations and natural laws. Thus, although it may be that the position is far from ontologically sparse, and may incline us away from certain other views (e.g. a temporal parts analysis of persistence), the view does not commit to the existence of temporal ontological resources, such as A- or B-qualities or relations etc. Indeed, it is only in the sense of not being committed to the traditional temporal resources that the view is minimal in any sense.

Second, it appears that that I have already committed to a gross assumption in stipulating an extremely close relation between time and change – a relation so close, in fact, that I am prepared to reduce time *to* change. The justification, if it can be called such, for the move lies in my arguments in chapter 5. Therein I argued that there is an unjustified assumption lurking at the core of what I called quasi-spatial understandings of time, that time is anything over and above mere change – that is, after all, the sum total of what we perceive. Since I was unable to locate any justification for time being anything more than change it seems sensible, at least at the outset, to see if we can get by with an account that does not stipulate time to be

¹ It should be noted at this time that I am referring here only to physical entities. The nature of propositions and other abstract entities is something that I discuss in detail below.

anything over and above mere change. This, then, provides my motivation for leaning away from substantival views of time.

Of course, there are strong arguments to the effect that time *is* something more than change – e.g. Shomaker (1969) – and these views do need to be thought through. Indeed, it may turn out that such arguments are ultimately fatal to Temporal Minimalism. But for now these will have to remain unconsidered. I shall beg the reader's patience and hope that Ockhamistic considerations are sufficient for me to define and defend the position without thinking of time as anything over and above mere change.

Third, and finally, I assume throughout the chapter that the motivation for the view is clear. Having shown why I do not think eternalist theories, of any ilk, are to be rejected, and having shown why presentism in its traditional guise is flawed, the view that I put forward is motivated inasmuch as it can provide answers to the questions that the other views cannot. It is an account that is both possible and, in light of its ability to answer the questions laid out, desirable.

7.1.1 Simultaneity

What I have said appears to imply that there is some other way in which things could have been, that it is possible for one entity to stand in a non-simultaneity relation to another. There are a number of points to be made. The existence of more than one time must be ruled out since, as has been argued previously, the TTT is inadequate, and we wish to avoid a B theoretic account for the reasons given in earlier chapters. What is being argued in Temporal Minimalism, then, is that there exists [tenselessly] a state of affairs or, in less loaded terminology, a set of physical entities *s*. However, this single [tenseless] set of entities *s* may change. It may undergo a change in composition or position. If *s* does change, then it must be that *s* gains some property not previously possessed by *s*, such that *s* is replaced by *s**. Since *s* and *s** are mutually exclusive, *s** having some property not possessed by *s*, only one of the two may exist. To make the point a little clearer, consider set *s* as the sum total of all entities where a rod *R* is straight, and the property * the property of being bent. If *s* exists then *s** does not, for *R* and *R** are mutually exclusive. Hence, *R* is not included in the set *s**. Let us suppose then, that set *s* is arranged such that *R* has a force exerted upon it instantaneously such that *R* gains the property *. This would mean that *s* does

not exist – for if s exists then s and s^* both exist, which they cannot, for R cannot both have the property $*$ and also lack it.

To see what time is let us also suppose that there exists another concrete entity in s . Our additional entity is a clock. If s exists our clock reads 5:00pm. For the sake of argument let us suppose that when R becomes bent, in other words if s^* and R^* exist, our clock reads 5:01pm – it too is prone to instantaneous changes of state! – then we are correct in saying both ‘ s exists at 5:00pm’ and ‘ s^* exists at 5:01pm’. But in this case to say that it is 5:01pm is to say nothing more than a particular physical arrangement has been realised – the arrangement where a clock is in the state of showing 5:01pm. Hence we begin to have some understanding of what time is in temporal minimalism.

One might suppose that if such a theory as temporal minimalism were true then existence and simultaneity would be coextensive. And such a supposition would be true. Those things that exist, do so now. However, this is not to say that existence and simultaneity are one and the same thing. Clearly the conditions under which one can say that an entity exists are not the same as the conditions under which one can say that an entity is simultaneous with an observation. To draw an analogy with mereology, although it is the case that a lump of bronze and a statue made from the bronze share the same composite parts, it is not clear that the two have the same identity conditions. After all, the lump of bronze can survive the destruction of the statue, whereas the statue clearly cannot survive its own destruction. In a similar fashion those entities in set s can survive the acquisition of some property $*$, but it does not follow that those entities in set s can remain simultaneous with s since the acquisition of $*$ creates a new set s^* , which constitutes the destruction of set s . Thus, the conditions for existence and simultaneity – although extensionally equivalent – are not the same. Hence, the objection made, that it is possible that there could have been things that are non-simultaneous, is quite right. This *could* have been the case. But, I suggest, it is not the case and this does not preclude us from being able to make sense of the simultaneity relation.

7.1.2 Time_e and Time_t

In what follows I want to argue for a two-fold distinction in how we should think about time. We are, as was intimated above, going to proceed on the assumption

that time is just change. However, there is a certain type of entity that we do not normally consider to be the object of change. I have in mind, here, abstract, possibilia, laws etc. We normally restrict change to the physical realm and, if it is plausible to proceed with time as nothing over and above change, then there is an obvious sense in which there may be a change in what there is in the physical – what I call the $time_e$ – where there is no change in such non-physical entities. However, there is a clear sense in which, even though the non-physical types of entity do not change, what exists *simpliciter* does change. Hence, we might reasonably speak of existing at a certain $time_e$ and at a certain $time_t$ – where $time_t$ is what exists *simpliciter*. However, more needs to be done to explain both concepts.

It appears from the account just given that the temporal minimalist's account will reduce all temporal discourse to tautology, which would be problematic. For example, it is possible for me to know that it is now 10:30, but for me not to know about some state of affairs that is included in the set s which is 10:30. I may not know, for example, that 10:30 includes Tony Blair having coffee. This point brings us on to an important distinction: temporal minimalism does not import any ontological importance to empirical time. In other words, the change that we perceive around us is not further characterised using metaphysical properties such as pastness etc. On the temporal minimalist account, empirical time, what I call $time_e$, is merely a particular arrangement of a physical state and is, by and large, conventional, whereas $time_t$ should be seen as constituting the sum total of existence.

In order for it to be correct that it is 10:30 it should be the case that a variety of physical states exist. The majority of clocks should report the numerical value 10:30, the sun should have risen. Further, we might expect the sun to occupy a particular position in the sky, the earth should be in some definite position with reference to the other planets. We might even communicate with people on the other side of the world to check that it was dark where they were and that the stars were in the position that we understand that they should be at 10:30 our $time_e$. But this is simply to equate “time” with a particular physical state and temporal passage with a number of changes which apparently stand in a regular relation to one another.

Hence, it is possible for me to know that the $time_e$ is 10:30 by making reference to my surroundings. And whilst I may know, locally, that it is 10:30 this merely means that I am aware of the physical state 10:30 in my immediate surroundings. As I suggested above, it *would* be a tautology to state *when* a clock

would have the property of showing 10:30, provided the clock was accurate of course.² Thus we may explain temporal discourse about the unknown by recourse to the further fact that not all of the physical state of 10:30 is known. For example, in a case where I ask what the time is, although I am aware of certain changes in myself and in my surroundings I am not aware of the sum totality of all changes in the universe. Nor, presumably, am I aware of the changes that have occurred in all accurate clocks, and it is this latter piece of information that I am asking for when I ask what the time is.

This distinction also leads to the potential bifurcation between $time_e$ on the local scale, so the arrangement of physical states within my vicinity, and $time_e$ on the global scale. In the latter case we might include entities in far-flung galaxies, the movement and change of which are not observable by ourselves. To complete the definition temporal minimalism also makes use of one further notion of time, $time_t$. To give a slogan, $time_t$ includes everything that exists, so set s of all physical entities and all non-physical entities as well. Most importantly there are still grounds for thinking of $time_t$ in terms of “the time”. For if time is nothing over and above change, then what exists will serve to determine what time it is, and although it is only entities that are in $time_e$ that change, it is still clear that entities that exist only in $time_t$ exist, and as such, serve to determine what time it is.

$Time_t$ is a difficult concept and is one worth pursuing further since its role is of central importance to temporal minimalism. $Time_e$, as I am calling it, is all that the temporal minimalist admits as assisting in the composition of temporality. There is no further sense to which we should consider things as temporal; not as past, present or future. In the perception of a hypothetical observer who can either see everything that exists (a God’s eye view perhaps), or one who can make use of arbitrarily fast signals, there will be one state of affairs, one $time_e$ on the global scale, and one set of abstracta exists. Thus we rule out any further characterisation of temporality. Now it may be that within that $time_t$ there exists a disagreement as to what the $time_e$ is. That is, any two clocks or physical processes can register different values and entities can change at different rates even though they are the sort of thing that normally change regularly with respect to one another. But, bearing in mind the conclusions entailed by chapter four, to the effect that the existence of the same entity at more than one time must be

² By an accurate clock all that is meant is that it is a clock that changes at the rate that one would expect with reference to other changes in $time_e$.

ruled out, such a time_t will be composed of only a single set of physical entities. Perhaps we might elucidate the notion further by defining any time_e as state of change, and time_t as the state of affairs that exists.³

In summary, then, if I were to be asked, “what time_e is it (on the local scale)?” I would be being asked for a detailed account of the various states of entities in my locale – such as clocks etc. If I were to be asked, “what time_e is it (on the global scale)?” I would be being asked for a complete account of the state of all physical entities. Finally, if I were to be asked, “what time_t is it?” I would be being asked to give a complete account of the state of all of the physical entities and the abstract ones too. As I have noted above, the distinction seems motivated precisely because the state of change determines the time and abstracta too are entities and, thus, in some sense at least should be thought of as determining what time it is – even if they themselves do not change.

7.1.3 Temporal passage

Above it was claimed that temporal passage was change in what there is in the physical. However, this appears to make temporal passage a very puzzling type of thing, most unlike the temporal passage of our perceptions. If, for example, there were to be no change other than some distant particle moving slightly to the left of its original position, we would not want to say that there had been temporal passage, for none of those things that exist around me have changed. And if none of those things have changed why would we suppose that the time has changed? As I see it, we have two disparate claims to reconcile here. On the one hand there has been a change in the universe, there has been sufficient change that traditional A theories would be required to say that what is present has changed. And this does seem reasonable, for presumably the state of affairs where the particle was to the right of where it is now is in the past. On the other hand we have our natural intuition about time which says that this is a rather puzzling state of affairs. The motion of some particle on the other side of the universe lacks the necessary influence to render a change in what time it is for us.

³ We know that there is no agreement as to what the time_e is on a global scale, due to problems of relativity, the numerical values attributed to the states of change in physical entities will never be the same if we take to frames of reference with an appropriately high difference in velocity.

One of the strengths of temporal minimalism is that it has the resources with which to deal with this problem. Although the time_t has changed, what exists has changed, to all intents and purposes the time_e (on a local scale) has not changed. On the temporal minimalist account there has been no change in the time_e on a local scale – all of our empirical reports as to what the time is will lead us to the conclusion that it is, indeed, still 10:30, unless we should somehow acquire access to this far flung region of the galaxy. Indeed, we might reasonably suppose that we should be entitled to say that it *is* still 10:30. But we can also add to this claim that what there is, time_t, has changed. Thus, what exists at that moment_t is not the same as that which existed before for what exists at that time_e on the global scale has changed.

Further, if there were to exist a physical universe that was non-spatially separated from this one, then we should also be able to provide intelligible responses to similar questions to the ones raised above. It very much appears that were such a state of affairs to exist, that the presentist is committed to saying that a change of state in one universe changes the state of affairs in the other, non-spatially separated universe – a conclusion that would be most perplexing. But, according to temporal minimalism we are required to admit that what there is, has changed – that it is no longer the same time_t (again “time” seems to be the wrong term here) – but that there has been a change in the global time_e in one of the worlds. Thus, if we consider world *w* and world *v* then we might have the following: world *w* is composed of three particles, as is world *v*. Suppose, then, that a fourth particle were created instantaneously in world *w*. We would want to say that there has been a change in what there is in time_t. Indeed, were the hypothetical observer to be able to observe both worlds somehow simultaneously then we appear committed to this thesis. However, we do not want to say that there has been any change in the non-spatially connected world *v*. According to temporal minimalism we can do just this. The time_e in world *v* has not changed at all, though the time_e in world *w* has. However, what exists before the perceptions of the hypothetical observer *has changed*. The state that includes two worlds and six particles, state *s*, ceases to exist at the point in time_t {world *w*} when the seventh particle comes into existence, the state in which there exist two worlds and seven particles.

7.1.4 Everything exists at time_t

It was noted in the formulation of temporal minimalism that a change from state s to state s^* required a change in what there was. In order to be counted as time_e this needs must be a change in concrete objects. However, I have also said that a time_t is all that exists tenselessly. Lowe (1998; pp. 96-98) rules out tenseless accounts of time, since, on his view, tenseless discourse serves to differentiate between physical and abstract objects, abstract objects being those things that we may refer to tenselessly. It would appear, then, that I am in something of a difficulty since the temporal minimalist has already used tenseless expressions to cover what exists and acknowledged the fact that this will change. How is the temporal minimalist to distinguish between abstract and concrete entities?

The answer lies, again, in the distinction between time_e and time_t. Propositions, numbers, universals and the like are, if they are to be admitted into our ontology, said to exist outside time_e, but in time_t (bearing in mind that time_t is composed by everything that exists [tenselessly]). Abstract entities form part of the set of s and thus must exist in time_t. However, because (all?) abstract entities are unchanging it will turn out that every set of s will exemplify these unchanging abstracta such that any time_t will include them. But this has the consequence of entailing that abstracta exist at times_t and thus that they may be referred to using tensed or tenseless terms.

There is nothing obviously contradictory about declaring that abstracta exist at times_t. Since the only temporal feature of the universe is the change in the set of s , and those changes consist in the changes in composition and location of physical entities, abstracta can clearly be defined as those things that are not prone to changes. Thus they are outside time_e and are distinct from physical entities. However, were time_e not to exist, thus were there to be no alteration in what exists (e.g. time_t), abstract entities would still exist. Indeed, abstracta could be all that exists. Even without time_e $2+2=4$. Admittedly, the temporal minimalist is committed to the claim that it *was* true that $2+2=4$ and that it *will be* true that $2+2=4$; but there is nothing obviously wrong with such claims. Granted, Lowe will want to say that the above claims are true in virtue of the fact that $2+2=4$ is tenselessly true, but there seems no reason that temporal minimalism need accept this, though the temporal minimalist *will* accept that $2+2=4$ *will be* true iff it turns out that $2+2=4$ when the designated future time_t comes to pass.

However, $2+2=4$ is true, it has been true, it will be true and it would be true even if $time_e$ did not exist. Of course, if $time_t$ did not exist – if nothing at all existed within the set of existing things, s ; then it might not be true that $2+2=4$: but that this is so is merely dependent upon the existence of the necessary abstracta.

7.1.5 Possibilia

The temporal minimalist endorses an account of “configurations of possibilities”;⁴ to be specific, timeless configurations of possibilities. Earlier on we defined $time_e$ as the physical state of affairs and $time_t$ as that which exists. Included in $time_t$ was $time_e$ (on a global scale) and all abstract entities. Thus, at $time_t$, we find all configurations of possibilities precisely because I take possibilities to be abstracta. Should it come to pass that what exists change then we would find the same set of possibilia in existence (for what is metaphysically possible is not contingent upon what time it is). The immediate problem to be raised for the temporal minimalist is whether or not this account makes use of some kind of ontological notion of passage of the kind imputed to Craig in 6.4. I argue that it does not, for on the temporal minimalist account, all that exists with regard to possibilia is the sum total of timeless configurations of possibilities. None of these configurations are to be distinguished from any other by any qualitative feature whatsoever, they are not, for example, “tensed”. In other words, there is no ontological feature of these possible worlds that either is, or accounts for, temporal passage.

Temporal passage is nothing more than a change in the $time_e$, so a change in the location or composition or location of material entities. Temporal minimalism is the view that passage is the continual change in $time_e$, and, thus, passage is the continual actualisation of these configurations of the possible. So the arrangement of a lump of bronze into a statue might be one actualised configuration at one $time_e$, and the dissolution of that statue into a lump might be another actualised configuration at another $time_e$. There is, then, no sense in which a change in $time_e$ relegates certain configurations of possibilities to a category of pastness, whereby they acquire a temporal property or relation. By including the existence of past and future abstracta,

⁴ My reasons for referring to configurations of possibilities rather than possible worlds will become evident shortly in 7.2.

along with all other possibilities, but not ascribing to them temporal properties, one avoids McTaggart's arguments. There is no such existent thing as past, present or future; merely configurations of the possible.

The highly controversial core of temporal minimalism is that what distinguishes past possibilities that were actual from past possibilities that were merely possible, are natural laws. Precisely, the natural laws uniquely specify a single set of configurations that include the whole of the way the world is, has been and will be. Hence, if it is true that the battle of Hastings occurred in 1066, then the configuration of the possible in which the battle of Hastings does occur in 1066 will be distinguished from a whole host of other configurations by the natural laws that obtain.

As I suggested above this appears highly controversial, and although this may be the case I should like to say one or two things in defence of the view. Firstly, although in stipulating that the natural laws uniquely specify a single set of configurations of the possible it is certainly to be admitted that there is a strong ontological commitment to be made, it is not entirely clear that this is very much stronger than that made by the B-theorist. For on a B-theoretic account, although it may not be *just* the natural laws that serve to determine what exists at particular times, it is still clear that there is a uniquely determined series of times that stand in permanent and unchanging relations to one another. Even though the B-theorists' commitment may not be to natural laws, they must clearly submit to some factor or factors that serve to uniquely determine a particular temporal series.

Second, in light of the arguments against eternalist theories of time and those levelled against presentism it might be thought that the commitment to such a controversial thesis might be worthwhile if it can solve the problems that beset our current best theories of time. With this rough sketch of the position given we must now see whether or not we should accept the view. So far in this chapter I have given the reader nothing by way of motivation for accepting temporal minimalism, for I have not shown that it has the resources to meet any of the objections raised in chapter six. It is to this task that I now turn. As I indicated at the outset of the chapter, much of what should be thought of as the motivation for accepting such strong metaphysical view comes from its ability to solve the problems noted with standard presentism in chapter 6.

7.2 Reference and Quantification

Within temporal minimalism it is perfectly possible to quantify over entities that one takes to be past entities as well as to make statements about the past and future that are true, even though the past and future do not exist. We will begin with the problem of reference since once this is dealt with the problem of quantification is readily dealt with too.

For the temporal minimalist talk of, and quantification over, the past and future is constituted by reference to and quantification over presently_t existing states of affairs. To explain this consider the following: it is true, or so we suppose, that the battle of Hastings was fought in 1066. The temporal minimalist breaks this statement down into three parts.

- (1) There exists [timelessly_e – i.e. independently of change in what there is at a time_e] a configuration of possibility p such that the battle of Hastings exists as a timeless_e possibility.
- (2) Were it to be actual it would have the physical arrangement of entities – the same global time_e – as that to which we would refer to as 1066.
- (3) Timeless_e possible configuration p stands in a “later than” relation to the timeless_e possible configuration currently actualised.

The existence of the possible worlds as timeless_e is intended to convey two ideas as was noted above: firstly that tenses are not applicable to possible worlds in the sense of conveying any properties and second that since possibilia exist without time_e, they are not to be conceived of as dependent upon physical states of affairs. If some state of affairs is a genuine metaphysical possibility then it remains such whether or not the time_e at which it could be instantiated as a physical possibility has passed. For now, then, note that a particular configuration would be “later than” another configuration where the two configurations stand in a logical relation such that one may be realised out of the other where the laws of nature remain unviolated.⁵

Now, note that the temporal minimalist would not accept that

⁵ I explain quite how these temporal relations are to be formed below.

Past $(\exists x)$ (x is the battle of Hastings)

Since this implies the past existence of the battle of Hastings when it remains unclear how past existence is distinct from present existence, such a view commits us to eternalism. Nor would they accept that

$(\exists x)$ Past (x is the battle of Hastings)

for the *de re* presentist it appears that we have the present existence of the past battle of Hastings, which again is not quite right; at least not on any presentist account that takes seriously both the desire to avoid McTaggart's paradox and the core thesis of presentism, i.e. that only the present exists. Instead, I think that the temporal minimalist *might* accept something like the following:

(x is [timelessly_e] the battle of Hastings) - e.g. a configuration of the possible

And that,

$(\exists x) \neg$ (x is the actual battle of Hastings)

But that

$(\exists x)$ (x is the battle of Hastings) – e.g. a configuration of the possible, and $(\exists y)$ (y is the present – at whatever moment this is read) and x is earlier than y.⁶

That this is so is an unchanging fact concerning the laws of nature and the configurations of possibilities that timelessly_e exist. Of course since time_e, the time which we give numerical value to, is given in terms of the physical state instantiated (for example, 2pm being nothing more than the physical state realised where clocks agree in the location of their hands), to say that the battle of Hastings occurred in 1066 is to say that the physical state of affairs that we take to be equivalent to 1066 occurs [tenselessly] at the same time_e as the actual battle of Hastings. Assuming that

⁶ Recalling, of course, that configurations of the possible exist at times_t.

“1066” is not taken to refer to the global time_e, or that we can give some account of the time_e at which the Battle of Hastings occurs without referring to the Battle of Hastings, and that it is not necessary to take the Battle of Hastings to be a necessary constituent of 1066 itself, questions as to the date of the Battle of Hastings are not tautological. Now, how does this deal any more successfully with problems of reference than the options discussed in 6.1.3?

The problem of reference that was laid out claimed that there was a lack of propositions about non-present (hence, non-existent) entities. The sentence

(4) dinosaurs roamed the earth

though undoubtedly true, does not pick out any proposition as there are no dinosaurs and, hence, no propositions *about* dinosaurs. But, of course, in temporal minimalism there *are* dinosaurs that exist in the present_t; they exist in particular configurations of metaphysical possibilities, though they do so outside the realm of change, e.g. time_e. Hence, since dinosaurs exist so do propositions about them.

But the question remains, how is it that we can achieve trans temporal reference to future and past states of affairs even given this timeless set of possibilities? We achieve trans temporal reference by successfully referring to some existent possibility that stands in a relevant B theoretic relation to the possibility that is instantiated. Hence, if the configuration of physical entities that exists now is identical to the possible set of entities *a*, then the configuration *a* is earlier than some other, say *b*, if the possible set of abstracta, *a*, stands in an earlier than relation to set *b*.

Temporal relations of the B series, earlier and later, can stand between relevant configurations of possibilities in virtue of the laws that relate the states of affairs in one configuration of the possible to the states of affairs in another as was noted above.⁷ If there were no time_e then it would still be the case that the various configurations of possibility that exist in time_t would stand in logical relations to one another, in much the same way that McTaggart suggested that entities in the C series stand in the relation “more inclusive” and “less inclusive”. The existence of change in the actual world is sufficient to entail that the relationship between the configurations

⁷ My reasons for referring to configurations of possibilities rather than possible worlds will become evident shortly.

of possibilities is temporal, although this is only a contingent fact about our reality; were there to be no change there would be no time_e and, as such, there would be no time at all and no temporal relations obtaining between the configurations of possibilities – though there would still be the logical relations mentioned above. In other words, rather than taking the A series to add anything to the C series to make it into the B series, I take the change in composition and location of physical entities to be sufficient to alter the essentially logical relations of the C series into B theoretic relations.

Thus, one configuration of possibilities will be “later” than another, if there are certain types of change that are required to take place between configuration *a* and configuration *b*, such that *b* comes after *a*. Now, if we can relate these metaphysical possibilities to one another, my B theoretic relations, then we can also generate A theoretic statements in the actual world based on the temporality of these configurations. Hence, “Dinosaurs *did* roam the earth,” is true iff the possible configuration currently instantiated as the actual is related to the configuration of the possible in which Dinosaurs *did* roam the earth by the relevant laws of nature. We may never know which of these configurations of the possible *was* instantiated, but that does not prevent one of them from *having been* instantiated. And thus, since there is genuine change in the world – precisely because change in the physical *is* time – and we have B theoretic relations between configurations of the possible acting as truth makers for tensed sentences. It is not entirely clear whether temporal minimalism favours a tensed or tenseless account, but given my arguments in chapter two that ought not to be seen as a problem. In essence, then, temporality is achieved through the union of change in the physical and the ordering relations in the metaphysically possible.

7.2.1 Configurations of possibilities, not possible worlds

Now we come on to the distinction between configurations of possibilities and possible worlds. The distinction between the two is as follows. A possible world is a maximally consistent state of affairs. A configuration of the possible entails an ontological commitment to the existence (in the sense described by Williamson in chapter two) of possibilia, and the arrangement of said possibilia into a particular configuration. Hence, the configuration of the possible arranged in such a way as to

represent the actual state of affairs at this moment, would include a possible Jonathan Tallant, a possible computer, a possible chair and a possible desk; all arranged into a particular configuration within some possible space.

We should prefer this account to the possible world account simply because it entails an ontological commitment to fewer entities. A possible world account *is* plausible and does represent a metaphysical possibility, but, being as parsimonious as possible, it seems that we ought to limit the number of entities that we postulate. To give an example, suppose that Charles and Elizabeth are playing a game of catch. Let us revert, momentarily, to a possible world account. In world *w* Elizabeth throws a ball to Charles and Charles catches it. Now, let us also suppose that in world *y* Elizabeth throws the ball, but that Charles does not catch it. There are clearly at least two physical possibilities if we hold Elizabeth's throwing the ball as fixed.⁸ In a possible world account we have to suppose that there are two possible worlds, with the entities such as Charles, Elizabeth and the ball duplicated across both worlds. However, on the configuration account there is no such need. The configuration *w* is composed of the possible Elizabeth who throws the ball, the possible ball that is thrown, and the possible Charles who catches the ball. Unlike world *y*, configuration *y* is composed from the same metaphysical possibility of Elizabeth and the ball. The only numerically distinct entity that is required is the Charles of configuration *y* who does not catch the ball.⁹ In other words, Elizabeth, who throws the ball, and the ball itself, only L-exist once – at least within this context. Charles, on the other hand, must L-exist twice, once where he catches the ball and once where he drops it. But this is quite simply to entertain the existence of one more entity – e.g. a second L-existing Charles – rather than a whole other possible world.

Thus if we return to the account of reference to be given by the temporal minimalist, we might say that when Bob says that, “‘Charles will drop the ball’ is true” Bob refers to the proposition which picks out configuration of possibility *y*, and says that this stands in a later than relation to the configuration of possibility *w* that mirrors the current, actual, state of affairs. Moreover, Bob also claims that *y will be*

⁸ Obviously, if Elizabeth's throwing the ball is held fixed then there are a huge number of physical possibilities that could ensue.

⁹ There are other reasons for holding such a view of modality, reasons given by Williamson (1998,1999). I find his reasons persuasive – though I lack the space to explore them here. My choice of the fewer entities motivation herein should be seen, in part, as a response to Loffler's (1998) claim that Williamson's ontology is too complex. In fact, as I see it, it is less complex than modal realism since it requires the existence of fewer entities.

the state of affairs that comes to pass in the actual world; this will be true *iff* *y* does come to pass. But this solution does not deny us the existence of propositions about past and future entities, because our propositions turn out to be about presently existing entities that stand in very peculiar logical relations.

It might be supposed that we have a potential problem if the sentence we are to make sense of is

(5) actual dinosaurs roamed the earth

Obviously there are no propositions about presently existing actual dinosaurs, possible dinosaurs yes, but not actual dinosaurs. What the temporal minimalist must do, I suspect, is claim that (4) and (5) are committed to the ontological implications of (6)

(6) dinosaurs actually roamed the earth

which is to say nothing more than there exists at time_{*t*} possible dinosaurs, and that these dinosaurs did roam the earth. More precisely, if it is true that dinosaurs roamed the earth, then the configuration of the possible in which dinosaurs do roam the earth, will be distinguished from a whole host of other configurations by the natural laws that obtain, and we are entitled to say that this relation is temporal because of the conjunction of change and the logical relations that obtain between these configurations of the possible.

However, parts of what I have said here is largely irrelevant to my case, one could construct temporal minimalism just as efficiently using a possible world account of modality, I simply prefer the configurations approach. Once again, I am assuming the motivation for accepting these strong metaphysical positions stems from the ability of the position to deal with problems that B-theory and presentism cannot.

7.3 Defining temporal minimalism¹⁰

Although in 7.1 I gave a brief statement of the ontology behind temporal minimalism I have not yet met the problems raised in 6.2, how to define temporal minimalism successfully (as a form of presentism) without engendering either triviality or falsity. I shall endeavour to deal with these problems here. I shall also have something to say about the problem of change due to Oaklander (2002), discussed in 6.2. In our discussions in 6.2 it was noted that the most obvious move for the presentist to make is to restrict the tenseless existential quantifier to the present without negatively defining the present in terms of the past and future.

7.3.1 No temporal categories

The first thing to remind ourselves of, then, is that temporal minimalism does not acknowledge the metaphysical cogency of the division of reality into ontologically relevant temporal modes, categories or properties. However, before we proceed I must say something more about the nature of the “present” within temporal minimalism and the nature of the simultaneity relation mentioned in 7.1. We can define it positively.

P: if x exists as a physical entity, then x is a member of s , the set of all physical entities, and x will stand in a simultaneity relation with all other members of s .

No mention has been made of tense; indeed, in order to make this definition adequate we must suppose that the existential quantifier is read as tenseless in the above. We have not declared that the existential quantifier ranges over times other than the present; rather, that those entities that exist stand in a simultaneity relation. Nor have we declared that the existential quantifier ranges only over the present thereby reducing p to a tautology. Thus, p delineates only a single set of physical

¹⁰ Some of the arguments here are drawn from my ‘Formulating Temporal Minimalism’, though it should be noted that in the previous work I do not cash Temporal Minimalism out with the use of the distinction between time_e and time_t .

entities – those that stand in a simultaneity relation to one another – and thereby implicitly rules out the existence of those entities that are not simultaneous with p .

However, \wp may appear to run into the following problem. If, as I say, \wp delineates a single set of physical entities, and does so tenselessly, then surely we have one of the two following choices to make. We could read the tenseless quantifier disjunctively, as in (b) above, and thereby prove \wp false, or we can read it as (c) above. But if we read it as (c) then we do, as Crisp notes, appear to be saying something along the lines that ϕ is true “outside time” in some sense.

But this is no real problem for the temporal minimalist since I would agree that configurations of possibilities *do* exist outside time_e, at least inasmuch as they themselves are not a part of time.¹¹ There being no “thing” that is time, it is quite possible that the tenseless quantification over all those things that exist include only one set of physical entities that stand in a simultaneity relation to one another.

Note then that the temporal minimalist is not prone to either of Smith’s (2002) objections.

The main founder of solipsistic presentism, Prior, tellingly defines it in an implicitly self contradictory way, a way endorsed by Craig, Zimmerman and other solipsistic presentists. Prior writes, ‘... the present simply is the real considered in relation to two particular species of unreality, namely the past and the future.’ (Prior, 1998: p.80). If the real stands in relation to the unreal, the unreal is real, since only something real can stand in relation to something...

And that,

Further there can only be multiple species of real things; unreality cannot be differentiated into ‘two particular species’, (p.123)

First, the temporal minimalist denies that there are any metaphysical categories of temporality. The real is not standing in relation to anything unreal, since we are not imputing reality to the ‘present’, only to that which exists. That which exists is then said to be present only in so much as it stands in a simultaneity relation. Of course one

¹¹ The nature of the simultaneity relation at a time_e must, then, be something like the observations of a hypothetical observer of the sort mentioned below in 7.3.2 or as what would exist according to an observer who could make use of arbitrarily fast signals.

of the features of temporal minimalism is that everything that does exist *does* stand in precisely that relation, but this is only a contingent fact about reality. There are configurations of possibility in which possible people exist located (*a la* eternalism) at different times, but perhaps in these configurations the people will lack our experience of temporality. Second, there is no obvious need for the temporal minimalist to include within their ontology anything other than one species of unreality. All that has been argued is that there is a single set of existent (physical) entities and that these entities stand in a simultaneity relation. The past / future distinction is, after all, to be grounded on the earlier / later relation.

7.3.2 Can temporal minimalism prove distinct from eternalism?

Callender asks us to consider the following:

Consider a four-dimensional manifold of point events, each having a unique spatial and temporal position. It will be useful to imagine each event carrying a lightbulb that we can switch on or off. For the moment, when a lightbulb is on we will say that the event *exists* and when it is off that it *doesn't exist*. The existing universe's size, duration, and topology will depend upon which lightbulbs are on. (p. S587)

With this in mind Callender represents the eternalist view thus:

The traditional tenseless view of time known as *eternalism* states that all the lights on our four-manifold are on... Temporal relations are relations among existing events...*presentism* pictures the four-manifold as foliated via an equivalence relation, simultaneity, and time as the one-dimensional linearly ordered quotient set induced by simultaneity. (p. S587)

He then claims that,

presentists about time say lightbulbs that are off don't exist. If the bulb is off, *it ain't*. Only light bulbs that are on exist, which is, unfortunately, precisely what eternalists maintain. Both theories agree at t_{n+1} that the light was on at t_1, t_2, \dots, t_n and that there was, is, and will be no time at which the light exists and is off. Where is the disputed fact of the matter? (p. S589)

Callender seems to feel that what he perceives as a lack of a genuine distinction between the presentist and the eternalist provides the presentist with a problem (pp. S587-9). Such a view seems mistaken since if there is a lack of a difference between the two positions and this lack of a difference is a problem for presentism then it is surely a problem for eternalism too.

However, it should be noted that there is an obvious difference between temporal minimalism and eternalism. Eternalism is prepared to treat time as something substantive, perhaps as extended in space-time, a view which the temporal minimalist is not prepared to accept. Equally, eternalism implies that were there an hypothetical observer capable of somehow, “looking in” on reality that they would see all light bulbs existing and lit. But this is something that both the presentist and the temporal minimalist deny. In the closest possible world where some such observer exists, what that observer would perceive would be identifiable with what we would call t , or t_1 etc.¹² It does not matter for our purposes whether or not the observer exists in the actual world since we are merely arguing over what is available for perception, not what is perceived. Hence, our observer would see only those light bulbs that are at say, t , and the light bulbs would appear to be lit. This obviously leads us on to question how the temporal minimalist will read the term “is” since part of Callender’s criticism of presentism in general is that the distinction between the tensed and tenseless reading of the existential quantifier is one which leaves both sides dissatisfied since we lack any method with which to decide between the two readings.

However, I think that we can show otherwise. The temporal minimalist reads ‘is’, reads the existential quantifier, as tenseless, such that everything that exists [tenselessly] is ranged over (option (c) mentioned in 6.2). However, since the temporal minimalist denies the reality of time, of the ontological distinction between the past, present and future, this is perhaps unsurprising: for the temporal minimalist will not concede that there is anything other than that which exists at the moment at which the token of ‘is’ is coined, or the existential quantifier is employed. Thus, I would reject Callender’s claim that,

¹² Hestevold and Carter (2002) adopt a similar strategy. They argue that presentism is to be defined in terms of what exists *simpliciter* (pp. 498-501). However, it seems to me that their formulation is just as prone as those that have gone before to questions as to *when* an event or state of affairs exists.

The presentist relies on a tensed theory of truth and a tensed reading of the existential quantifier. Truth and existence at t is only assigned to state of affairs at t . Not surprisingly, according to the presentist, it's not true at t_1 that the lights at t_2 are on. By contrast, the eternalist relies on a tenseless theory of truth and of the existential quantifier, where the truth and existence at t is assigned to state of affairs omnitemporally. According to this rule, it is true at t_1 that the lights at t_2 are on. Since there are no convincing reasons to adopt one or another interpretation of truth and/or the existential quantifier (so far as I can see), there is no way to decide which rule is correct. Left at this, the debate seems merely over whether we ought to use our predicate 'is true' to describe present events or whether we ought to extend it to non-present events too. (S589)

I would reject it on the grounds that there are metaphysical and phenomenological reasons for rejecting the metaphysical core of eternalism (chapters three to five) – that more than one time exists *simpliciter*. Temporal minimalism is prepared to admit that more than one time_e exists on a number of distinct local scales, but that only one time_t exists.

7.3.3 Change

In section 6.2 we saw that

if a tensed proposition changes its truth-value at different times, then there must *be* those times at which the proposition changes, and in order to be the genuine *times* they must be members of a temporal series whose generating relation is earlier/later than. But if there exists only *one* time, the present time, then how can any time be earlier or later than another and how can a proposition or anything else *change* from *one time to another*? (Oaklander (2002: p. 75)

In other words, the presentist's solution fails because she lacks the ontological resources to give a full account of change. But the temporal minimalist can, I think, avoid the problem raised by Oaklander. A tensed proposition will be true at a time_t in virtue of some particular state of affairs at a time_e. Since more than one time_e exists, in the sense that more than one configuration of the metaphysically possible exists, it is possible that an event be later than another, and, hence, that the truth of a

proposition change from one time_t to another. Hence, because the temporal minimalist can make use of the B theoretic relations earlier than and later than, they can circumvent the problem.

7.3.4 Persistence

I do not want to say too much here about persistence through time. However, there are one or two remarks that are apt. Firstly, persistence “through” time does not literally happen. Time is not a “thing” or a number of ontological categories through which we pass, rather time is change. When we say that time passes, what we mean is that things change, that is all. There are two separate arguments that go together to formulate my claim that if temporal minimalism is true, entities must endure as opposed to perdure. First, where endurance is defined as an entity persisting through time iff it is wholly present at each moment at which it exists, and perdurance is the claim that an entity persists through time by having different temporal parts located at each time that it is said to exist, it appears that perdurance is in trouble from the off. Under a perdurance scheme identity is from “the top down”. One of my temporal parts is identical with me and part of the same whole as another part, iff it is part of the same whole. But, as Oaklander (1992) has pointed out:

if a whole is something distinct from its presently existing part and is the aggregate of all its parts, then it does not exist at any one time and so cannot, in any literal sense, move from one moment to the next as, according to the tensed theory, it must. (p. 82)

Drawing the analogy between spatial and temporal parts Oaklander argues:

If A is the sum of a, b, and c, and only a and b exist, then A cannot exist. Similarly, if a temporal whole, W, is a succession of temporal parts p₁, p₂ and p₃, and only p₁ and p₂ exist, then W (in the sense of the whole) does not exist. And if W does not exist at any one time, then W cannot be said to literally move from one time to another. (pp. 82-3)

Thus, there appear to be good negative arguments to the end that temporal parts

analyses will not hold in conjunction with a temporal minimalist ontology.¹³ This conjunction between temporal minimalism and an endurance account of persistence seems appropriate as I claimed earlier. Theodore Sider (2001) makes, what I think, is a compelling case for perdurance accounts (provided, of course, one is prepared to deny presentism) where they are conjoined to eternalism. Indeed, where we are invited to think of time as “like space” in the eternalist fashion (c.f Sider 2001: p. 224), and as standing in the permanent relations of “later-than” and “earlier-than”, the eternalist claim that at each moment at which an entity exists it is “wholly present” can obviously be seen to be possible, but surely it is now to be seen as unmotivated. In any case, since temporal minimalism appears our best option, so too, does an endurance account of persistence.

7.4 The physics necessary for Temporal Minimalism

If temporal minimalism is to be accepted then, as it is a form of presentism, it must find some way to circumvent the problem raised by the special theory of relativity which was laid out above in 6.3. To recapitulate, briefly, the problem is that the special theory seems to imply that there is no preferred frame, there is no single frame from which we can say, at any given moment, “this is how reality really is.” Instead, how reality is depends upon the velocity that one has with respect to other entities in space-time. If there is no single “right way” of viewing reality then this would appear to rule out presentism on the grounds that, at any one moment, there really is no correct description of reality; rather, there are as many correct descriptions as there are frames of reference. Furthermore, each description of reality that can be made from each different inertial frame will imply the existence of some other hyperplane, such that it appears that times other than the present exist. What is present in one frame may be past or future in another. Only the “here-now-ism” discussed above (6.3) appears able to reconcile itself to this claim without further entailing that presentism is false.

Since it was argued (6.3) that “here-now-ism” is an unattractive option for the presentist, and hence for the temporal minimalist, we must, instead, choose a different option. But what are the options? Really, as was noted in 6.3, we have only one

¹³ It should be noted that Brogaard (2000) believes that a temporal parts analysis is compatible with a theory of presentism.

option. We must opt for something like Sider's Hybrid 1. All that is needed for presentism, and hence temporal minimalism, to be a viable theory, is that we can postulate at least the possible existence of an absolute frame. Since this can be established through metaphysical revisionism, as was argued in 6.3, the revisions that follow are acceptable.

There might remain a nagging concern that simply establishing the logical possibility of an absolute frame is insufficient to establish the plausibility of the view. One might object that simply because theories of creationism stating that the world was created in 4004BC are logically consistent with the evidence, does not mean that we should endorse creationism. Likewise, it might be objected that simply because temporal minimalism does not logically contradict the special theory does not entail that temporal minimalism is correct.

Despite this concern I still think that temporal minimalism is motivated. After all, what is motivating the view is that it can deal with the various problems noted with B-theory and presentism. As a species of presentism, and in the absence of a verifiable absolute plane, it seems that the best the temporal minimalist *can* do is to show that their view does not contradict the findings of science. To be accepted temporal minimalism will have to rely upon metaphysical motivations found in its ability to deal with problems that other theories cannot. And, since what is being suggested is a metaphysical, rather than physical, revision to the special theory it seems that motivation from metaphysical considerations ought to be enough.

7.4.1 The use of the absolute frame

In stating that the special theory denies the existence of the absolute frame the foe of presentism is able to create the following worry for the presentist. If there is, truly, only one moment that exists, why is it that different inertial frames appear to report that the constituents of that moment differ according to one's velocity? The general picture that the presentist wants to create of there being, literally, a "God's eye view" on proceedings seems to be a natural, and desirable, consequence of any particular view. In using relativity to deny that this is so, the foe of presentism obviously causes some consternation. But, if the presentist can find some way of disputing the relativist claim – that there *is* no absolute frame – then we have no problem. What is needed is not a claim that there really is an identifiable absolute

frame, merely an argument to the effect that one cannot prove that there is no absolute frame. If it is possible that there is an absolute frame then temporal minimalism is viable, and, given the forgoing arguments against static theories of time and the allegedly contrived nature of the space-time explanation, there is, or so I contend, sufficient evidence to motivate a preference for a form of presentism over theories of space-time. And of course, the existence of an absolute frame, a single true picture of how reality really is *at a moment*, is all that any theory of presentism – hence temporal minimalism – requires. The question, then, is how does the presentist reject the claim that there is no absolute frame of reference?

7.4.2 How to establish the possibility of the absolute frame

Consider the following statement of the argument from relativity against presentism:

SR(a):

- SR(a) (1) The special theory is empirically verifiable and hence correct
- SR(a) (2) The special theory implies ontological commitments that contradict presentism
- SR(a) (3) Presentism is demonstrably false

The fact of the matter is, as we shall see, that there are empirically equivalent theories to the conventional interpretation of relativity that are, of themselves, preferable to the conventional interpretation of relativity. This, coupled to the claim that any static theories of time are of dubitable worth, recommends such theories. These theories (C.f. Craig 2000b: chapter 5), are neo-Lorentzian theories, and if we can prove them viable, entail that SR(a) is incorrect. Instead we ought to replace SR(a) with,

SR(b):

- (1) The empirical findings associated with SR(a) are verifiable and hence correct
- (2) The empirical findings associated with SR(a) are inconclusive as to whether Neo Lorentzian theories, or Einsteinian¹⁴ interpretations are true
- (3) Presentism is false

¹⁴ The Einsteinian interpretation of SR is merely the conventional interpretation that denies the existence of the absolute frame.

And, of course, SR(b) (3) clearly does not follow from the first two premises. We should also note that given the empirical equivalence of Neo Lorentzian and Einsteinian interpretations of relativity the distinction between the two becomes metaphysical. If there turn out to be metaphysical reasons for preferring a Neo Lorentzian interpretation of relativity over its Einsteinian counterpart then we have done sufficient to supplant the Einsteinian interpretation with an interpretation that is supportive to presentism and hence temporal minimalism.

7.4.3 Neo-Lorentzian theories

A theory may be classified as Lorentzian just in case it affirms (i) the round trip vacuum propagation of light is isotropic in a preferred (absolute) reference frame R_0 (with speed $c=1$) and independent of the velocity of the source, and (ii) lengths contract and time rates dilate in the customary special relativistic way only for systems in motion with respect to R_0 . (Craig 2000b: 108-9)¹⁵

The difference between Einsteinian and Neo-Lorentzian interpretations of the relativistic effects discussed above (chapter three) is essentially a difference of metaphysics. Einsteinian interpretations appear positivistic.¹⁶ Lorentz (1913) was certainly not.

According to Einstein it has no meaning to speak of motion relative to the aether. He likewise denies the existence of absolute simultaneity.

It is certainly remarkable that these relativity concepts, also those concerning time, have found such rapid acceptance.

The acceptance of these concepts belongs mainly to epistemology... It is certain, however, that it depends to a large extent on the way one is accustomed to think whether one is attracted to one or another interpretation. As far as this lecturer is concerned, he finds a certain satisfaction in the older interpretations, according to which the aether possesses at least some substantiality, space and time can

¹⁵ Of course, in addition to (i) and (ii) we will also have to take into account our perception of the customary relativistic effects within R_0 from frames other than R_0 .

¹⁶ Note, I do not say that Einstein was a positivist, but that this particular interpretation attributed to Einstein is positivistic.

be sharply separated, and simultaneity without further specification can be spoken of. In regard to this last point, one may perhaps appeal to our ability to imagine arbitrarily large velocities. In that way, one comes very close to the concept of absolute simultaneity.

Finally, it should be noted that the daring assertion that one can never observe velocities larger than the velocity of light contains a hypothetical restriction of what is accessible to us, [a restriction] which cannot be accepted without some reservation. (H.A. Lorentz, A. Einstein, H. Minkowski, *Das Relativitätsprinzip*, Fortschritte der mathematischen Wissenschaft 2, mit Anmerkungen von A. Sommerfeld und Vorwort von O. Blumenthal (Leipzig: B.G. Teunber, 1913), p. 23 (Pais translation) Quoted in Craig 2000b: p. 105)

So if the presentist is not a positivist then she may have a way out of the problem devised for them by the Einsteinian.¹⁷ After all, relativity does not prove that there cannot be an absolute frame; rather, it claims that the existence of an absolute frame of reference cannot be verified – and hence is meaningless. But it should be clear that talk of an absolute frame is only meaningless within a positivistic context, a context of which metaphysics is not necessarily a part. Hence, there is no empirical reason that the presentists ought to give up their belief in the existence of an absolute inertial frame.

7.4.4 The superiority of the Lorentzian account

Firstly, following Craig (2000b), it appears that there are some sizeable advantages to be had by supporting Neo-Lorentzian rather than space-time interpretations of relativistic phenomena. In chapter three it was noted that the space-time explanation of relativistic phenomena is not really an explanation. Or at least whilst it explains our perceptions, it does little, if anything, to explain why reality is the way that it is. On a space-time account a ball does not fall to the floor because it is a three dimensional entity attracted by a gravitational force; instead, the world line of

¹⁷ Of course if we are merely searching for the best explanation then what I say here may not go through. But if we are searching for the best explanation then it is open to the Temporal Minimalist to deny that the Einsteinian solution *is* the best because it makes use of the discredited space-time model.

a four dimensional entity is located at a number distinct space-time points. But this is not to state why the ball falls to the floor, merely to state that it does so.

7.4.4.1 Causal explanation

The advantage of any theoretical Neo Lorentzian approach is that it must provide *some* reason for the relativistic phenomena actually occurring, such that if the Lorentzian wishes to say that the time dilation of a reference frame travelling at a high velocity is only illusory, then the theory must provide some causal explanation as to why this occurs. Craig considers just such an option.

‘A body moving with respect to this frame [inertial frame (IF)] will drag its gravitational field along with it. The theory of retarded potentials applies to the gravitational or electromagnetic field of a body moving relative to I(F). For such a body energy propagation is not isotropic and its co-moving fields are no longer symmetric, which leads to a whole chain of interacting anisotropy effects. If the field of a moving electron is compressed in the direction of motion, for example, then its surface must be similarly compressed to maintain an equipotential equilibrium state, and the moving electron takes the shape of an ellipsoid. A system of particles would contract in the direction of motion in order to sustain the interparticle equilibrium of the system. No substantial aether is required for the production of such effects; the existence of I(F) suffices,’ (pp. 111-112)

As Craig himself is at pains to point out (p. 113), it is not essential that this particular explanation be correct; the point of the argument is merely that whereas the space-time interpretation of relativity implies that the perception of contraction in a moving body is due to a perspective upon a four dimensional entity – but tells us nothing of how reality got to be how it is – the causal explanation that must be offered by the Neo Lorentzian gives us some genuine account, to be explored and potentially falsified, and hence gives us some further avenue for scientific enquiry where it is clear that the imbedding of relativistic phenomena within space-time is an idealism that cannot be falsified.¹⁸

¹⁸ Rindler, W (1969: p. 10), Goldberg (1984: p. 105).

7.4.4.2 Compatible with change

Second, the Neo Lorentzian account, by stipulating the existence of an absolute frame, is compatible with dynamic expositions of time and temporality, and therefore is not committed to the static picture of reality that was held up for analysis (and rejection) in chapter four. Thus, a Neo Lorentzian account is preferable to its space-time counterpart on the grounds that it can provide a genuine and satisfactory account of passage. It should be noted that this is not restricted to presentist theories; the existence of the absolute frame of becoming is essential to *any* theory which attempts to incorporate a genuine account of temporal passage that is not to be some disjointed form of “here-now-ism”.

7.4.4.3 No need for time over and above change

Third, and this is where I part company from Craig, the Neo Lorentzian solution to the problem does not necessitate that there be a metaphysical time over and above mere change. Where Craig wants to implement metaphysical time as the time that is perceived by God (2001: p. 169), I see no particularly good reason to refer to time as anything more than change. As was argued in chapters five and seven, it is not apparent that there is any compelling reason for us to think that time is, literally, an entity, or that it is extended as any kind of substance. Theories of space-time provide us with a *prima facie* plausible motivation for accepting that time is extended. But since such theories are, or so I have argued, ruled out, theories of space-time do not, in fact, provide us with motive to think of time as extended at all. Although Craig may object that my line of thought pays insufficient attention to the role of a deity in determining metaphysical time, inasmuch as the time of a deity is true metaphysical time, I think my position stronger in virtue of the fact that temporal minimalism is not dependent upon the existence of a deity, whose very existence is disputable. But it is not that temporal minimalism is incompatible with metaphysical time either; rather metaphysical time could be thought of as an “add on”.

It should be clear that although temporal minimalism remains neutral with regards to the existence of a deity, should one wish to incorporate such a deity as Craig's into temporal minimalism then there would be no obvious barrier to doing so; though one would, then, have a motive for introducing metaphysical time over and above mere change (presumably something like $time_e$ on a global scale) as the time of God. Such a move, were it accepted, would provide further motivation for denying that the Einsteinian interpretation of relativity is correct as there would be one metaphysical time, the time of God; that is, the one true time. Only one of the times of the various frames of reference could, then, turn out to be the absolute frame.

7.4.5 Alleged disadvantages of Neo Lorentzian interpretations of relativity

The two main disadvantages to be considered are that the Neo Lorentzian interpretation is more complicated than its Einsteinian counterpart since it must postulate that at least some of the relativistic phenomena are not, in fact, real but mere illusion; and second, that reality would not behave in such a way as to deny us access to its true nature, and thus that these illusions ought not to be a part of our description of reality. The Einsteinian is certainly onto something here, for in postulating the existence of an absolute frame it appears that the Lorentzian is committed to saying that although there is, really, only one way that reality exists, that reality somehow conspires to make it appear that there is no such absolute frame of reference. If it is there, why can we not see it? Certainly, then, the Einsteinian solution renders itself *prima facie* the more simple of the two options making use, as it does, of as many frames of reference as there are perspectives upon a particular four dimensional entity. It should also be added in favour of the space-time interpretation that the completeness of the solution is quite satisfying and that the perspectival solution to the problems of contraction, dilation etc., is a most simple and obvious one.

7.4.5.1 Reply to the simplicity objection

I suspect that the first response from the Neo Lorentzian may be to say that the Einsteinian is rather blinded by his own theory if he thinks the Neo Lorentzian theory to be more complicated than its Einsteinian counterpart. Whilst, perhaps, the Lorentzian picture does not have the completeness mentioned above and may need

to postulate the existence of some illusion where the Einsteinian solution has a greater degree of technical simplicity, the Lorentzian has the greater degree of conceptual and metaphysical simplicity. For, rather than denying the common sense notion that there exists a genuine notion of simultaneity, as the Einsteinian must, the Lorentzian accepts this basic concept of simultaneity. The, pre theoretically, absurd Einsteinian claim that there is no such thing as absolute simultaneity requires an astonishing revision of our conceptual apparatus and so to call it more simple than its Lorentzian counterpart is false.

One can make similar claims as to the metaphysical simplicity of the two interpretations of relativity. In regarding space-time as fundamental, the Einsteinian interpretation of relativity makes the implicit claim that mathematics is sufficient a tool for telling us how reality *really is*, how space and time, in fact, reduce to space-time. But there must surely be some complicated metaphysics at work to explain how four dimensional entities appear to us as three dimensional entities if, in fact, they turn out to be radically different four dimensional entities. If this methodology were not suspect enough, the Einsteinian must also rely upon a metaphysic, a metaphysic of four dimensional entities, that, by unifying space and time into a single entity, is significantly more complex than a metaphysic of space and time. I say that the metaphysics of space-time are more complicated than those of space and time precisely because, as has just been noted, the nature of space-time is hidden from us, and hence, as I argued in chapter three, the metaphysical picture to be constructed is highly complex and the nature of intrinsic properties remains hidden from us. A metaphysic of three dimensions is far simpler for us to construct.

Clearly, then, the Einsteinians cannot be referring to conceptual or metaphysical simplicity, but empirical simplicity. And on this note, perhaps we can find some sympathy with their position. It does seem, that in needing to postulate some physical cause for why it is that relativistic phenomena refuse to reveal to us the true nature of the absolute frame, the Lorentzian is at a disadvantage. Since the Einsteinians can explain these effects without needing to postulate further laws and relations they have the upper hand. But it should be clear that this advantage is only short lived; by postulating the existence of a physical law the Lorentzians at least leaves their position open to experimentation and possible falsification. The Einsteinians, in merely stipulating the geometric solution to the problem deny themselves any physical means by which to test their claim and consequently this

leaves the Lorentzian view with the greater explanatory power. So, although the theory *may* be empirically simpler, it is so only at the cost of diminished explanatory power and greater metaphysical and conceptual complexity.

7.4.5.3 Reply to the objection of malice

According to Craig (2000b: p. 115) the single most obvious objection to the Lorentzian position is that there simply is no physical evidence for the existence of an absolute frame. Given our various analyses, should there be such a thing as an absolute inertial frame, then we should have found it. For it to still be the case that there is, genuinely, an absolute frame, nature would have to be arranged in such a fashion to make it appear as if it were conspiring to hide its existence from us; and there is simply no reason to suppose that this is the case.

But, contra Einsteinian claims, there is evidence to suppose that there exists an absolute frame and that it is our own perceptual experiences of time which entail that there is genuine passage. Since genuine passage cannot be accommodated within a space-time manifold, at least not without the inclusion of an unwanted explanatory gap, it seems that our experience of temporal passage is, of itself, good evidence as to the falsity of the claim that there is no evidence for the existence of an absolute frame. Although this is not the sort of evidence that the Einsteinian will say is necessary (precisely what is necessary according to the Einsteinian being far from clear) it is evidence for the existence of an absolute frame.

Further to this, the Einsteinian is working on the claim that reality is simply not the kind of thing to behave in such a way as to hide from us the most basic truths about it. Assuming that this is indeed true, which may prove a controversial assumption, the Einsteinians must explain why it is that, on their model and in rejecting the Lorentzian account, it is not possible for us to be deceived by nature; but in making their own case it is perfectly possible that we are deceived. For, as was argued in chapter three, the static theorist is committed to the claim that our every day perceptual experience is a mere illusion arising from the nature of our existence in reality. Thus, on the one hand, our potential deception by reality is ruled out by the Einsteinian as too extravagant even to consider when considering other interpretations of relativity, whereas, on the other, our potential deception is perceived to be a necessary part of said theory. Admittedly there is a difference in degree at stake. The

Einsteinian will say that our scientific observations reveal to us the true nature of reality precisely because they are more focused on finding how things really are. Thus the deception would have to be greater than in the case of our everyday observations of chairs and tables. But the physicist must surely also impugn all other sciences that do not reveal this true four dimensional nature of reality. The biologist, for example, although carrying out equally detailed work and paying just as much attention to the nature of reality as the physicist, does not perceive reality to be four dimensional in their work.

This lack of consistency when considering the possible deceptions we may have indicates, surely, a not inconsiderable bias towards the Einsteinian interpretation of reality.¹⁹ It might even seem reasonable, given the forgoing, to suppose that the argument from illusion weighs more heavily on the side of the Lorentzian than it does the Einsteinian. This, especially given that there is evidence for the existence of an absolute frame. Craig (2000b) raises two points in this vein. First he notes:

SR is a restricted theory of relativity: it is only uniform motion relative to the privileged frame that fails to manifest itself. But in all other cases of motion, the absolute character of that motion is disclosed. This is not to say that acceleration or rotation proves the reality of privileged space, but it is to say that, given the classical concepts of time and space, nature does not at all conspire to conceal either absolute motion or the privileged space from us. (p. 116)

Thus, it appears that the classical concepts of time and space are not as concealed as the Einsteinian might like to think. And second Craig argues that there are variants of the classical aether,

such as the microwave background radiation or the quantum mechanical vacuum, which serve to disclose a privileged frame. Indeed, when Einsteinians complain that no evidence of a privileged space and time exist, one wonders what it would take to convince them of the contrary. (p. 116)

¹⁹ One that may potentially be aided and abetted by our natural tendency to think of time in spatial terms (Chapter five)

All in all then, it seems that the Einsteinian argument that the necessity of illusion to conspire against us to keep from us the true nature of reality in order for the Lorentzian view to be correct, lacks the even handedness that one might seek in an open minded approach to metaphysics.

7.5 Conclusion

I hope to have shown that this brief sketch of temporal minimalism points to a new way of thinking about time, one where we take time to be mere change in the physical – change in composition and location of entities. Although I have only been able to sketch the position in this final chapter, I hope to have shown the potential for the position to be developed and the advantages to doing so. Further, I have shown that temporal minimalism, at least so far as I have been able to develop it, proves immune to the problems raised for traditional versions of presentism which were considered in chapter six. It should also be noted that in arguing in the way that I have I would also endorse the claim that standard versions of presentism have sufficient resources to meet the challenges from the special theory, though they may perhaps lack the metaphysical resources to meet some of the problems mentioned in chapter six. There remain challenges for temporal minimalism. For instance, I have said nothing about Shoemaker style arguments that purport to show situations in which it would be credible to suppose that there can be time without change – a claim that I would deny. Nor have I said anything concerning the alleged problem raised by Le Poidevin (1991) where he challenges presentist theories and their construction of the present. Such apparent counter arguments to temporal minimalism are important and worthy of discussion, but I lack the space here to detail how I would set about such a task, and it is for a fuller exposition of temporal minimalism that such arguments will have to wait.

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