A Philosophical Investigation Into Time and Tense

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The candidate confirms that the work submitted is her own and that appropriate credit has been given where reference has been made to the work of others.

Abstract

I defend and develop the new tenseless token-reflexive theory of time. I begin by charting the development of the debate between the tensed and the old tenseless theories of time. The tensed theory of time maintains that time exists and is intrinsically tensed. According to the old tenseless theory, time exists and is intrinsically tenseless, the notions of past, present and future being analytically reducible to tenseless temporal relations. The new tenseless theory of time concedes that tense is an irreducible feature of language and thought. However, it rejects the claim of the tensed theory that tense is an irreducible feature of temporal reality. Tensed sentences have truth conditions statable in entirely tenseless terms, so the irreducibility of tensed language and thought does not imply that the metaphysical nature of time is such that it is intrinsically tensed.

The new tenseless theory of time must be defended on two fronts. It must be shown that the truth conditions of tensed sentences can indeed be stated in entirely tenseless terms. I consider and reject the date version of the new tenseless theory of time. I then consider and defend the token-reflexive version of this theory. It must also be shown that tense is not a feature of reality. I argue that the notion of tense has two essential features. It involves the ontological distinction between past, present and future, and the objective reality of temporal becoming. A careful examination of these two essential features reveals that they cannot, under any interpretation, be consistently held together. The supposition that tense is an objective feature of reality is thus logically unsustainable.

I develop the new tenseless token-reflexive theory of time in three substantial areas. I argue that, despite appearances, there is no analogy between this theory of time and the theory of genuine modal realism, according to which all possible worlds, including the world we inhabit, are equally real. This comparative analysis between these two theories reveals that the new tenseless theory of time is on firmer ground than both its apparent modal counterpart and various tensed theories of time.

I undertake a conceptual analysis of the notion of the direction of time. I argue that the tensed theory of time is singularly unable to account for this notion, while the new tenseless theory has the conceptual equipment necessary to provide a satisfactory and perspicuous account of it. Finally, I consider the notion of tensed meaning. I argue that the distinction between character and content can be combined with the token-reflexive account of the truth conditions of tensed sentences to yield a highly illuminating account of tensed meaning that is consistent with a tenseless ontology.

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KEY TO NOTATION

The logical symbols used in this thesis are those of Cass and Le Poidevin (1993). I include an ordinary language equivalent for each symbol which is its most common rendering. Where logical notation occurs within the text, I there provide an ordinary language translation of it.

Logical Symbol	*Name*	*Read As...*
$\forall$	Universal Quantifier	'For all...'
$\exists$	Existential Quantifier	'There is at least one...'
&	Conjunction	'...and...'
$\vee$	Disjunction	'...or...'
$\sim$	Negation	'It is not the case that...'
$\rightarrow$	Material Implication	'If..., then...'
$\leftrightarrow$	Material Equivalence	'If..., and only if...'

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Finally, I dedicate this thesis to my husband, Ian Dyke, without whom I would not understand the value of time.

Chapter 1

The Genesis of the Tensed/Tenseless Debate: From McTaggart to Mellor and Beyond

1.1 Introduction

The subject matter of many of the debates in the philosophy of time owe a great deal, not least, arguably, their origin, to the insights and arguments of McTaggart. Curiously, McTaggart's project was to prove, on a priori grounds, the unreality of time. While few philosophers have adopted wholeheartedly his conclusion, believing that time itself is real in some sense, the arguments McTaggart employed in order to arrive at his conclusion have generated many debates about the genuine metaphysical nature of time. In this chapter I intend to illustrate how it is that McTaggart's argument for the unreality of time engendered the various debates about the nature of time that have been, and are now being carried out.

I do not intend to subject McTaggart's argument to a critical evaluation. There have been countless attempts to elucidate, endorse and criticize this argument, and various aspects of it over the years. For some of these see Broad (1938), Dummett (1960), Christensen (1974), Oaklander (1984) and Farmer (1990). The task that I set myself with respect to McTaggart's argument is to illustrate how it served as the impetus for the debate between the tensed and the tenseless theories of time, since this is the debate that I intend to take up.

I will begin this chapter by introducing the concepts of the *A* series and the *B* series, concepts which are crucial to McTaggart's analysis and argument for the unreality of time. I will then formally expound the key steps in McTaggart's argument. Each step in this argument, I will argue, is responsible for the generation and development of various constituents of the debate between the tensed and the tenseless theories of time. For each step in the argument I will examine some of the arguments in support of it offered by both McTaggart and others who have defended it. I will also examine some of the responses to it and criticisms of it. I will then show how this preliminary debate developed into the more recent and contemporary debates, and how these latter came to be carried out in terms of the concepts that ultimately became fundamental to them. Once I have undertaken a thorough investigation of the genesis of the debate between the tensed and tenseless theories of time in this way, I will endeavour to illustrate the most recent developments in the

debate. Hugh Mellor (1981) is a proponent of one of the newest versions of the tenseless theory of time, a theory which has changed significantly since its inception, brought about by the work of McTaggart and Russell. I will expound Mellor's theory in some detail, emphasizing the respects in which it differs from older versions of the tenseless theory and also its underlying metaphysics which render it a genuinely tenseless account. Mellor's theory will then serve as the platform from which I take up the debate between the tensed and the tenseless theories of time.

1.2 The A Series and the B Series

> I shall give the name of the *A* series to that series of positions which runs from the far past through the near past to the present, and then from the present through the near future to the far future, or conversely. The series of positions which runs from earlier to later, or conversely, I shall call the *B* series. (McTaggart (1927) p. 10).

Here, McTaggart articulates two fundamental, and fundamentally different kinds of temporal concept. Each kind of concept is employed by us in our everyday temporal language and temporal thought, and they differ from each other in the following ways. The *A* series is a series of temporal positions at which we identify events as being located. Any event that we might care to think about is located in either the past, present, or future, and it is these temporal distinctions that serve as the identifying mark of the *A* series. However, the *A* series admits of finer distinctions than merely that between past, present and future. We can pick out the *A* series location of an event as, for example, two weeks ago, or some time during the last millennium; as now this minute, or now this century; as 0.2 milliseconds hence, or as next year. Each of these expressions locates an event in the *A* series, but at some more or less specific degree of pastness, presentness or futurity. Various kinds of linguistic expression enable us to identify the *A* series positions of events. We can employ the diverse inflections of verbal tenses, as, for example, when we say 'The daffodils were in season, the bluebells are in season, and the roses will be in season'. We can also employ numerous adverbial expressions to locate events in the *A* series. For example, 'It is two days since they found the body' or 'Summer will soon be upon us'. Thus, we have at our disposal a number of linguistic devices for identifying the *A* series positions of events in time. Positions in the *A* series have also come to be known as tenses.

Once we have understood the nature of the *A* series, and the distinctions between past, present and future that are constitutive of it, we are in a position to notice a peculiar feature of the *A* series. This is that no event is ever permanently located at one particular *A* series position.[1] Events appear to change their *A* series position from one moment to the next. The 1996 European Cup Championships is currently occurring. It is an extended present event. Last month, however, it hadn't yet started; it was still a future event, and each day it became less and less future, occupying *A* series positions of less and less remote futurity. Soon it will be over, and as the European cup is presented to the winners it will become a past event. Then, as each day passes, it will occupy *A* series positions of gradually more and more remote pastness. Characteristic of the *A* series, then, is the notion of the passage of time, of transiency and temporal flow. *A* series positions are not occupied permanently, but merely momentarily, or fleetingly.

The *B* series is McTaggart's name for an alternative conceptual tool that we employ for the purpose of locating events in time. Constitutive of the *B* series are the temporal relations of 'earlier than', 'later than', and 'simultaneous with'.[2] Like the *A* series, the *B* series is a series of temporal positions at which we identify events as being located. However, positions in the *B* series are essentially relational, unlike (ostensibly) positions in the *A* series. We cannot simply identify an event as earlier or later, as we can identify an event as past, present or future. If I were to assert of an event that it is earlier, I would have asserted something incomplete, and would face the question 'Earlier than what?'.[3] *B* series positions can thus only be asserted of events in relation to other events. Or, to put it another way, an event can only be located at a *B* series position in relation to another event or *B* series position. The temporal relations of 'earlier than', 'later than' or 'simultaneous with' thus locate

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1 One might be tempted to think that, if time is infinitely extended, then some events will always have been past and others will always be future. However, to draw this conclusion from the possibility of infinitely extended time is to make an invalid inference. If time is infinitely extended, it does not follow that any event is temporally located at an infinite distance from the present. It merely follows that no matter how far from the present an event is located, there will be another that is even more distant.

2 McTaggart does not mention the temporal relation of simultaneity when expounding the nature of the *B* series. This is because he is articulating how we distinguish between *positions* in time, and no two distinct positions in time can be simultaneous with each other. However, two distinct events in time may be located at the same position in time, and are thus simultaneous with each other. Thus, for the purpose of articulating how we identify the temporal location of events in time, it is necessary to include the temporal relation of simultaneity.

3 Expressions such as 'It happened earlier' or 'It will happen later' are implicitly tensed since they imply that the event referred to happened earlier, or will happen later than *now*.

events in the *B* series, but only in relation to one another. Every event is either earlier than, later than, or simultaneous with every other event.

The striking feature of the *B* series, in contrast with the *A* series, is that events do not change their *B* series positions. A consequence of the essentially relational nature of the constituent elements of the *B* series is that the temporal relation that one event stands in to another event is an unchanging relational property of that event. Events do not move closer together or farther apart from each other in time, nor can the successive order in which they occur be reversed. Thus, if it is true that the opening match of the Wimbledon tournament of 1996 precedes the final of the same tournament (two uniquely identifiable events), then it can never be the case that the final precedes the opening match, or that these two events occur simultaneously. If the opening match precedes the final by two weeks, then it can never be the case that these two events are temporally separated by any more than, or any less than two weeks. The temporal relation in which one event stands to another is something which does not change, regardless of the *A* series positions which those events occupy. In other words, if an event, e_1, occurs earlier than another event, e_2, then that temporal relation holds between those events wherever they are located in the *A* series. They might both be past events, e_1 being more past than e_2; they might both be future events, e_2 being more future than e_1. Alternatively, e_1 might be past or present, and e_2 still future, or e_1 might be past, and e_2 either present or future. Crucially, the *A* series positions of e_1 and e_2 gradually change over time, but the temporal separation between them, the temporal relation in which they stand to each other, remains constant.

One important corollary of this difference between the *A* series and the *B* series, which will play a significant part in the ensuing discussion, is as follows. Since the *A* series position of an event changes, a sentence asserting of an event that it occupies a certain *A* series position does not have a constant truth-value. The sentence type 'The festival began two days ago' will be true if uttered at certain times, but false if uttered at certain other times. However, since the *B* series relations between events do not change, a sentence asserting of an event that it stands in a particular temporal relation to another event does have a constant truth-value. If the sentence type 'The festival occurs after the summer solstice' can ever be

truly asserted, then it can always be truly asserted, since *B* series relations between events remain constant over time.[4]

McTaggart's introduction of the distinction between the *A* series and the *B* series, it is important to note, was based on an observation of the kinds of temporal concept that we employ as a matter of fact. The *A* series and the *B* series are not merely conceptual devices that McTaggart constructed for the purpose of using them as the foundation for his refutation of the reality of time. They are de facto features of our ordinary temporal experience. McTaggart noticed that we employ these two different conceptual tools for ordering events in time, and then analysed and codified them into the *A* series and the *B* series. Further analysis of these two different kinds of temporal series, and of the conceptual connections between them led to his argument for the unreality of time. In the next section I will formally propound the key steps in this notorious argument.

1.3 A Formal Exposition of McTaggart's Argument

> It will be convenient to begin our enquiry by asking whether anything existent can possess the characteristic of being in time. I shall endeavour to prove that it cannot. (McTaggart (1927) p. 9).

McTaggart's argument for the unreality of time, as I see it, consists of five key steps. McTaggart provides arguments and support for each step, and I will examine these in each of the next five sections. In this section, however, I will comment only upon the formal validity, or otherwise, of the argument.

The five key steps in McTaggart's argument, then, are as follows:

(1) The reality of time entails the existence of change.

(2) The existence of change requires the existence of an *A* series.

(3) It is not possible for a *B* series to exist unless an *A* series also exists.

(4) The notion of the *A* series is self-contradictory, and therefore, the *A* series cannot be a constituent of reality.

(5) Since the *A* series does not exist, change does not exist, and therefore time does not exist, so time is unreal.

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[4] This point will be developed and explored throughout this chapter, and throughout this thesis.

Clearly, the argument is formally valid, so whether or not it is sound depends on whether or not the premises are true. If premises (1) and (2) are true, there can only be time if there is change, and there can only be change if the *A* series has objective and independent existence. Premise (3) provides support for premise (2) by ruling out the alternative possibility that the *B* series alone might be sufficient to account for the existence of change, and thereby for the existence of time. Clearly, if it is not possible for a *B* series to exist unless the terms of that series also form an *A* series, then it is not possible for a *B* series alone to provide the basis for the existence of change, and thereby for the existence of time itself. Thus, by steps (1), (2) and (3), it is clear that the *A* series must exist objectively if time is to exist at all. However, by premise (4), the notion of an *A* series is inherently self-contradictory, and since nothing that is self-contradictory can exist in its own right, the *A* series cannot exist independently and objectively. The existence of time is dependent on the existence of change, which in turn is dependent on the existence of the *A* series. If the truth of premise (4) can be adequately substantiated, then the *A* series does not exist. This rules out the existence of change, which in turn rules out the existence of time itself.

Thus we have a formally valid argument for the unreality of time. Those who are not prepared to accept the truth of this conclusion have therefore turned their attention to proving the falsity of one or more of the premises. Thus, arguments have been generated which oppose or support each premise. Depending on which premises are supported, and which contested, very different pictures of the nature of time have emerged. McTaggart's opponents agree with each other that his conclusion must be false, and that time must be real in some sense. They disagree with each other, however, over which of McTaggart's premises are true and which are false, and consequently over the essential nature of time itself.

In the next five sections I will examine some of the arguments for and against the truth of each premise, and show how these have yielded the recent and contemporary debates within the philosophy of time. I will also indicate the two main kinds of theory about the nature of time that have emerged from McTaggart's argument, and how, essentially, they differ from one another.

1.4 The Reality of Time Entails the Existence of Change

> It would, I suppose, be universally admitted that time involves change. (McTaggart (1927) p. 11).

The truth of premise (1), or of some variant of it, is not seriously disputed. It is generally thought, no matter what one's particular view of the nature of time, that time somehow involves change, or that time is the dimension of change. However, the precise nature of the connection between time and change has been debated. McTaggart's premise, as it stands, sets up a fairly close connection between time and change. It requires that change must be going on if time is to be real. This effectively rules out the possibility of changeless time, or of periods of time in which nothing whatsoever changes. If all change stopped, time itself would cease to exist on this view. If one were concerned about this, and wanted to remain agnostic about whether or not time without change is a genuine possibility, then the assertion of a weaker connection between time and change would suffice, without jeopardizing the validity of the argument as a whole.[5] For example, the assertion of a connection between time and the mere possibility of change would be suitable in place of McTaggart's first premise. In other words, the assertion that the reality of time entails, rather than the existence of change, the mere possibility of change, would establish the intimate connection between time and change that McTaggart is concerned to demonstrate without ruling out the possibility of time without change. Some such interpretation of premise (1) is thus almost universally accepted. Since premise (1) has not been subjected to serious dispute, it has not been responsible for generating much in the way of debates about the nature of time.

1.5 The Existence of Change Requires the Existence of an A Series

> If there is no real *A* series, there is no real change. (McTaggart (1927) p. 13).

McTaggart's argument in support of this premise takes the following form. He supposes that there is no *A* series; that the distinctions of past, present and future do not apply to reality. He then asks whether such a picture of temporal reality can accommodate the notion of change, and concludes that it cannot. Thus, he reasons, change cannot exist unless the distinctions of past, present and future apply to reality, that is, unless the *A* series is real.

In what way, then, does McTaggart argue that the existence of the *B* series alone is insufficient to account for the possibility of change? McTaggart argues that

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5 Shoemaker (1969) and Newton-Smith (1980) both argue that there can be time without change.

if time consists solely of the *B* series, then all events are related to each other by the permanent *B* series relations of 'earlier than', 'later than' and 'simultaneous with'. Nothing about the temporal manifold thus constituted can change. If any two events are temporally related to each other, then the temporal relation which holds between them always has held and always will hold between them. *B* series facts about events are permanent and unchanging, so the possibility of change is inconsistent with time being constituted solely by the *B* series. The only respect in which events, and facts about them, change is in terms of the different *A* characteristics that they possess at different times. Genuine change, for McTaggart, is the continual change that events undergo from future to present to past. If the distinction between past, present and future is rejected, and with it the *A* series change that events undergo, then the *B* series time that we are left with is inconsistent with the possibility of change.

In the Principles of Mathematics (1903), Russell puts forward an alternative account of change. He argues that

> Change is the difference, in respect of truth or falsehood, between a proposition concerning an entity and the time *T*, and a proposition concerning the same entity and the time *T'*, provided that these propositions differ only by the fact that *T* occurs in the one, where *T'* occurs in the other. (Russell (1903) p. 469).

According to Russell, then, it is objects and not events that are the proper subjects of change. Change occurs if and only if an object has a property at one time that it lacks at another time. If Russell's analysis of change is correct, then the existence of the *A* series is not required in order for change to be possible. Change consists in the variation of properties possessed by objects over time.

McTaggart considers and rejects Russell's analysis on the following grounds. Suppose an object, *O*, has a property, *P*, at time *T*, and then lacks *P* at time *T'*. For McTaggart this cannot constitute genuine change because it is a fact at all times that *O* has *P* at *T* and that *O* lacks *P* at *T'*. Genuine change must be something over and above such changeless facts. Temporal change, for McTaggart, only occurs if facts change, and the only respect in which facts can change is their position in the *A* series. In order to reinforce his dissatisfaction with Russell's analysis of change, McTaggart draws an analogy with spatial variation:

> The meridian of Greenwich passes through a series of degrees of latitude. And we can find two points in this series, *S* and *S'*, such that the proposition 'At *S* the meridian of Greenwich is within the United Kingdom' is true, while the proposition 'At *S'* the meridian of Greenwich is within the United Kingdom' is false. But no one would say that this gave us change. Why should we say so in the case of the other series? (McTaggart (1927) p. 15).

The point that McTaggart makes by drawing this analogy is that there is no formal difference between Russell's analysis of change that does not involve the *A* series, and spatial variation. However, there clearly is a difference between change and spatial variation. The question then arises, 'How is Russell to account for this difference?'. If he argues that the case of temporal variation constitutes change while spatial variation does not on the grounds that temporal variation occurs along the temporal dimension, then it appears that he is merely begging the question against McTaggart. This is because he would be introducing time as the dimension of change into his definition of change. However, given its similarity to an analogous definition of spatial variation, the choice of time as the dimension of change would seem to be purely arbitrary. Furthermore, McTaggart's thesis is that without the *A* series there can be no change, and without change there can be no time. Consequently, a *B* series whose terms do not also possess *A* characteristics is not, for McTaggart, a temporal series.[6] Russell's analysis of change assumes that such a *B* series *is* a temporal series, and it is in this way that, it is claimed, it begs the question against McTaggart.

This brief examination of the second step of McTaggart's argument, in which he argues that the *A* series must exist if there is to be change, contains the seeds of a number of debates in the philosophy of time which have since developed. Firstly, the question of whether the *A* series and *A* series change, as McTaggart has described them, are objectively real is at issue. Those who think they are objectively real have come to be known as tensed theorists, and those who reject them have come to be known as tenseless theorists. Henceforth I will adopt this terminology.

The debate over the reality of the *A* series, and of *A* series change, has been carried out in a number of different ways. Some tensed theorists have defended McTaggart's account of *A* series change in terms of the successive acquisition and

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6 This aspect of McTaggart's argument will be explored in the next section.

loss of the properties of futurity, presentness and pastness.[7] Others have developed their own account of *A* series change, or temporal becoming, and thus also of what the *A* series itself consists in.[8] Broad (1923), for example, argues that temporal becoming cannot consist in the successive acquisition and loss of *A* characteristics, because this is to treat temporal becoming as if it were a species of qualitative change. Mere qualitative change, however, presupposes temporal becoming, according to Broad. He argues that temporal becoming consists in the successive coming into existence of present events, which subsequently become past. The future does not exist, so there is no characteristic of futurity as such. Broad's account is tensed because it asserts the objective existence of the distinction between past, present and future.

Tenseless theorists who reject the objectivity of the *A* series and of temporal becoming have done so in a number of ways. Some have argued that the alleged phenomenological experience of temporal flow is merely mind-dependent. Russell (1915) is one of the earliest proponents of this thesis. According to Russell, if an event can be truly described as past, this is because it occurs earlier than some specified conscious experience or sense datum. The presentness of an event consists in its being simultaneous with some sense datum, and its futurity consists in its being later than some sense datum. Thus, for Russell, if there were no minds, or conscious subjects, there would be no past, present or future. Events would still be temporally related to one another by the relations 'earlier than', 'later than' and 'simultaneous with', but the status of the distinction between past, present and future is merely mind-dependent. In McTaggart's terms Russell rejects the objective existence of the *A* series, and of *A* series change, but maintains that the *B* series is real, and that it is a genuinely temporal series. Other tenseless theorists[9] including Grünbaum and Baker have developed more sophisticated versions of the mind-dependence of temporal becoming.

Another strategy adopted by tenseless theorists to account for the supposed experiential feel of temporal flow has been to argue that it is, in some sense, language-dependent. For example, Smart (1963) argues that tensed language is implicitly anthropocentric, and that this creates the illusion of an objective distinction between past, present and future, and of an objective flow of time. He then argues

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7 For example, Smith (1993), Markosian (1992) and Zeilicovici (1986).

8 For example, Broad (1923), Prior (1968), Schlesinger (1991), Bigelow (1991) and Christensen (1993). Some of these accounts will be examined critically in Chapter 3.

9 For example, Grünbaum (1964, 1968, 1971) and Baker (1974, 1978).

that since tensed language is responsible for this mistaken metaphysical picture of temporal reality, we ought to aim to divest language of tenses so that we may conceive of temporal reality as it really is. The hidden anthropocentricity of tensed language, according to Smart is concealed in its implicit self-referential nature. For example, the truth-value of an assertion that an event is past is dependent on the temporal location of the assertion itself, and the temporal relation in which it stands to the event that it is about. Smart infers from this that tensed utterances implicitly *refer* to themselves. He then concludes that, since tensed language generates metaphysical confusion about temporal reality, it should be eliminated in favour of a tenseless language that employs only temporal relations that obtain between events and assertions about them. He writes

> When we use tenses and token-reflexive words such as 'past', 'present' and 'future' we are using a language which causes us to see the universe very much from the perspective of our own position in space-time. Our view of the world thus acquires a certain anthropocentricity, which can best be eliminated by passing to a tenseless language. By the use of such expressions as 'earlier than this utterance' and 'later than this utterance' we make quite explicit the reference to our particular position in space-time. Once we recognize this anthropocentric reference and bring it out into the open we are less likely to project it onto the universe. (Smart (1963) p. 142).

There is one aspect of tensed language that Smart claims is not translatable into tenseless language. Sentences that express the temporal passage of events from future to present to past, for example, 'This event was future, is present and will be past', he argues, cannot be expressed in a purely tenseless language. Smart sees this limit to his translation project as a benefit, because he takes it as proof of the concealed token-reflexivity of tensed language, and of the metaphysical confusion generated by such sentences. Nelson Goodman (1977) has also argued in support of the thesis that tenses and temporal becoming are in some sense language-dependent. However, he sees sentences that express the temporal passage of events, and indeed of times, as fully translatable into a tenseless language. According to Goodman, the sentence '*t* was future, is now present and will be past'

> says merely that this utterance is at time *t*, is later than some earlier time, and earlier than some later time. (Goodman (1977) p. 270).

However, he notices that a sentence that appears genuinely to express the flow of time, such as 'A time is at first future, then becomes present, then becomes past', despite appearances, is not a tensed sentence at all. What the sentence as a whole, and each of the individual clauses says does not depend, for its truth or falsity, on the time at which it is uttered.

Both Smart and Goodman thus focus their arguments for the language-dependence of temporal becoming on an analysis of the language that we ordinarily use to express this notion. Both of their arguments depend on the truth of the claim that tensed language can be translated into tenseless language. This claim has since been disputed by both tensed and tenseless theorists, as we will see in section 1.6.

An alternative strategy adopted by some tenseless theorists who aim to prove that McTaggart's notions of the *A* series and of *A* series change are not objective features of temporal reality has been to argue that, when subjected to scrutiny, they cannot coherently be maintained. Unlike the projects of proving that temporal becoming is mind- or language-dependent, this strategy does not try to make sense of the alleged intuition that time flows in some sense. Instead, it seeks to prove that the concept of temporal flow is logically unsustainable, and thus cannot be a constituent of temporal reality no matter what our intuitions might tell us. Two examples of philosophers who have adopted this strategy are Smart (1949) and Williams (1951). Smart argues that the notion of the flow of time is merely a metaphor, albeit one which feels very natural to us. If we were to lose sight of that fact, and treat it as having a more significant status than that of a mere metaphor, we would find ourselves entangled in various logical absurdities. For example, if it is true to say that time flows, it ought to make sense to ask how fast time flows.[10] The only way in which we can make sense of this question is by positing a second time dimension against which the rate of flow of the first time dimension can be measured. The introduction of a second time dimension is unsatisfactory in itself, but even more problematic is the fact that the question as to the rate of flow of time insidiously reappears with respect to this second time dimension. Again, in order to

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[10] Prior (1958) and Webb (1960) argue that this approach does not succeed in proving the absurdity of the notion of the flow of time. Schlesinger (1982) offers an account in which he claims that questions about the rate of flow of time can be answered meaningfully. MacBeath (1986) argues, successfully I think, that Schlesinger's account fails.

make sense of this apparently innocuous question, we would have to introduce a third time dimension against which the rate of flow of the second time dimension could be measured. Clearly, Smart argues, taking seriously the idea of time as something which flows is the first step on this infinite regress of otherwise redundant dimensions of time, and it is the first step that we ought to avoid. Williams has similar objections to the notion of time's passage, and remarks that 'Time 'flows' only in the sense in which a landscape 'recedes into the west" (Williams (1951) in Gale (1968a) p. 105).

According to this strategy then, no matter what our intuitions might tell us about the transiency of time, taking them seriously results in logical absurdities. Therefore, we ought not to take them seriously. McTaggart's notion of *A* series change does not stand up to logical scrutiny and ought, on those grounds, to be rejected.

There is one more debate generated by step (2) of McTaggart's argument that I will briefly examine here. McTaggart's notion of *A* series change, and its essential connection, in his view, with the concept of change itself, is closely related to the way in which propositions about the *A* series positions of events appear to change in truth-value. McTaggart writes:

> There can be no change unless some propositions are sometimes true and sometimes false. (McTaggart (1927) p. 15).

This claim of McTaggart's has generated a debate about the connection between time and truth.

The fact that tensed sentences such as 'The hay has been harvested' express propositions which appear to be true at some times and false at others is indicative, according to some tensed theorists, of the fact that events genuinely undergo *A* series change. The sentence 'The hay has been harvested' expresses a true proposition when, and only when, the event reported by the sentence, the harvesting of the hay, is a past event. At all other times the proposition expressed by the sentence is false. So, according to some tensed theorists, propositions actually undergo changes in their truth-values over time, and this is a reflection of the *A* series change that the events which they are about themselves undergo.

The response of the tenseless theory to this feature of tensed sentences has generally been along the following lines.[11] Truth, it is claimed, is a timeless, or eternal property of propositions. The validity of the laws of logic depend upon such a claim. Thus, when a sentence expresses a proposition which appears to change its truth-value over time, that is an indication that we are dealing with an incomplete proposition. The time at which a tensed sentence is uttered must be included in the full expression of the proposition expressed by it. Thus, if the sentence 'The hay has been harvested' is uttered at time *t*, the proposition expressed by that utterance must be supplemented by the time of utterance in order to be complete. The full expression of the proposition expressed by such an utterance will be something like 'The harvesting of the hay occurs earlier than *t*'. It is only when we have completed the proposition by relativizing it to the time at which the sentence is uttered that we are in a position to determine whether or not the proposition is true. Furthermore, the truth-value that it possesses is permanent. The temporal relation between the event reported by a proposition and the time at which that proposition is expressed does not change.

Thus, on the one hand it is claimed that some propositions are irreducibly tensed, and thus change their truth-value over time. The metaphysical implications of this are taken to be that *A* series change is a real and irreducible feature of temporal reality. On the other hand, it is claimed that all propositions have a constant truth-value. The propositions expressed by tensed sentences contain an implicit reference to the time at which they are expressed, and this needs to be made explicit in order to complete the proposition, and thus determine its truth-value. The metaphysical implications of this are taken to be that *A* series change is no part of temporal reality. Propositions that seem to imply that *A* series change is real are merely ambiguous, and once we remove the ambiguity we are in a position to realize that it is only temporal relations between events that are constitutive of time. Propositions only appear to change their truth-values because distinct utterances which express them stand in different temporal relations to the events they report. The introduction of *A* series change to account for this temporal ambiguity in language is unnecessary and metaphysically superfluous.

The second step of McTaggart's argument has thus provided fertile ground for the development of a number of debates about the nature of time. To sum up briefly, these debates are as follows. Firstly, there is McTaggart's own claim that the

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11 For example, Russell (1903), Broad (1921), Reichenbach (1947) and Goodman (1977).

A series must exist in order for there to be change, and Russell's counter-claim that the *B* series is sufficient to account for change. Tensed theorists have then defended the objective existence of the *A* series in a number of ways. Tenseless theorists have argued in response that *A* series change is merely an illusion which can be fully explained in terms of its dependence on minds, or on language. An alternative strategy adopted by tenseless theorists has been to argue that the notion of *A* series change is logically unsustainable, and thus should be rejected no matter what our intuitions about temporal flow might tell us. Finally, a debate has arisen over whether propositions have changing truth-values, thus reflecting real *A* series change, or whether they have permanent truth-values, thus reflecting the permanent *B* series relations between events. In the course of introducing these debates, two further debates were hinted at. These concern the question of whether tensed sentences can be translated into tenseless sentences, or vice versa, and whether the *B* series can be reduced in some sense to the *A* series, or vice versa. I will introduce these two debates in greater detail in the next section, since they derive mainly from the third step in McTaggart's argument.

1.6 It is Not Possible For a B Series to Exist Unless an A Series Also Exists

> The *B* series, therefore, is not by itself sufficient to constitute time.....so it follows that there can be no *B* series when there is no *A* series. (McTaggart (1927) p. 13).

As I noted in section 1.3, this step in McTaggart's argument is a variant of the previous step, and one whose purpose is to provide further support for the claim that the existence of an *A* series is a necessary condition for the possibility of change. I include it here under a separate heading because, as will become clear, this approach to proving the necessity of the *A* series for the existence of time has been taken up in many different ways, and is consequently the impetus for a variety of debates that have become central in the philosophy of time.

In chapter 33 of *The Nature of Existence* McTaggart does not provide an explicit argument for the claim that a *B* series cannot be a genuinely temporal series unless its terms also possess *A* characteristics and change in respect of them. However, this claim does seem to be implicit in much of what he says, and in particular, in his arguments for step (2) that I outlined at the beginning of the previous section. Furthermore, in chapter 51 he asserts that 'The term *P* is earlier than the term *Q* if it is ever past while *Q* is present, or present while *Q* is future'

(McTaggart (1927) p. 271). In a footnote to the section in which he makes this assertion he writes 'The statement in the text remains an adequate definition of 'earlier than" (McTaggart (1927) p. 271n). From this we may infer that McTaggart believes that the *B* series is in some sense dependent on the *A* series. The nature of this dependence is not entirely clear, although, from his remark in the footnote it could be argued that he believes that the *B* series is definable in terms of the *A* series, and thus is analytically reducible to it, in the sense that *B* series expressions can be translated without loss of meaning by *A* series expressions.

Some tensed theorists have taken up this claim and argued independently for the reducibility of the *B* series to the *A* series.[12] The metaphysical conclusion claimed to be derivable from such an argument is that, since the *B* series is dependent for its existence on the *A* series, the *A* series is essential for the existence of time, and furthermore that the *B* series alone could not constitute time.[13] Tenseless theorists have responded by arguing, in the first place, that the *B* series is not reducible to the *A* series, and further, that the *A* series is in fact reducible to the *B* series.[14] Those who argue that the *A* series is reducible to the *B* series have claimed that it is the *B* series that is fundamental for the existence of time, and our notion of the *A* series is dependent for its existence on the *B* series.

The notion of reducibility has thus played an important part in the debate between the tensed and tenseless theories of time. However, the question arises of just what kind of reduction is at issue in these arguments. Hinckfuss (1975) outlines four different kinds of reduction. In the first place there is the analytic reduction in which one statement is reduced to another statement on the grounds that the two statements are synonymous with each other. Hinckfuss notes that there are mainly two areas in which an analytic reduction can be of significance. The first is where the synonymy of the two statements is not immediately apparent, and has to be accompanied by supporting argumentation. The second is where the grammar of the statement to be reduced is logically, and perhaps ontologically, misleading, but the grammar of the reducing statement is not. He gives as an example Ryle's claim that the statement 'Colour involves extension' is reducible to 'Whatever is coloured is extended'. The statement to be reduced uses the term 'colour' as a referring term

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12 For example, Gale (1968b) and Loizou (1986).

13 A rather maverick tensed position on the issue of reducibility is that advocated by Plecha (1984). Plecha argues that 'One can both acknowledge that language can be detensed and accept the absolute present' (Plecha (1984) p. 529).

14 For example, Smart (1963) and Goodman (1977).

which might suggest that there is a thing called 'colour', whereas the reducing statement avoids this potential ambiguity.

The second kind of reduction is an explicatory reduction. In an explicatory reduction no claim for synonymy is made. The reducing statement is simply more explicit about the kind of implications that may be drawn from it than is the statement to be reduced. An example is that of replacing use of the term 'space' with reference to spatial relations. Of those who employ the term 'space', some wish to refer to an objectively existing entity, and others do not. However, the need to refer to spatial relations is common among those who generally use the term 'space'. Thus, the possibility of making dubious implications is avoided.

The third kind of reduction discussed by Hinckfuss is an ontological reduction. Once more, no claim for synonymy between the two statements is made. The statement to be reduced has unacceptable implications, for example, by purporting to refer to an entity which, it is claimed does not exist. The reducing statement avoids all such misleading implications, but retains all the useful and informative implications of the original. I do not see any significant difference between Hinckfuss' accounts of the explicatory and the ontological reductions. Neither makes any claim for synonymy between the statement to be reduced and the reducing statement. They both seek to clarify the ontological implications of the statement to be reduced. Henceforth, therefore, I will make no reference to these two types of reduction as distinct, and I will refer to the ontological reduction when discussing reductions which exemplify them.

Finally, Hinckfuss discusses the notion of a theoretical reduction. Ordinary language contains terms which refer to entities with which we are acquainted through ordinary experience. Scientific discoveries sometimes reveal the underlying nature of such entities, and terms are introduced which describe their underlying nature. Thus, water is theoretically reducible to H_2O; temperature is theoretically reducible to mean kinetic energy. Again, no claim for synonymy between two such terms is made. The two terms have significant application in different fields of discourse. However, the entities they refer to are, it is claimed, contingently identical.

Of the four kinds of reduction described by Hinckfuss, into which category do the reductionist claims of tensed and tenseless theorists fall? I think it is clear that neither the reduction of the *B* series to the *A* series, nor the reduction of the *A* series to the *B* series is a theoretical reduction. No claims for the contingent identity of the two series are made. Furthermore, neither *A* expressions nor *B* expressions are the

result of scientific discoveries about the underlying nature of time. I will thus rule out theoretical reduction as a candidate for the type of reduction at issue here. The metaphysical claims of the tensed theory are that the *A* series is more fundamental than the *B* series, and that the latter is dependent for its existence, or for its temporality, on the former. The metaphysical claims of the tenseless theory are that the *B* series is more fundamental than the *A* series, and that the *A* series is dependent for its existence on the *B* series. The pertinent question is by what reductionist means are these metaphysical theses claimed to be achieved?

According to Hinckfuss, if any claims for synonymy are made between the reducing statement and the statement to be reduced, then the reduction is an analytic one. If not, then, having ruled out the theoretical reduction, and having dismissed the distinction between the explicatory and the ontological distinctions, the reduction is ontological. What, then, are the reductionist claims of tensed theorists who assert that the *B* series is reducible to the *A* series?

For McTaggart's part, his belief that the temporal relation 'earlier than' could be adequately defined in terms of the *A* characteristics of its relata would seem to constitute an analytic reduction. The claim that '*P* is earlier than *Q*' can be *defined* as '*P* is past while *Q* is present or *P* is present while *Q* is future' seems to be a claim for the synonymy of the two statements. This is not a straightforward analytic reduction in Hinckfuss' terms however, because it does not seem to be the case that the former statement is misleading in a way in which the latter is not. I suggest that McTaggart's reasons for defining the former statement in terms of the latter are that, unless it is made explicit that the relata, *P* and *Q*, possess *A* characteristics, the fact that 'earlier than' is a *temporal* relation is not confirmed. Thus, the reducing statement makes explicit the temporal nature of the statement to be reduced, and shows the order of ontological dependence between *A* characteristics and *B* relations.

The motivation behind McTaggart's claim for reducibility is clear, however, as we have seen, he offers no explicit argument for his conclusion. Some tensed theorists have taken up his cause, providing a variety of arguments for the claim that the *B* series is reducible to the *A* series. Gale (1968a) argues that the *B* series is reducible to the *A* series on the grounds that certain *A* sentences entail *B* sentences but the converse entailment relation does not hold. For example, the sentence '*X* is present and *Y* is future', which asserts the specific *A* characteristics of *X* and *Y*, entails the sentence '*X* is earlier than *Y*'. However, the sentence that expresses the temporal relation in which *X* and *Y* stand to each other entails nothing about the

positions in the *A* series occupied by *X* and *Y*. Thus, there is an asymmetry in the information expressed by *A* sentences and *B* sentences such that the former are more informative than the latter. The information expressed by *B* sentences can be derived from *A* sentences, but the reverse is not the case. Gale concludes from this that tensed language cannot be eliminated without loss of information, and therefore that there are certain entities in the world, namely tensed properties, which we can only refer to by using tensed language. Since we can derive information about the position in the *B* series of events from sentences expressing their position in the *A* series, but not vice versa, he concludes that the *B* series is ontologically dependent on the *A* series; the existence of the *A* series is of primary importance to time.

Gale elsewhere (1962, 1968b) provides additional arguments to support his conclusion. He examines examples where a tensed sentence can be used to convey certain information, but no tenseless sentence can do so. He concludes from this that *A* characteristics are fundamental features of events, and are not reducible to *B* relations. The example he uses is of a man, Joe, whose job it is to warn his military company when the enemy are within 100 yards of their position. If Joe shouts 'The enemy are now within 100 yards', then his company are duly warned of the position, and may take appropriate action. If, however, he tries to capture the information contained in this tensed sentence in terms of the tenseless relations between the event he is reporting and his utterance of the sentence, or the time at which he utters it, he will be unable to convey the appropriate information. If, for example, Joe shouts 'The enemy are within 100 yards at noon', his company will not be warned of the situation unless they know that it is *now* noon, and this is a piece of tensed information. He concludes that tensed information is essential for successful communication, and thus that tensed sentences cannot be reduced to tenseless sentences. Tensed language thus refers to a feature of the world, the *A* series, that must exist, and on which the *B* series must depend.

Elsewhere (1968b) Gale attempts an explicit reduction of sentences expressing *B* relations between events to sentences expressing the *A* characteristics of those events. He argues that the sentence '*P* is earlier than *Q*' is reducible to the sentence '*P* is past and *Q* is present *or P* is past and *Q* is future *or P* is present and *Q* is future *or P* is more past than *Q or Q* is more future than *P*'. According to Gale the analysans and the analysandum are logically equivalent, but the analysans is ontologically more perspicuous on the grounds that it is in virtue of the possession by *P* and *Q* of *A* characteristics that they stand to each other in the temporal relation that they do. Arguably, however, the reduction fails because of the inclusion in the

analysans of the last two disjuncts. An assertion that *P* is more past than *Q* entails that *P* and *Q* are both past, and that *P* is earlier than *Q*. Similarly, an assertion that *Q* is more future than *P* entails that *P* and *Q* are both future, and that *Q* is later than *P*. Consequently, this attempt at an analytic reduction of sentences expressing *B* relations between events to sentences expressing the *A* characteristics of those events appears to be circular because the analysans makes implicit use of the analysandum.

Broad (1938) offers an alternative argument for the claim that the *B* series is dependent on the *A* series. He frames it in terms of an argument that the relation 'earlier than' can only obtain between terms that have *A* characteristics. The argument appeals to an analogy. Broad claims that, just as harmonic relations can only hold between terms that have pitch, so *B* relations can only hold between terms that have *A* characteristics. Furthermore, the harmonic relation that obtains between two notes depends on the difference between the absolute pitches of the two notes. Similarly, he argues, the *B* relation that obtains between two events depends on the difference between the absolute values of their *A* characteristics. Thus, he claims, *B* relations are founded upon differences in the *A* characteristics of their relata. Whatever the merits of this argument by analogy, Broad is clearly persuaded by it. He writes:

> This view seems to me to be a highly plausible one, and I know of no positive argument against it. If it were accepted we should have to grant to McTaggart that there could not be *B* relations between terms unless the terms had *A* characteristics, even if we refused to admit that *B* relations are definable in terms of *A* characteristics and their differences. I should consider that this theory holds the field unless it can be shown that sentences which contain the words 'past', 'present', or 'future', or their equivalents, can be translated without loss of meaning into sentences which do not contain these words or equivalents of them, but do contain the phrase 'earlier than' or some equivalent of it. (Broad (1938) p. 303).

It is clear from this that the reduction Broad envisages to be viable from the *B* series to the *A* series is not analytic, since he does not seem to accept that *B* relations can be defined in terms of *A* characteristics and their differences. I would suggest that the reduction is thus ontological, because of the claim for the

ontological dependence of *B* relations on *A* characteristics. It is interesting to note however, that Broad claims that the only way in which his position can be undermined is if an analytic reduction can be effected from *A* characteristics to *B* relations. Arguably, an ontological reduction would suffice. However, I do not believe that Broad's argument is sufficiently robust that it can only be undermined if it can be shown that the *A* series is reducible to the *B* series. All that Broad has done is to draw our attention to a potential analogy between, on the one hand, harmonic relations and absolute pitch, and on the other hand, *B* relations and *A* characteristics. How strong is this analogy? Arguably, it is not as strong as Broad thinks. For one thing, it is difficult to make sense of a harmonic relation obtaining between two entities unless those entities have pitch. However, it is quite simple to make sense of a *B* relation obtaining between two entities where those entities do not possess *A* characteristics. For example, we can understand what it is for two events that occur in a work of fiction to be temporally related, such that one is earlier than the other, but neither of these events are either past, present or future.[15] I submit that Broad appeals to the close connection between harmonic relations and absolute pitch, and makes the unwarranted assumption that the same close connection obtains between *B* relations and *A* determinations. Clearly, however, the requisite connection does not obtain in the latter case as it does in the former.

The response of the tenseless theory to the claim that the *B* series is reducible to the *A* series has been twofold. The tenseless theory has aimed to disprove the arguments to the effect that the *B* series is reducible to the *A* series. Furthermore, its proponents have aimed to prove that the *A* series is, in some sense, reducible to the *B* series. Once more the question arises, by what reductionist means has the claim of the priority of the *B* series been effected? For a long time during the development of this debate tenseless theorists sought to achieve an analytic reduction of the *A* series to the *B* series.[16] They argued that it is tensed language which gives rise to our notion of the *A* series, but that tense is a feature of our language, rather than a feature of temporal reality. We have already touched on some of the attempts to show how tense is language-dependent in the previous section, but that was in the context of attempts to prove that temporal becoming is language-dependent. In this section I will outline more exhaustively the various arguments by which tenseless

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15 See, for example, Curric (1992).

16 See, for example, Thalberg (1963), Fisk (1971), Fitzgerald (1974) and Williams (1974, 1977).

theorists claimed to show that tensed language is wholly reducible to tenseless language, and thus to prove that tense is not a real feature of the world.

If tense is to be completely eliminable from language, then the first phenomenon of tensed language to be dealt with is the apparent variability in the truth-values of tensed sentences. Tensed sentences, as we saw in the previous section, seem to have the curious capability of changing their truth-values over time; of being true at some times and false at others. According to tenseless theorists this is merely a superficial phenomenon that can be completely dispelled once we appreciate fully the distinction between sentence types and sentence tokens. A sentence token is a particular instance or occurrence of a sentence. It may be a spoken, written, or even mental token of a sentence, but it is a particular and unique entity. My utterance of 'The cow jumped over the moon' is a unique sentence token that has a definite location in time and a definite truth-value. A sentence token is a token of a particular sentence type. If I utter the sentence 'The cow jumped over the moon' twice in succession, then I have uttered two distinct tokens of the same sentence type. The sentence type is a particular grammatical formation of words that all tokens of that type share. A sentence type is thus a somewhat abstract object that has no definite location in time, except insofar as one could say that it exists at all the spatiotemporal locations at which its tokens exist.

According to the tenseless theory then, when it is claimed that tensed sentences have variable or unstable truth-values, it is clearly only sentence types that have this characteristic. A sentence token has a determinate truth-value.[17] A sentence type has a variable truth-value if and only if some of its tokens are true and others false. Thus, according to the tenseless theory it is misleading to talk of the changing truth-values of tensed sentences, or of tensed propositions, since nothing really changes its truth-value over time. It is simply the case that different tokens produced at different times of the same tensed sentence type have different truth-values. This gives the impression that the sentence type itself is a determinate object which changes its truth-value over time.

If tense is to be eliminable from language, then it must be shown how particular tokens of tensed sentences can be translated into tenseless sentences. Any attempt to translate tensed sentence types into tenseless sentences will fall at the first

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[17] It is important to emphasize that this is a tenseless explanation of the phenomenon that tensed sentences appear to have variable or unstable truth-values. There are some tensed theorists, for example Priest (1986) and Tichý (1980), who hold that a particular unique sentence token *can* change its truth-value over time.

hurdle. This is precisely because tensed sentence types do not have determinate truth-values, but tenseless sentence types do. A necessary condition of the translatability of one sentence by another is that they should have the same truth-value, but no tenseless sentence type can have the same truth-value as a tensed sentence type because the latter does not have a single determinate truth-value, whereas the former does. Thus, the distinction between sentence types and sentence tokens successfully dispels the apparent phenomenon of the variable truth-values of tensed sentences.

Attempts by tenseless theorists to show how tensed sentence tokens can be translated into tenseless sentences have been of three main types. Each type of translation claim has aimed to show how the tenses of events are really disguised temporal relations between events. Thus, what appears to be a monadic property of an event is really a dyadic relation which that event stands in to another event or moment. The three types of translation claim differ from each other insofar as they each choose a different entity to stand as the second relatum of the appropriate temporal relation. According to the first kind of translation claim the *A* determination of an event is a disguised temporal relation between that event and some conscious event or sense datum. According to this translation claim tense is mind-dependent. The second kind of translation claim sees the tense of an event as a disguised temporal relation between that event and the date at which that tense is ascribed to it. This yields a date version of the translation claim. Finally there is the token-reflexive version of the translation claim. According to this claim a tensed sentence token which ascribes a tense to an event is translatable into a tenseless sentence which ascribes a temporal relation between that event and the event constituted by the production of the sentence token itself.

According to the mind-dependence translation claim tense is a subjective feature of our temporal experience. Events are only past, present or future in relation to some mental event, such as an act of perceiving or of remembering. A tensed sentence token which ascribes an *A* determination to an event can be translated by a tenseless sentence which ascribes a *B* relation between that event and some mental event. Russell (1915) advanced such a view, arguing that a tensed sentence token such as '*e* is now' means the same as, or can be translated by '*e* is simultaneous with this' where 'this' is a logically proper name of a sense datum of which the utterer is aware while he is uttering the sentence token. Similarly '*e* is past' can be translated by '*e* is earlier than this', and '*e* is future' can be translated by '*e* is later than this'. Thus, events are only past, present or future in relation to the

mental activity of a perceiver. That this is so is shown by the translatability of tensed sentence tokens into tenseless sentences that ascribe temporal relations between events and subjective experiences.

There are a number of problems with this translation claim. In the first place, the alleged translation contains the term 'this' which itself is a context-dependent term. Thus, the tenseless translation of the tensed sentence token is not a sentence type whose tokens all have the same truth-value. Thus, the translation procedure has not achieved the aim of divesting language of all temporally context-dependent expressions. Secondly, a mental event is one which, in principle, cannot be experienced by anyone other than the one who experiences it. Only the speaker can know the reference of 'this' which stands in the appropriate temporal relation to the relevant event. Thus, it would seem that communication is rendered impossible among individuals employing tensed language on this analysis. Finally, it is possible to ascribe *A* determinations to mental events, for example, truly to assert 'This sense datum is present'. Proponents of the mind-dependence translation claim would have to say that such a tensed sentence token is translatable by a sentence such as 'This sense datum is simultaneous with itself'. Arguably, this is unsatisfactory as a translation of the ascription of a tense to an event, since it is true of every event that it is simultaneous with itself, but it is not true of every event that it is present.

The date version of the translation claim attempts to eliminate tense in favour of the tenseless ascription of dates to events. According to this date theory, despite the fact that a tensed sentence token appears to ascribe a monadic tensed property to an event, it really does nothing of the sort. A token of the present tensed sentence 'The cow is jumping over the moon' uttered at time *t*, can be translated without loss of meaning by the tenseless sentence 'The cow jumps over the moon at *t*'. The verb in the tenseless sentence is to be taken as tenseless, and not present tense, and consequently the tenseless sentence is completely divested of tense. Similarly, a token of the past tensed sentence 'The cow jumped over the moon', uttered at time *t*, is fully translatable as 'The cow jumps over the moon earlier than *t*'. A token of the future tensed sentence 'The cow will jump over the moon' uttered at *t* is translated by 'The cow jumps over the moon later than *t*'. Thus, according to this theory, ascriptions of tense are to be replaced by ascriptions of temporal relations between events and moments of time referred to by dates.[18] The metaphysical implications of

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[18] This theory requires the existence of times in some sense, but it is neutral as to the particular conception of times that is adopted. For example, it is consistent with both a relational and a substantival conception of times.

this translation claim are held to be that, since tensed language can be completely eliminated in favour of the more perspicuous language of tenseless temporal relations and dates, tense is not a genuine feature of temporal reality.

One reason that the tenseless date language is held to be more perspicuous than tensed language is that it avoids the potentially misleading notion of sentences which appear to change their truth-value over time. Two tokens of the sentence 'It is now raining' uttered at different times, according to this theory, actually say different things which explains why they may have different truth-values. A token uttered at *t* says 'It is raining at *t*' and a token uttered at *t'* says 'It is raining at *t'*'. These tenseless date translations have fixed truth-values. By bringing the time of utterance into the translation of a tensed sentence token, any confusion over the apparent changing truth-value of the tensed sentence type is eliminated.

The date version of the translation claim, however, faces a number of problems. The first problem is generated by its use of dates. A use of 'now' appears to refer to the time at which it is uttered, so if it is uttered at time *t* it seems prima facie plausible to translate that use of 'now' with the expression 'at *t*'. However, a use of 'now' is immune to error through misidentification by both speaker and hearer, while a use of 'at *t*' is not. If I utter a token of 'You may start writing now' at *t*, everyone concerned will know at what time they may start writing. If, however, I utter at *t* 'You may start writing at *t*', it is possible for someone not to know at what time they may start writing. Someone who does not know that it is *t now* will not know that they may start writing now. Thus it seems that the tenseless date sentence is not a successful translation of the tensed sentence token, since it is possible for someone to understand both sentence tokens at the same time and yet to take different attitudes to the truth-value of each.

Another problem with the date version of the translation claim arises in connection with tensed sentence tokens such as 'It is 5pm now'. Such sentence tokens can clearly be used informatively. They convey tensed information about what time it is now. If the date version of the translation claim is correct, however, such a sentence token is to be translated by the tenseless sentence 'It is 5pm at 5pm'. This sentence does not have the same information content as the tensed sentence token that it purports to translate, and furthermore it is trivially true. These two sentences cannot have the same meaning, and cannot provide adequate translations of each other. Thus, the date version of the translation claim appears to be unable to deliver the conclusion that it sets out to establish. It does not provide an adequate

formula for translating every tensed sentence token into a tenseless sentence without loss of meaning, so it fails to prove that tense can be eliminated from language.

The final version of the translation claim that has been put forward by tenseless theorists is the token-reflexive version. According to this theory, tense can be completely eliminated from language in favour of tenseless sentences that assert that a temporal relation holds between events and token utterances about them. There are a number of ways in which a translation such as this has been claimed to be effected. Take a tensed sentence token such as 'It is now raining'. It has been claimed that this token can be translated by the tenseless sentence 'Rain occurs simultaneously with this token'. The motivation behind this attempt at translation is that attributions of tense are merely disguised attributions of temporal relation between the event that a tensed sentence token is about and the event constituted by the production of the tensed token itself. Thus, this version avoids the problems we have seen connected with introducing dates into the translation. It merely countenances events and the temporal relations between them. However, the tenseless sentence is inadequate to the task of eliminating tense from language. That this is the case can be seen by asking oneself what the expression 'this token' in the alleged translation refers to. If it refers to the token of the tensed sentence, then clearly the tensed token must be produced in order for this expression to refer to it. Tensed sentences must therefore be retained within our language. If it refers to the tenseless sentence in which it occurs, then the tenseless sentence is covertly behaving as if it were a tensed sentence token. The sentence 'Rain occurs simultaneously with this token' is temporally context-dependent in the same way as it 'It is raining now', so tense has not been eliminated from our language by this alleged translation.

Another attempt at a token-reflexive translation of tensed sentence tokens is as follows. The token 'It is raining now' is translated by the tenseless sentence 'Rain occurs simultaneously with the utterance of 'It is raining now''. Here, the tensed sentence is mentioned rather than used. However, once more the alleged translation is ineffective. If the occurrence of the tensed token is replaced by an occurrence of the tenseless sentence, the tenseless sentence once more behaves as if it were tensed. The occurrence in the tenseless sentence of the tensed token imparts the relevant tensed information; the information that it is raining now.

Another problem with the token-reflexive translation claim is as follows. It depends for its viability on the assumption that tensed sentence tokens implicitly refer to themselves. It is for this reason that the various translations attempt to make this self-reference explicit. Now, it has been argued, most notably by tensed

theorists, that tensed sentence tokens are not self-referring. If these arguments are successful, then the token-reflexive translation claim fails on these grounds. However, it seems to me that the translation claim will fail even if tensed sentence tokens can be shown to be self-referring. This is because, by attempting to make the self-reference explicit, the tenseless sentence which is supposed to translate the tensed sentence token is not, itself, self-referring. A sentence token which is self-referring cannot be translated by a sentence which is not self-referring, because any two such sentence tokens obviously differ significantly in meaning in precisely this respect. Therefore, two such sentence tokens cannot be synonymous. If the alleged translation is based on the claim that tensed sentence tokens are self-referring, then the claim of translatability is self-defeating. In principle, no two such sentence tokens can convey the same information.

I conclude that attempts to translate tensed sentence tokens by tenseless sentences fail for one of two reasons. The alleged translations either fail to convey the same information as is conveyed by the tensed token, or they behave as if they are tensed sentence tokens, and thus fail to eliminate the function that tense performs. Thus, attempts at an analytic reduction of tensed to tenseless language are futile.

It seems that much of the debate between the tensed and tenseless theories of time since McTaggart and until about 1980 has been carried out in terms of attempts to prove an analytic reduction from the *B* series to the *A* series or vice versa. In my discussion of attempts to prove an analytic reduction of the *B* series to the *A* series I showed how any such attempt implicitly appeals to *B* relations while claiming to eliminate them. My discussion of attempts to prove an analytic reduction from the *A* series to the *B* series showed that any such attempt faces a variety of problems. Arguably the most serious of these problems was that the alleged tenseless translations of tensed sentence tokens either fail to convey the same information as the tensed tokens or they take on the context-dependent role of tense, and thus fail to eliminate the function that tense performs. Thus, I believe my discussion has shown that neither kind of analytic reduction can work. It seems that ordinary language cannot do without tense, but neither can it do without statements of temporal relation. A language without tense that adequately described the temporal relations that obtain between every event in the history of the universe would certainly be informative, but it would lack one vital piece of information; it would omit to tell us which of the times so described is now. To employ such a language would be like being in possession of a map of the world, but without knowing which

place on that map one could truly describe as 'here'. Conversely, a language divested of expressions of temporal relation would be completely opaque. As Mink (1960) has said,

> A pure *A* language is impossible because, once purged of the presupposed schema of *B* relations, every statement would employ a strictly unique tense. Tenses, in such a language, would carry the burden of indicating *remoteness* as well as temporal *direction* from the utterance. Hence the meaning of no two statements could be compared - although perhaps this would be no matter, since neither logic nor science could be formulated in such a language in any case. (Mink (1960) p. 259).

Thus, claims for the ontological priority of the *A* series or the *B* series cannot be achieved through attempts at analytic reductions.

1.7 The Notion of the A Series is Self-Contradictory

> The attribution of the characteristics past, present, and future to the terms of any series leads to a contradiction. (McTaggart (1927) p. 22).

McTaggart's argument in support of this premise is deceptively simple, and has proved notoriously difficult to counter. He argues that the three *A* characteristics of past, present and future are mutually incompatible. This seems eminently plausible. If an event is past, then it is not present or future; if it is present then it is not past or future, and if it is future, then it is not past or present. He goes on to assert that every event has all of these three incompatible determinations. Thus, to assume that the *A* series exists is to commit oneself to the contradictory position that every event possesses each of three incompatible determinations.

The immediate response to this contradiction, as McTaggart duly notes, is to assert that the contradiction only holds if events possess these incompatible determinations simultaneously, but as they possess them successively, the problem does not arise. The problem, however, does not evaporate quite as simply as that. There are two ways in which we can say that events possess different *A* characteristics successively. We can say that they possess them at successive *B* series times, or at successive *A* series times. If we take the first option, we can say

that an event is future at t_1, present at t_2 and past at t_3, where t_1 is earlier than t_2, which in turn is earlier than t_3. This option is not open to one who has accepted McTaggart's argument so far, because for McTaggart there can be no *B* series without an *A* series, and this approach presupposes the *B* series in order to make sense of the *A* series. However, even if one does not see this as an obstacle, this option to make sense of the *A* series is still unacceptable. This is because to interpret the *A* series in this way is to relinquish that feature of it that is essential to it. In other words, to understand the *A* series in this way is to relinquish *A* series change. That an event, *e* is future at t_1, present at t_2 and past at t_3 are features of *e* that never change. They are thus not genuine *A* characteristics. To assert that these are features of *e* is equivalent to the assertion that *e* is earlier than t_1, that *e* occurs at t_2 and that it is later than t_3. This way out of McTaggart's contradiction thus renders the *A* series dependent on the *B* series.

The alternative option is to say that events possess different *A* characteristics at successive *A* series times. Thus *e* is present, will be past, and has been future. However, the possession by an event of *A* characteristics at successive *A* series times is a changing feature of those *A* series times. To say that *e* is present, will be past and was future is just to say that *e* is present at a present moment of time, past at a future moment of time, and future at a past moment of time. However, those moments of time at which *e* possesses incompatible *A* characteristics are themselves subject to *A* series change. Thus the contradiction is transferred to the *A* series times at which events possess *A* characteristics. McTaggart argues that one thus embarks on a vicious infinite regress because in any attempt to dispel the contradiction, it simply reappears in the explanation. It is *A* series change, the essential feature of the *A* series, which is responsible for its self-contradictory nature.

The paradox that McTaggart thus reveals in the essential nature of the *A* series has generated many responses. Some have simply failed to appreciate the force of the paradox. Gunn (1929), for example, thought he had dispelled the paradox merely by taking the first step of the vicious infinite regress:

> Although past, present and future are used of the same event, they are so used at different times. (Gunn (1929) p. 348).

Others have attempted to undermine the contradiction on various grounds. For example, some have sought to show that McTaggart's analysis of *A* series change is

misleading because it treats *A* series change as a species of qualitative change.[19] They argue, rather, that *A* series change is unanalysable, and is presupposed by qualitative change. This approach seems to me to be simply a refusal to address the problem posed by McTaggart's paradox. Others have argued that there is a regress, but it is not vicious.[20] They support this by saying that '*e* is present' does not *mean*, but simply *entails* that '*e* is present at a moment of present time'. The regress is thus of the same kind as one which moves from '*p* is true' to "*p* is true' is true' and so on, and is thus benign. However, the claim does not follow through for '*e* has been future' and '*e* will be past', and amounts to the claim that all tenses are simply unanalysable.

In chapter 3 I will examine closely various attempts to avoid McTaggart's paradox, but here I will simply outline the metaphysical agendas of those who object to and those who endorse the paradox. If the *A* series is inherently self-contradictory, then tense can be no part of temporal reality. This conclusion leaves the way clear to argue that time is tenseless, so tenseless theorists have sought to reinforce McTaggart's argument. Thus, the contradiction has been reiterated and reformulated by tenseless theorists in order to prove that time is not intrinsically tensed. Dummett (1960) and Mellor (1981) have both offered restatements of McTaggart's paradox in an attempt to make the contradiction more apparent.

The tensed theory, on the other hand, which holds that time is intrinsically tensed, has tried to find a flaw in McTaggart's argument in order to prove that the *A* series is not self-contradictory. Alternative approaches by the tensed theory have been to attempt to make sense of *A* series change in ways which avoid McTaggart's paradox. I examine some of these attempts in chapter 3. If the *A* series can be shown not to be contradictory, then tense can be a part of reality, and the way is clear to argue that it is an essential constituent of temporal reality.

1.8 Time is Unreal

> Nothing is really present, past, or future. Nothing is really earlier or later than anything else or temporally simultaneous with it. Nothing really changes. And nothing is really in time. (McTaggart (1927) p. 22).

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19 For example, Broad (1923), Pears (1956), Lloyd (1978) and Lucas (1989).

20 For example, Wisdom (1928), Stebbing (1936) and Cleugh (1937).

As we saw in section 1.3, McTaggart's argument for the unreality of time is formally valid, so its soundness depends on the truth-values of its premises. As we have seen in the preceding discussion, the overall soundness of McTaggart's argument has generally been rejected. However, I have tried to outline how this argument has been responsible for the generation of many debates between the tensed and tenseless theories of time. Thus, while his conclusion has been rejected, alternative conclusions about the nature of time have been drawn on the basis of his argument. Put simply, the issue is as follows. McTaggart's argument can be seen as the conjunction of a positive and a negative thesis. His positive thesis is that the *A* series is essential for the existence of time. His negative thesis is that the *A* series is inherently self-contradictory. The tensed theory has adopted his positive thesis, but rejected his negative thesis. The conclusion it has drawn from this is that the *A* series is a necessary feature of time, and since the *A* series is not self-contradictory, time exists and is intrinsically tensed. By contrast, the tenseless theory has rejected his positive thesis and adopted his negative thesis. Thus, its proponents have argued that the *A* series is self-contradictory, so it cannot be a constituent of temporal reality. However, since the existence of the *A* series is not essential for the existence of time, time exists and is intrinsically tenseless.

McTaggart's argument has thus generated debate about the ontological nature of time. If tense is real, then there is support for the claim of ontological disparity between past, present and future. In chapter 3 I examine various tensed claims for such an ontological asymmetry. If, on the other hand, tense is not real, then there is support for a tenseless ontology. Thus, although McTaggart's conclusion has been almost universally rejected, it should now be clear just how important it has been in the context of debates within the philosophy of time. However, as we have seen in the discussion so far, all the arguments generated between the tensed and tenseless theories have been subject to criticism. It would seem that the debate has reached an impasse. In the next section I will examine some recent developments in the debate which may offer a possible route out of this impasse.

1.9 A New Direction For the Debate

In my discussion of the arguments put forward by the tenseless theory in favour of a reduction from the *A* series to the *B* series, we saw how a complete analytic reduction in linguistic terms was shown to be impossible. This conclusion was reinforced in the 1960s and 1970s by various philosophers working in the field

of the philosophy of language. It was argued by, among others, Castañeda (1967), Kaplan (1978), Perry (1979) and Wettstein (1979), that indexicals such as 'now', 'here' and 'I', and other context-dependent expressions, are essentially irreducible. They cannot be translated without loss of meaning into non-context-dependent expressions. Thus, tense, being a temporally context-dependent feature of language, is irreducible, and the project of effecting an analytic reduction from the *A* series to the *B* series is futile.

However, as we have seen, there is another kind of reduction that make no claims for synonymy between the reducing statement and the statement to be reduced. Might not an ontological reduction from the *A* series to the *B* series be possible? If so, then the impossible burden of proving tense to be completely eliminable could be discharged, while retaining the important metaphysical conclusions to be established by such a reduction. Two philosophers, writing independently of each other at about the same time came up with arguments for an ontological reduction from the *A* series to the *B* series. They were Smart (1980) and Mellor (1981).

The theses of both Smart and Mellor are motivated by the thought that, even though tensed language is ineliminable, tensed sentence tokens only require the existence of tenseless facts to account for their truth-values. Thus, the aim is to prove that tensed sentence tokens have tenseless truth conditions. If this can be shown, then the metaphysical conclusion to be drawn is that a tenseless ontology is both necessary and sufficient to account for tensed truths. This conclusion, together with McTaggart's argument for the self-contradiction in supposing tense to be real, it is claimed, justifies the conclusion that tense is a feature of language and thought, and not of reality.

Smart (1980) puts forward a date version of what has come to be known as the new tenseless theory of time.[21] According to this theory a sentence token which purports to ascribe a tense to an event is true if and only if that event stands in the appropriate temporal relation to the time at which the sentence token is produced. So, the truth of a sentence token which ascribes a particular tense to an event depends on the time at which that tense is ascribed to that event. Thus, a token of the tensed sentence 'It is now raining', uttered at time *t*, is true if and only if it is

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[21] Another proponent of the date version of the new tenseless theory of time is Williams (1992).

raining at *t*. A token of 'It was raining' uttered at *t* is true if and only if it rains earlier than *t*, and a token of 'It will rain' uttered at *t* is true if and only if it rains later than *t*.

Mellor (1981) offers a token-reflexive version of the new tenseless theory. According to this theory a token, *u*, of the tensed sentence 'It is now raining' is true if and only if rain occurs simultaneously with *u*. A token, *v*, of 'It was raining' is true if and only if it rains earlier than *v*. A token, *w*, of 'It will rain' is true if and only if it rains later than *w*. The date theory uses the time at which a tensed sentence token is produced as one of the relata of the appropriate temporal relation, the other relatum being the event reported by the sentence token. Thus, the time at which the token is produced occurs in that token's truth conditions. The token-reflexive theory, by contrast, uses the event constituted by the production of the tensed sentence token itself as one relatum of the temporal relation, the other being, again, the event reported by the sentence token. In this case, the occurrence of the tensed sentence token occurs in that sentence token's own truth conditions. This theory gives the truth conditions of tensed sentence tokens in terms of the temporal relation which obtains between two events. The events in question are the event reported by the sentence token and the production of the sentence token itself. The date theory gives the truth conditions of tensed sentence tokens in terms of the temporal relation which obtains between an event and a time. The event is that reported by the sentence token, and the time is that at which the sentence token is produced. In chapter 2 I will give a detailed examination of these two versions of the new tenseless theory of time. I will examine the differences between these theories, their implications, and some objections to them. At this point, however, I will point out some important ways in which the new tenseless theory of time overcomes the problems of the old tenseless theory.[22]

The new tenseless theory denies that tensed sentence tokens can be translated without loss of meaning by tenseless sentences. This shift in the strategy of the tenseless theory is responsible for its ability to overcome the problems that faced the old theory. In the first place, the new theory does not have to argue that tensed sentence tokens are self-referring, and then face the problems associated with translating a self-referential sentence token into a non-self-referential sentence.

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[22] In the ensuing discussion I will focus on how the token-reflexive version of the new tenseless theory overcomes the problems of the old tenseless theory. The key feature of the new theory that distinguishes it from the old is the fact that it rejects the translation claim and offers a tenseless account of the truth conditions of tensed sentence tokens instead. This feature is common to both versions of the new theory, so it will suffice to discuss just one version. Furthermore, I will discuss the differences between these two theories in chapter 2.

Tensed sentence tokens, according to the new theory, are token-reflexive. All this means is that tensed sentence tokens occur in their own truth conditions. The ontological conclusions to be drawn from this thesis are still that time is tenseless, and that tense is merely a feature of language. However, this conclusion can be achieved without making the contentious claims about the self-referential nature of tensed sentence tokens, together with claims of their translatability that the old theory makes.

Many of the attempts to translate tensed sentence tokens into tenseless sentences found themselves unable to divest language completely of all context-dependent expressions. Expressions such as 'this token' or 'this utterance' inevitably crept into the alleged translation. The new theory recognizes that language cannot be divested of all context-dependent expressions and, rather than attempting to reduce them all to one context-dependent expression such as 'this token', it embraces them all, in their wide variety, as irreducible. However, it argues that the irreducibility of tense in language has no implications for the existence of tense in reality, since all tensed sentence tokens have tenseless truth conditions.[23] The mistake made by proponents of the old tenseless theory was to think that the *only* way in which tense could be shown not to exist in reality was by showing how tense could be eliminated from language. Once it was realized that tense could be retained in language without implying that tense is a feature of reality, the problems of the old tenseless theory could be dispelled.

In the remainder of this chapter I will sum up my findings so far, and give an outline of the questions I will address in the rest of this thesis.

1.10 The Way Forward

In this chapter I have been concerned to illustrate how McTaggart's argument for the unreality of time was largely responsible for generating the debate between the tensed and the tenseless theories of time. I have examined in detail the development of this debate up to, and including the most recent advances made by proponents of the new tenseless theory of time. It is in defence of this modified version of the new tenseless theory of time that I take up the debate.

In chapter 2 I will examine the significance of truth conditions for the current status of the debate for both tensed and tenseless theories. I will consider the differences between the date version and the token-reflexive version of the new

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23 Butterfield (1985) also argues explicitly for this conclusion.

tenseless theory, and argue that the date version faces problems to which the token-reflexive version is immune. I will then defend this latter theory against a series of penetrating objections.

Chapter 3 will explore in detail the nature of the tensed theory of time. I will examine all the different ways in which its proponents have tried to make sense of real tense. Ultimately, I will argue, the supposition that tense is real is in principle unsustainable. Thus, I intend to establish that the new tenseless token-reflexive theory of time offers the correct account of the nature of time. In the rest of this thesis I will concern myself with three independent problems for the theory I defend, and I will attempt to resolve them.

The problem I address in chapter 4 concerns the striking analogies between the theory I defend and David Lewis' theory of genuine modal realism. Given the prima facie existence of these analogies, is a proponent of the new tenseless theory of time committed, by parity of reasoning, to genuine modal realism?

The tenseless theory of time rejects the doctrine of temporal passage, and its corollary that there is an ontological asymmetry between the past and the future. Given this rejection, I will consider in chapter 5 whether the theory I defend can provide a satisfactory account of the direction of time. Finally, in chapter 6, I address a particular objection to the token-reflexive version of the new tenseless theory of time. This objection was put forward by Smith (1987b, 1993), and is potentially devastating for Mellor's theory. Smith claims to prove that Mellor's theory is self-contradictory, and furthermore, that the only way in which to avoid this charge results in Mellor's theory collapsing into the old tenseless theory, one which, it has been conceded, fails. I will show how, with some clarification and modification, Mellor's theory can survive Smith's attack. However, my resolution of this problem raises an important question for the new tenseless token-reflexive theory of time. As it turns out, there is an objective difference in meaning between a tensed sentence token and the tenseless sentence that states its truth conditions which is not discernible in the truth conditions of those sentence tokens. Can the new tenseless theory of time provide a satisfactory account of tensed meaning, or must real tense be invoked to do so?

In conclusion, the aims of this thesis are to provide a solid defence of the new tenseless token-reflexive theory of time, together with arguments to the effect that the tensed theory of time is wholly unsatisfactory. In addition I aim to develop the new tenseless token-reflexive theory of time on three broad fronts, thus showing

that it is not only the correct account of time, but also the most theoretically advantageous.

Chapter 2

A Tenseless Theory of Time: Two Rival Accounts?

The debate between the tensed and tenseless theories of time is now focused on the nature of the truth conditions of tensed sentences. Does the objective truth or falsity of tensed sentences require the existence of tense as a constituent of temporal reality? If the answer to this question is yes then, it is claimed, real tense is an objective feature of reality, and the tensed theory is vindicated. If, on the other hand, this question is answered in the negative, the tenseless theory is supported, as time need not be tensed in order to account for the objective truth or falsity of tensed sentences. The tenseless theory aims to prove that tensed sentences have truth conditions that appeal only to the existence of dyadic tenseless temporal relations, and not to the existence of monadic tensed temporal properties. If it is the case that the truth conditions of tensed sentences can be stated in a purely tenseless metalanguage, then this can be taken as providing support for the conclusion that reality is tenseless. In addition, McTaggart's paradox claims to show that any conception of temporal reality as tensed is logically incoherent. Thus, arguments in support of the self-contradictory nature of a tensed reality, and arguments in support of the conclusion that the truth conditions of tensed sentences are tenseless, together provide grounds for the conclusion that time is tenseless.

In the next chapter I will examine arguments that seek to prove that temporal reality is tensed, and I will reinforce McTaggart's argument that any such conception of temporal reality is inherently self-contradictory. In this chapter I will focus my attention on the question of whether a satisfactory account of the truth conditions of tensed sentences can be given in entirely tenseless terms. The pursuit of the unitary aim of providing such an account has yielded two distinct accounts of the tenseless truth conditions of tensed sentences. According to one version, a tensed sentence, if true, is true in virtue of its token-reflexivity. According to the other, if a token of a tensed sentence is true, it is made true by virtue of the tenseless temporal relation that obtains between what the sentence is about and the date at which the token is produced. Following Smith (1993) I shall refer to these as the token-reflexive theory and the date theory respectively. Both versions seek to achieve their common aim by explaining how the truth-values of tokens of tensed sentences depend on the context-

sensitivity of those sentences. However, each follows its own strategy in providing this explanation.

In this chapter I intend to examine these two tenseless accounts of the truth conditions of tensed sentences. I will consider some arguments that have been levelled against each, and I will explore the relationships between them. However, in order to effect a complete examination of these two accounts it will be important not to lose sight of the ultimate objectives of any such theory. What, then, are the objectives of a tenseless theorist who provides a tenseless account of the truth conditions of tensed sentences? I believe that this question has been neglected by those involved in the debate but not, as yet, to its serious detriment. However, as will become clear in the ensuing discussion, neglecting it can give rise to serious confusion which could be damaging to the progression of the debate. Therefore, in order to pre-empt any such confusion, I will address this question first. Once I have established what conclusions can legitimately be drawn from an account of the truth conditions of tensed sentences, I will turn to the date theory and the token-reflexive theory, and consider the extent to which they each succeed in achieving their objectives.

2.1 The Significance of Truth Conditions

In the debate between the tensed theory and the old tenseless theory of time, the central issue was that of translatability. The reason why translatability was the focal point for the debate was that it was thought by tensed theorists that if tensed sentences were untranslatable by tenseless sentences, the former must convey information that cannot be conveyed by the latter. The reasoning continued that tensed sentences conveyed this peculiar information by ascribing irreducible tensed properties to moments and events. It was then claimed that the objective truth of some tensed sentences bore witness to the fact that these monadic temporal properties were genuinely instantiated.

The old tenseless theory responded to this line of argument by claiming that, as a matter of fact, tensed sentences could be translated by tenseless sentences without any loss of meaning. It was thought that this rebutted the argument of the tensed theorist because it showed that there was no additional information conveyed by tensed expressions over and above that conveyed by tenseless expressions. Hence, it was concluded by the old tenseless theorist, tensed expressions did not ascribe monadic temporal properties to their subjects. The old tenseless theorist wanted to prove that tense could, in principle, be eliminated from language.

Consequently, her claim was that tenseless expressions were more fundamental than tensed expressions; that tensed expressions were dependent for their meanings on tenseless expressions. Furthermore, there were ontological conclusions to be drawn from such a reduction. If tensed expressions were ultimately dependent for their existence on tenseless expressions, then they cannot depict any feature of temporal reality that is not also depicted by tenseless expressions. Thus, if all temporal language could be reduced to tenseless language, only the latter would be genuine temporal language. Tenseless language alone would have ontological significance and depict the true nature of temporal reality. Therefore, according to the old tenseless theory of time, a true and complete picture of temporal reality does not include tense: time is tenseless. The issue of translatability was thus crucial for both the tensed and the old tenseless theory for two reasons. It had semantic significance, allowing conclusions to be drawn regarding the nature of temporal language. It also had ontological significance, warranting conclusions to be drawn regarding the nature of temporal reality.

However, as has already been discussed in chapter 1, the project of the old tenseless theory failed because it is not the case that every tensed sentence can be translated without loss of meaning by a tenseless sentence. The untranslatability thesis is now almost universally held. As a result, the central issue in the debate between the tensed and tenseless theories is no longer translation; it is now a question of truth conditions. Why are truth conditions the key to the current debate? What is a tenseless theorist aiming to establish by arguing that every tensed sentence has truth conditions statable in a tenseless metalanguage?

As I mentioned earlier, I believe this question has been neglected, and yet it is an important question to consider if we are to avoid unnecessary confusion. One of the reasons for this neglect is that the answer to the question is often taken to be self-evident. Talk of truth conditions is commonplace throughout the philosophy of language, and much of metaphysics, and it is thought that its significance is well understood.[1] Various intuitions about the significance of truth conditions reflect this attitude, but also, paradoxically, reveal at least two distinct notions of the nature of that significance. The first notion is illustrated by such intuitions as 'to know the meaning of a sentence is to know under what conditions it is true'; 'to give the truth conditions of a sentence is to give its meaning', and 'to understand a sentence is to

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[1] There has been at least one dissenter to this view. Baker and Hacker (1983) argue that discourse concerning truth conditions is ultimately unintelligible.

grasp its truth conditions'.[2] The common theme running through these intuitions is that there is some significant connection between the meanings of sentences, our grasp or understanding of those sentences, and their truth conditions. Thus, the notion of truth conditions is taken to have some kind of semantic, or cognitive significance. The second notion can be illustrated by such intuitions as 'the truth conditions of a sentence state what must be the case if that sentence is to be true'; 'a sentence is true if and only if its truth conditions obtain or are satisfied', and 'a statement of the truth conditions of a sentence states what the world must be like if that sentence is to be true'.[3] There is a different common theme running through these intuitions which is that there is some significant connection between truth conditions and the ontological commitments of a sentence. Thus, the notion of truth conditions is also intuitively taken to have some kind of ontological significance. So, stating the truth conditions of an ordinary language sentence is intuitively thought to have, on the one hand, some kind of semantic, or cognitive relevance, and on the other, some kind of ontological relevance.

One can discern in the literature varying levels of adherence to each of these intuitions. Some philosophers emphasize the semantic significance of truth conditions,[4] while others concentrate on examining their ontological significance.[5] Donald Davidson recognizes both aspects of the nature of truth conditions when he says 'The truth of an utterance depends on just two things: what the words as spoken mean, and how the world is arranged' (Davidson (1986) p. 309). Whatever the varying allegiances to these two intuitions by different philosophers, I think it is clear that both of them are, in some sense, correct. On the basis of that perfectly reasonable assumption, it follows that any complete and satisfactory account of the nature of truth conditions ought to do justice to both kinds of intuition. Indeed, it has been argued on the grounds of theoretical advantage, most notably by Wright

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2 Such intuitions are variously expressed by, for example, Davidson (1984) and Martin (1987).

3 These intuitions are expressed by, for example, Davidson (1986) and Dummett (1978).

4 For example, Horgan argues that 'Although the providing of truth conditions may still be a useful and important part of semantics for natural language, it is not likely to be an ontologically perspicuous enterprise' (Horgan (1986) p. 13). Similarly, Martin says of the project of providing truth conditions for sentences, 'The object of such an enterprise is to provide an account of the meanings of each sentence by telling, in essence, what the truth conditions of that sentence are' (Martin (1987) p. 207).

5 Kirkham criticizes Dummett for reducing the debate about the nature of truth to a debate about ontology. Kirkham comments 'Arguing about theories of truth is not just a roundabout way of arguing about ontology, nor is the latter debate a roundabout way of arguing about the proper theory of truth' (Kirkham (1992) p. 191).

(1992), that the *best* conception of truth, and therefore of truth conditions, is one that does justice to both our cognitive, or semantic intuitions regarding truth conditions, and to our intuitions regarding their ontological significance. I believe that the potential for confusion can arise if it is thought that the semantic and the ontological significance of truth conditions are entirely distinct aspects of this notion; that they have no bearing on each other.

Some examples of the sort of confusion that can arise if an account of the notion of truth conditions is offered that fails to take account of both sets of intuitions are as follows. Skidmore (1994) argues that the notion of truth conditions can be construed ambiguously either as a Fregean sense or as a state of affairs. To conceive of truth conditions as a Fregean sense is to recognize the semantic, or cognitive significance of truth conditions, while to conceive of them as a state of affairs is to recognize their ontological significance. Skidmore sees these construals as mutually exclusive, and opts for the first construal. Consequently, he puts forward an account of truth conditions that renders the connection between language and reality irrelevant to the notion of truth. Another philosopher who treats these two aspects of truth conditions as wholly independent of each other is Smith (1993). He argues for a distinction between the new tenseless theory of time and what he calls the 'nonsemantic tenseless theory of time'. That he sees a distinction here at all is, I believe, evidence of his having taken each of the two aspects of the notion of truth conditions to be significant only to the exclusion of the other. In what follows I will endeavour to show this.

Smith characterizes the new tenseless theory of time as 'the theory that tenseless truth condition sentences provide a 'logically adequate representation of ordinary temporal language" (Smith (1993) p. 13), and then remarks that one of its proponents (Smart (1980)) 'is concerned with the logical structure of ordinary language and is interested in how the meaning of ordinary expressions should be understood or represented in theories of meaning for ordinary language.' (Smith (1993) p. 13). Thus, according to Smith, the aim of the new tenseless theory of time, in providing tenseless truth conditions for ordinary tensed language, is purely to satisfy the semantic intuitions regarding the nature of truth conditions. That is, as Smith sees it, proponents of the new tenseless theory of time intend to explicate the semantic significance of ordinary tensed language by providing a complete account of its truth conditions. According to Smith, proponents of the new tenseless theory of time are not concerned with giving an account of the ontological commitments of tensed language. Indeed, he criticizes Oaklander (1991) for misunderstanding the

new tenseless theory of time when the latter argues that its aim in giving the truth conditions of tensed language is to fulfil the "ontological' function of representing the metaphysical nature of time' (Smith (1993) p. 13). The aim of the new tenseless theory of time, according to Smith, is merely to provide an adequate account of every aspect of the *meaning* of tensed language by giving an account of its truth conditions.

The nonsemantic tenseless theory of time is, according to Smith, a theory that 'considers the meaning or semantic content of ordinary tensed discourse as irrelevant - or at least as not crucial to the truth or falsity of the tenseless theory of time' (Smith (1993) p. 14). Smith is here suggesting that the aim of this theory in giving the truth conditions of ordinary tensed language is wholly ontological, to the exclusion of any semantic significance that truth conditions may have. It merely represents in an 'ontological' language the metaphysical nature of time, and that 'ontological' language has no significance whatsoever for the meaning of the tensed language whose truth conditions it states.

I want to argue that the relationship between the semantic and ontological significance of truth conditions is far more subtle than Smith has here suggested. By isolating each of these factors from the other, to the extent of constructing two distinct tenseless theories each supporting one but not the other, he has grossly misunderstood the true nature of truth conditions.[6] As I noted earlier, our semantic and ontological intuitions about the nature of truth conditions are both correct, and each has a role to play in any single account of the truth conditions of tensed language.

In order to illustrate the relation between the semantic and the ontological implications of truth conditions, I will take an example of an ordinary tensed sentence and consider what we can legitimately conclude by stating its tenseless truth conditions. The sentence type 'The stranger is now approaching' has no determinate truth-value. Some tokens of it will be true and others false, depending on certain features of the context in which those tokens are produced. By stating its truth conditions we are effectively providing a truth-conditional schema for a sentence

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[6] I remark here that it is Smith who has constructed these distinct theories, although he attributes them to various tenseless theorists. I believe my remark is warranted because these theorists do not consider themselves to be supporting distinct versions of the tenseless theory of time. I will shortly argue that this is a distinction without a difference, and that there is both a semantic and an ontological significance to any account of the truth conditions of tensed language, so Smith's attempt to force these theorists into distinct camps is his own, not theirs, and is unjustified.

type which any token of that type must satisfy if it is to be a true token.[7] The tenseless truth-conditional schema for this sentence type may look something like this:[8]

(1a) Any token *u* of 'The stranger is now approaching' is true if and only if the stranger's approach is simultaneous with *u*

The occurrences of the copula 'is' in the statement of the truth-conditional schema of this tensed sentence are to be taken as tenseless, rather than present tense. In general, any verbs that occur in a tenseless truth-conditional schema, or in a statement of the tenseless truth conditions of a tensed sentence, outside of the tensed sentence whose truth conditions are being stated, are to be taken as tenseless. It is important to make this assumption at this stage because the aim of the tenseless theorist is to state the truth conditions of any tensed sentence in tenseless terms. If the statement of truth conditions contains present tense copulae, or tensed verbs of any kind, then that aim has been frustrated from the outset. Of course, whether the position of the tenseless theorist is tenable; whether the truth conditions of tensed sentences *can* be stated without the need for real tense remains to be proven. This truth-conditional schema can be represented in logical notation by the following universal quantification:

(1b) $\forall u(Tu \leftrightarrow Seu)$

where *e* represents the event referred to by the sentence in question, *Sxy* represents the relation '*x* is simultaneous with *y*', and *T* represents the predicate '... is true'. According to this truth-conditional schema, a particular token of the sentence type, say, a token *a* will have the following truth conditions:

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[7] I am here introducing the notion of a truth-conditional schema. My reasons for doing so are that, within a tenseless framework, we cannot properly speak of the truth-value of a tensed sentence type since different tokens of it may have different truth-values. Hence, we cannot properly speak of the truth conditions of a tensed sentence type, since no one set of conditions can be necessary and sufficient for the truth of a tensed sentence type. However, where tensed sentence types are concerned, it is possible to provide a formula that any token of that type must adhere to if it is to be a true token. Furthermore, this formula yields determinate truth conditions for any particular token of that type. I call this formula a truth-conditional schema.

[8] I will shortly illustrate that it is possible for there to be at least two different accounts of the tenseless truth conditions of tensed sentences. In order not to pre-empt that discussion, I here offer one possible such account. What I have to say about truth conditions *per se* is applicable to any such account.

(2a) *a* is true if and only if the stranger's approach is simultaneous with *a*

This statement of the truth conditions of *a* can be represented in logical notation as follows:

(2b) $Ta \leftrightarrow Sea$

Clearly, the statement in (2b) is the result of a straightforward application of the rule of universal instantiation to the statement in (1b). Thus, stating the truth conditions of a sentence type provides a general schema which any true token of that type must instantiate.

With these examples in mind we may now ask in what sense do truth conditions have semantic significance, and in what sense do they have ontological significance? Whether we are examining a sentence type or a sentence token, the truth conditions illustrate how the meaning of a sentence depends on the meanings of its constituents, and on how they are combined together in its structure. However, when the sentence whose truth conditions we are considering is context-dependent, as tensed sentences are, the truth conditions are particularly illustrative as to the features of the sentence on which its meaning depends. Tensed sentences are context-dependent either in virtue of containing explicitly temporal indexical expressions such as 'now', 'yesterday' or 'next week', or in virtue of a device such as verbal inflection which conveys the information that the sentence is past, present or future tense.

As a result of being context-dependent different tokens of the same sentence type can have different truth-values. In giving a procedure for judging the truth-values of tokens of a sentence type, the truth-conditional schema makes explicit how the truth-values of its tokens depend on when those tokens are produced. The truth-conditional schema thus explicates the context-dependence of tensed sentence types, which is an aspect of their meaning. In so doing, it provides us with a formula according to which we can tell which of its tokens are true and which false. Thus, the truth-conditional schema (1a) states that, for any token of this sentence type, it will be true if and only if a relation of simultaneity obtains between the token itself and what the sentence is about. It is in this sense that tensed sentences can be described as token-reflexive; the tokens themselves constitute part of the truth conditions. Thus, according to the token-reflexive version of the new tenseless

theory of time, tensed sentences are token-reflexive, and the semantic significance of their truth conditions is to render transparent this token-reflexivity.

In what sense do truth conditions have ontological significance? Following Wright (1992), I am assuming that a conception of truth conditions that does justice to both our semantic and ontological intuitions, and that accepts the explanatory burdens of both, is better than any other conception of truth conditions, on the grounds of theoretical advantage. On the basis of that assumption, the ontological role of truth conditions is to identify the ontological commitments of a sentence. A truth-conditional schema states how one aspect of the world must be if a token of that sentence is to be true. A true sentence token has truth conditions that are fulfilled. Thus, reality is as they say it is. Given a true token of 'The stranger is now approaching', its satisfied truth conditions are that the token and the stranger's approach occur simultaneously. Its ontological commitments are that the event constituted by the stranger's approach, and the event constituted by the production of the sentence token stand to one another in the temporal relation of simultaneity. The satisfaction of the truth conditions implies that the two events and the temporal relation in which they stand to each other are all part of reality.

Thus, the truth-conditional schema of a tensed sentence type explicates how the meaning of a sentence depends on the meanings of its constituents. In particular, it explicates the context-dependence of the tensed sentence; how the truth-values of its tokens vary according to when they are produced. By explicating this aspect of the meaning of a tensed sentence, it is committed to the existence of a number of entities, specifically two events that stand to each other in a particular temporal relation. Thus, truth conditions have both semantic and ontological significance.

Having examined the nature of truth conditions, I will now return to the original question: what can be established by arguing that every tensed sentence has truth conditions statable in a tenseless metalanguage? The aim of any tenseless theorist, in arguing for this position, is to explain the semantic contribution of tensed terms to the meanings of sentence types in which they occur. It is also to make explicit the ontological commitments of tokens of those sentence types. Smith's distinction between the new tenseless theory of time and the nonsemantic tenseless theory of time is thus a specious one. The truth conditions of tensed sentences do have semantic significance; they explicate the context-dependence of those sentences, but this does not mean that for any token of a tensed sentence type, the statement of its tenseless truth conditions is a complete and satisfactory statement of the meaning of the tensed token. The tenseless theorist denies this by embracing the

untranslatability thesis; by claiming that a sentence that states the tenseless truth conditions of a tensed token cannot translate that tensed token without some loss of meaning. The truth conditions of tensed sentences also have ontological significance; they claim that *only* tenseless temporal relations need exist in order to account for the truth of a tensed sentence. There is no need for real tense to account for the objective truth or falsity of tensed sentences. However, *pace* Smith, this does not mean that questions of the semantics of tensed terms are irrelevant to establishing the ontological conclusion that temporal reality is tenseless. The aim of providing tenseless truth conditions for tensed sentences is twofold. There is a semantic aim and an ontological aim, and each complements the other. To misunderstand this, as Smith clearly has, is to misunderstand the project of the new tenseless theory of time.

The true nature of the truth conditions of tensed sentences is at the heart of the debate between the tensed and tenseless theories. The reason for this is that each theory intends to provide the definitive explanation for a peculiar feature of tensed language. This feature is that tensed sentence types have no determinate truth-value. Their truth-values appear to 'change' over time. Or, to frame the feature in terms of a tenseless conception, the truth-values of different tokens of a particular tensed sentence type depend on when those tokens are produced. The definitive account of the truth conditions of tensed sentences will provide an adequate account of why this is so. It will explain why, and how, the truth-values of different tokens of tensed sentence types differ from one another depending on when they are produced.

The definitive account of the truth conditions of tensed sentences will also make perspicuous the ontological commitments of tensed language. If the correct account of the truth conditions of tensed language commits us to the objective reality of temporal becoming, then we are committed to the metaphysical conclusion that time is tensed. If, on the other hand, the correct account of the truth conditions of tensed language commits us only to the existence of tenseless temporal relations, then that, together with arguments for the paradoxical nature of objectively real tense, provides support for the metaphysical conclusion that time is tenseless. This is why the true nature of the truth conditions of tensed language is crucial to the debate between the tensed and tenseless theories. The correct account will explicate the peculiar semantics of tensed language and will also make perspicuous the true metaphysical nature of time.

2.2 Tensed Truth Conditions

The tensed explanation for the variation in truth-value among different tokens of the same tensed sentence type (a phenomenon I shall henceforth call the variable truth-value phenomenon), is that the truth conditions of these sentences are tensed. For example, a token of the sentence type 'The stranger is now approaching' will be true if the event referred to by the token, the stranger's approach, is a present event. Some tensed theorists explicate this in terms of the event's possessing the property of presentness.[9] So, one possible tensed account of the truth conditions of this sentence is as follows:

(3a) Any token *u* of 'The stranger is now approaching' is true if and only if the stranger's approach is present

In logical notation this would be represented as follows:

(3b) $\forall u(Tu \leftrightarrow Ne)$

where the predicate '*N*...' represents the property of presentness, while the predicates '*P*...' and '*F*...' represent the properties of pastness and futurity respectively. If this tensed account of the truth conditions of tensed sentences is the correct one, then ontologically, we are committed to the reality of the tensed properties of pastness, presentness and futurity, because the truth-conditional schema invokes such properties as constituents of reality. With these properties as objective constituents of reality, the tensed explanation of the variable truth-value phenomenon is that events acquire and shed these properties in succession. An event is first future, then present and then past. If a future tense sentence token is uttered about an event while that event is future (i.e. possesses the property of futurity), then the token will be true. If that event is present or past when the token is uttered then the token will be false. For example:

(4a) Any token *u* of 'The stranger will be approaching' is true if and only if the stranger's approach is future

(4b) $\forall u(Tu \leftrightarrow Fe)$

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9 For example, Smith (1993), Zeilicovici (1986) and Markosian (1993).

Similarly:

(5a) Any token *u* of 'The stranger was approaching' is true if and only if the stranger's approach is past

(5b) $\forall u(Tu \leftrightarrow Pe)$

The variable truth-value phenomenon is explained, under this account of the truth conditions of tensed sentences, by whether or not the event referred to by a tensed sentence actually possesses the tensed property that the sentence ascribes to it. This explanation of the phenomenon commits us to the reality of tensed properties. The successive acquisition and loss of these properties by events constitutes temporal becoming which, on this account is an objective feature of reality. This explanation commits us to the metaphysical conclusion that time is tensed.

In chapter 3 I will examine closely the supposition that temporal reality is tensed, and I will present a number of arguments, on several fronts, that such a conception of time is inherently paradoxical. However, I will here note one immediate problem for a tensed account of the truth conditions of tensed sentences such as that outlined above. If this account of the truth conditions of a tensed sentence are correct, then all tokens of a given tensed sentence are made true by the same fact, regardless of when those tokens occur. The tensed truth-conditional schema makes no reference to the time at which a token is produced, but appeals only to the tensed fact that the event referred to by the sentence possesses a particular tensed property. So, for example, all tokens of the sentence type 'The stranger was approaching' have the same truth conditions. They will all be true if it is the case that the event referred to by the sentence type, the stranger's approach, is a past event. The problem with this is that a given token of this sentence type may be false, because for example, the event referred to is a present event. However, the event will then become past, and then the truth conditions for that particular sentence token will obtain. Thus, on this account, a false sentence token can change its truth-value and become true. Similarly, a true sentence token can change its truth-value and become false. Furthermore, the truth-value of a given tensed token does not depend on when that token is produced.

Hugh Mellor (1981) has argued that this tensed account of the truth conditions of tensed sentences generates a truth-conditional version of McTaggart's paradox, because it results in particular tensed sentence tokens being both true and false. Whether or not this is the case, it would seem to be at least counter-intuitive to hold that particular sentence tokens actually change their truth-values over time. Our intuitions regarding the truth-value of a particular tensed sentence token are that it is either true or false, that it remains either true or false, and that whether it is true or false depends on when it is produced, and consequently on the temporal relation that obtains between its production and the event that it is about. A tensed account of the truth conditions of tensed sentences as described above jettisons all these intuitions. However, there are some proponents of the tensed theory who are quite happy to maintain that particular tensed tokens change their truth-value over time, and that their truth-value depends wholly on whether or not a particular tensed fact obtains.[10] I mention this potential problem for such an account only in passing, since I will be presenting independent arguments against the tensed theory in the next chapter, and my main concern in this chapter is to establish whether the tenseless theory can provide a satisfactory account of the objective truth or falsity of tensed sentences.

2.3 Tenseless Date-Involving Truth Conditions

The tenseless theory denies that time is tensed, that temporal becoming is an objective feature of reality, and that tensed properties are constituents of temporal reality. It must therefore find an alternative explanation for the variable truth-value phenomenon, one that appeals only to the existence of tenseless temporal relations. A close look at the variable truth-value phenomenon reveals that the temporal relations could play a key role in accounting for it. What appears to be crucial to this phenomenon is not merely that given tokens of a tensed sentence type have different truth-values, but that the truth-value an individual token has depends on *when* it is produced. It seems that all we need in order to account tenselessly for the truth-values of tensed sentence tokens are the tenseless temporal relations of 'earlier than', 'later than' and 'simultaneous with', together with a system for identifying objectively the times at which sentence tokens are produced. Our conventional system of dates appears to fit the bill as we can use it to identify objectively the times at which events occur, and also to calculate the temporal separation between events.

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10 For example, Priest (1986, 1987).

Thus, we have the apparatus we need to construct a tenseless account of the variable truth-value phenomenon. It is reasoning such as this that constitutes the motivation for the date version of the tenseless theory of time. Dates are non-indexical expressions for referring to times,[11] and hence they provide a means of identifying objectively the time of the context of utterance of a tensed sentence token. By using the system of dates we have an objective means of telling whether the event a tensed sentence is about stands in the appropriate temporal relation to the time at which a token of the sentence is uttered. Therefore, we have an objective means of telling whether the sentence token is true or false.

There are other reasons which have motivated the date version of both the old and new tenseless theories of time. For example, the explanations of the meanings of temporal indexical expressions are generally given along the following lines:

> Clearly, for example, 'now', said at noon, refers to noon, said at midnight, to midnight. (Yourgrau (1990) p. 1).

Temporal indexical expressions are commonly taken to be directly referential; they refer directly to the moment at which they are uttered, and not via any definite description of that moment.[12] In this sense they are taken to be exactly analogous to other indexical expressions. For example, the spatial indexical 'here' refers to the place at which it is uttered. We have non-indexical names for places which enable us to refer to them objectively from wherever we happen to be located. Similarly, we have non-indexical names for times which allow us to refer to them even when we are not located at those times. This seems to have constituted evidence to proponents of the date theory for the view that we should explicate the meanings of all temporally context-sensitive language in terms of the non-context-sensitive language of dates.

Further motivation for the date theory is that tensed sentence tokens and their corresponding tenseless date sentences are intersubstitutable salva veritate in

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11 In the ensuing discussion I will make reference to times, but I do not intend to enter into the debate concerning the nature of times. Important as it is, this debate is not directly relevant to the discussion I am engaged in, which is compatible with both a reductionist and a substantival conception of times.

12 In chapter 6 I examine closely the directly referential nature of indexicals, and argue that the motivation for it is consistent with a token-reflexive account of the mechanism by which indexicals operate to fix the truth-value of tokens in which they occur.

extensional contexts. In other words, a token of 'The stranger is now approaching' uttered at date *D* can be substituted in extensional contexts by 'The stranger is approaching at *D*', and retain the same truth-value.[13] Ultimately, the date theory has been taken up as a means of providing tenseless truth conditions for tensed sentences, together with an objective, tenseless explanation of the variable truth-value phenomenon, that is committed merely to a tenseless ontology.

How does the date theory ascribe truth conditions to tensed sentences? To illustrate the date theory in practice, I will provide examples of the tenseless date truth-conditional schemata for a past, present and future tense sentence type. I will also give an example of the tenseless date truth conditions of a given token of each sentence type.

The Present Tense

Truth-conditional schema

(6) For any token *u* of 'The stranger is now approaching' uttered at *t*, *u* is true if and only if the stranger's approach is simultaneous with *t*

Truth conditions of a given token, *a*, uttered at date t_1

(7) *a* at t_1 is true if and only if the stranger's approach is simultaneous with t_1

The Future Tense

Truth-conditional schema

(8) For any token *u* of 'The stranger will be approaching' uttered at *t*, *u* is true if and only if the stranger's approach is later than *t*

Truth conditions of a given token, *b*, uttered at date t_2

(9) *b* at t_2 is true if and only if the stranger's approach is later than t_2

The Past Tense

Truth-conditional schema

(10) For any token *u* of 'The stranger was approaching' uttered at *t*, *u* is true if and only if the stranger's approach is earlier than *t*

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[13] Smith (1993) recognizes that this is the case, but denies that it provides any evidence for the date version of the tenseless theory of time.

Truth conditions of a given token, c, uttered at date t_3

(11) c at t_3 is true if and only if the stranger's approach is earlier than t_3

The above account of the tenseless date-involving truth conditions of tensed sentences aims to account for the objective truth or falsity of every tensed sentence. It appeals only to the tenseless temporal relations that obtain between the times at which tensed sentences are tokened and the events that those sentences are about. Its semantic aim is to account for the variable truth-value phenomenon. Its ontological aim is to do so by invoking only the existence of tenseless temporal relations, and thereby to support the conclusion that time is tenseless. The question that now arises is whether the date theory so described is adequate to the task of accounting for every instance of the variable truth-value phenomenon, and whether it can withstand criticism from proponents of the tensed theory of time.

The date version of the tenseless theory of time seems, at first sight, to be both extremely plausible, and capable of meeting the requirements of the tenseless theory. The truth-values of tokens of tensed sentences depend on when those tokens are produced. The date theory provides us with non-context-dependent means of referring to those times, so that once we have identified objectively the time at which a token is produced, we can establish objectively whether the token is true or false. Thus, the date version of the tenseless theory delivers truth conditions in an epistemically valuable way. It accounts for the variable truth-value phenomenon while remaining ontologically committed only to tenseless temporal relations, and not to tensed temporal properties.

However, despite this initial plausibility, there is a powerful argument against this theory that has been put forward by Smith (1993), and which needs to be examined closely. Smith considers an utterance, *U*, of the tensed sentence type 'Henry is ill' which is produced on July 28, 1940. He states that its date-involving truth conditions would be given as follows:

(12) 'Henry is ill' is true as spoken by John on July 28, 1940 if and only if Henry is ill on July 28, 1940.

Smith's aim is to establish that the clause which occurs to the right of the biconditional, 'Henry is ill on July 28, 1940', is not a necessary condition for the truth of *U*. If he succeeds it follows that (12) is not a statement of the truth conditions of *U*, a conclusion that would signal the failure of the date theory. The first step in his

argument is to presuppose the indirect reference theory, such that the date expression refers to a time via a propositional definite description of it. With this assumption in place he argues that to assert that (12) is a necessary condition for the truth of *U* is to assert that *U* is not true in any world in which Henry is not ill on July 28, 1940. He then continues:

> But this is not the case. In the actual world, *U* occurs at a time that possesses the date-property of being 1,939 years, 6 months, and 27 days later than Christ's birth. Let us first suppose that the reductionist theory of times is true and that this time is a set of simultaneous events, two of which are *U* and Henry's illness. This set of events does not possess the aforementioned date-property in each possible world in which it exists. In one of these worlds, W_1, Christ was not born at all; and in another world, W_2, Christ was born 1,938 years earlier than the set of events that contains Henry's illness. In both of these worlds, *U* is true, since *U* is simultaneous with Henry's illness. But 'Henry is ill on July 28, 1940' is false in W_1 and W_2, since, in these worlds, Henry is not ill at whatever set of events has the property of being 1,939 years, 6 months, and 27 days later than Christ's birth.
>
> The same result follows if we assume the substantival theory of times. In the actual world, *U* and Henry's illness occupy the moment that has the date-property of being 1,939 years, 6 months, and 27 days later than Christ's birth. But in W_1 and W_2, the moment occupied by *U* and Henry's illness does not possess this date-property; consequently, the date-sentence - but not *U* - is false in these worlds. (Smith (1993) p. 35).

Whether we adopt a substantival or a reductionist theory of times, Smith's argument purports to prove that what occurs on the right hand side of the biconditional in (12) is not a necessary condition for the truth of *U*, and consequently does not state the truth conditions of *U*. His strategy is to interpret (12) according to possible worlds terminology, and then to provide counter-examples to that interpretation. I think it is clear that, granted Smith's assumption concerning the mechanism via which the date expression refers to a time, there are indeed many

possible worlds in which U is true and the date-clause is false, and consequently (12) is not a statement of the truth conditions of U. But must we grant the assumption?

If the direct reference theory is true and date expressions refer directly to times, not via propositional definite descriptions of them, then Smith's argument fails. This is because, according to this theory, the date expression is used referentially rather than attributively, and directly refers to the set of simultaneous events or moment that is, in the actual world, 1,939 years, 6 months, and 27 days later than Christ's birth. Furthermore, this directly referential expression refers to this same set of simultaneous events or moment in every possible world in which it exists, irrespective of whether it possesses that date property in that world. Consequently, in every world in which U exists, Henry's illness also exists at the same time, so both U and the sentence containing the referentially used date expression are true. Specifically, they are both true in W_1 and W_2.

Smith is, however, aware that the direct reference theory has the means to avoid his argument concerning the worlds W_1 and W_2. He goes on to put forward arguments that purport to defeat this interpretation of the date theory:

> There are worlds in which U is true but the referentially used date-description is not. There is a world W_3 in which S [the set of simultaneous events that actually contains U] does not exist but in which U occupies a set S_1 that contains all and only the events that S contains except that S_1 contains a certain dust like particle on the planet Venus hitting the ground, whereas S does not. In this world U is true since it is simultaneous with Henry's illness, but 'Henry is ill at S' is false, since Henry is ill at S_1, instead.
>
> If we adopt the substantival theory, the direct reference theory will also fail to give necessary conditions for the truth of U. There is a world, W_4 in which U and Henry's illness and all the other events in S (or S_1) occupy M^*, rather than M [the moment at which U actually occurs]; consequently, U is true, but 'Henry is ill at M' is false. (Smith (1993) p. 36).

Smith's scenarios involving the worlds W_3 and W_4 that he uses to argue against the date theory that takes date expressions to be used referentially seem compelling. W_3 is a world in which U and Henry's illness are members of a different set of simultaneous events, to which the directly referential date description does not

apply. W_4 is a world in which the set of events containing U and Henry's illness occupies a different moment from the one it occupies in the actual world, and consequently the directly referential date description does not apply to that moment. It is my belief that these two arguments succeed provided we allow Smith one crucial assumption. This is that the utterance, U, that is a member of S_1 in W_3 and the utterance, U, that occupies M^* in W_4 is the *same* utterance, U, that occurs in the actual world. If this is not the case, then it is possible for U in S_1 and U in M^* to have their own date-involving truth conditions. The fact that the directly referential date-involving truth conditions for U in the actual world are not necessary conditions for the truth of U in W_3 or of U in W_4 would be irrelevant. The point is arguable, but I will not pursue it here as there is another, more decisive objection to the date theory.

The date theory's account of the truth-conditional schemata for past, present and future tense sentence types does not appear to conform to the usual format for truth-conditional schemata. The date theory requires that the time of the context of utterance is specified in the truth-conditional schema of a tensed sentence type, and in the statement of the truth conditions of a tensed sentence token. Consequently there is an extra term on the left hand side of the biconditional. The usual format for truth-conditional schemata and statements of truth conditions is to have the sentence whose truth conditions are being given mentioned on the left hand side of the biconditional, with its truth conditions stated on the right hand side. It is possible that this slight deviation from the usual format could mean that the date theory does not state the correct truth conditions of tensed sentences. An examination of the logical form of the truth-conditional schemata and of the statements of truth conditions should shed some light on this matter. In order to facilitate this examination I will reproduce the date theory's account of truth conditions, together with representations in logical notation of the logical form of those truth conditions.

The Present Tense

Truth-conditional schema

(6a) For any token *u* of 'The stranger is now approaching' uttered at *t*, *u* is true if and only if the stranger's approach is simultaneous with *t*

(6b) $\forall u \forall t(Sut \rightarrow (Tu \leftrightarrow Set))$

Truth conditions of a given token, *a*, uttered at date t_1

(7a) *a* at t_1 is true if and only if the stranger's approach is simultaneous with t_1

(7b) $Sat_1 \rightarrow (Ta \leftrightarrow Set_1)$

The Future Tense

Truth-conditional schema

(8a) For any token *u* of 'The stranger will be approaching' uttered at *t*, *u* is true if and only if the stranger's approach is later than *t*

(8b) $\forall u \forall t(Sut \rightarrow (Tu \leftrightarrow Let))$

Truth conditions of a given token, *b*, uttered at date t_2

(9a) *b* at t_2 is true if and only if the stranger's approach is later than t_2

(9b) $Sbt_2 \rightarrow (Tb \leftrightarrow Let_2)$

The Past Tense

Truth-conditional schema

(10a) For any token *u* of 'The stranger was approaching' uttered at *t*, *u* is true if and only if the stranger's approach is earlier than *t*

(10b) $\forall u \forall t(Sut \rightarrow (Tu \leftrightarrow Eet))$

Truth conditions of a given token, *c*, uttered at t_3

(11a) *c* at t_3 is true if and only if the stranger's approach is earlier than t_3

(11b) $Sct_3 \rightarrow (Tc \leftrightarrow Eet_3)$

The logical form of these truth-conditional schemata and statements of the truth conditions of tensed sentence tokens reveals why the date theory fails to state the correct truth conditions of tensed sentences. The requirement of this theory to specify the time of utterance results in the biconditional being contained within another conditional, and occurring as its consequent. In each of (7b), (9b) and (11b) it is possible for the antecedent to be false and the consequent true, while the statement as a whole is true. Therefore, it is possible for, say, *b* not to be

simultaneous with t_2, while the biconditional is true. In other words, *b* could be true because the requirements laid down by the biconditional are satisfied, while *b* is not simultaneous with t_2. Therefore, date-involving truth conditions thus specified, do not state the correct truth conditions for tensed sentences. They leave it open for the tensed sentence token to be true, while the appropriate relation between the token and the date specified does not obtain.

The question remains, however, why it was that the date theory seemed initially to be so plausible, when logically it is unable to provide the correct truth conditions for tensed sentences. It seemed initially that the date theory was able to explain the variable truth-value phenomenon because the truth-values of tokens of tensed sentence types really do vary according to when they are produced. It also seemed to be able to achieve that aim while being ontologically committed only to those temporal entities that are acceptable to the tenseless theory. If the problem Smith identified with the date theory is a genuine one, it arises as a result of the ascription of dates to times. Our dating system is a contingently created convention. Times, however conceived, have the dates they do only contingently. They might have had other dates. Smith exploits this aspect of the date theory by showing that there are possible worlds in which *U* and Henry's illness are simultaneous, and consequently *U* is true, but in which the date ascribed to the time at which *U* and Henry's illness occur is not the same date as that at which they occur in the actual world.

Similarly, the problem I identified concerning the logical form of date-involving truth conditions arose as a result of the occurrence of dates as contextual features of sentence tokens in the truth condition sentences. What this problem showed was that a sentence token, such as *a*, could be true because of its simultaneity with the stranger's approach, while not occurring at the date specified in the truth conditions. Again, what is crucial to the truth of *a* is the temporal relation that obtains between the token and the event it is about. Employing our contingent dating system to specify objectively the times at which tokens occur seemed to provide the answer for the tenseless theory, when in fact it results in the failure of the date version of this theory.

However, this examination of why the date theory fails also reveals what is crucial to the truth of tensed sentence tokens. It is the tenseless temporal relation that obtains between the event a sentence token is about, and the sentence token itself. Events can stand in temporal relations to other events as well as to times specified by dates. The production of a sentence token constitutes an event.

Therefore, it would make sense to specify the truth conditions of a tensed sentence token by appealing only to the event the sentence is about, the event constituted by the production of the token, and the temporal relation that obtains between those two events. There is no need to invoke the system of dates, which alone is responsible for the difficulties facing the date theory. The resulting account of the truth conditions of tensed sentences will retain all the advantages of the date theory: its account of the variable truth-value phenomenon and its tenseless ontology, while discarding that which was responsible for its failure: its appeal to the system of dates. The token-reflexive theory of the truth conditions of tensed sentences is thus motivated by the same reasons that tend to motivate the date theory. However, now we have seen precisely why the date theory fails, and how a token-reflexive theory may avoid the same pitfalls, it is all the more appealing.

2.4 Tenseless Token-Reflexive Truth Conditions

The truth or falsity of a tensed sentence token depends on the temporal relation that obtains between the event the sentence is about and the event constituted by the production of the token itself. A token-reflexive theory that explains this dependence would be able to account for the variable truth-value phenomenon, while remaining ontologically committed only to tenseless temporal relations, in addition to events. In such a theory, the production of the token itself constitutes part of the truth conditions of the tensed sentence. The part it plays is that it is one of the relata of a dyadic temporal relation, the other being the event referred to by the sentence. To illustrate the token-reflexive mechanism involved in giving the truth conditions of tensed sentences I will construct the token-reflexive truth-conditional schemata for a past, present and future tense sentence type. I will also give an example of the token-reflexive truth conditions of a given token of each sentence type.

The Present Tense

Truth-conditional schema

(1a) Any token *u* of 'The stranger is now approaching' is true if and only if the stranger's approach is simultaneous with *u*

(1b) $\forall u(Tu \leftrightarrow Seu)$

Truth conditions of a given token, *a*

(2a) *a* is true if and only if the stranger's approach is simultaneous with *a*

(2b) $Ta \leftrightarrow Sea$

The Future Tense

Truth-conditional schema

(13a) Any token *u* of 'The stranger will be approaching' is true if and only if the stranger's approach is later than *u*

(13b) $\forall u(Tu \leftrightarrow Leu)$

Truth conditions of a given token, *b*

(14a) *b* is true if and only if the stranger's approach is later than *b*

(14b) $Tb \leftrightarrow Leb$

The Past Tense

Truth-conditional schema

(15a) Any token *u* of 'The stranger was approaching' is true if and only if the stranger's approach is earlier than *u*

(15b) $\forall u(Tu \leftrightarrow Eeu)$

Truth conditions of a given token, *c*

(16a) *c* is true if and only if the stranger's approach is earlier than *c*

(16b) $Tc \leftrightarrow Eec$

The first thing to note about the above account of the truth conditions of tensed sentences is that, unlike the date theory, it has the correct logical form for such an account. It certainly achieves its semantic goal of accounting for the variable truth-value phenomenon. It does this by making perspicuous the token-reflexivity of tensed sentences. In achieving this semantic goal, it satisfies the ontological requirements of the tenseless theory.

We now have before us a tenseless token-reflexive account of the truth conditions of tensed sentences, together with an explanation of why one might be motivated to adopt that account. There can be no doubt that this account does explain the variable truth-value phenomenon. However, because it has the ontological implications that it does, those who reject a tenseless ontology have sought to undermine it. In general, there are two strategies available to any opponent of the tenseless token-reflexive analysis. The first is to argue that what occurs on the right hand side of the biconditional in a tenseless token-reflexive statement of truth conditions fails to state the truth conditions for the particular tensed sentence. According to this strategy, tenseless token-reflexive truth conditions are neither necessary nor sufficient for the truth of a given tensed sentence. The second strategy is to concede that tensed sentences have tenseless token-reflexive truth conditions, but to argue that these truth conditions are merely necessary, but not sufficient for the truth of tensed sentences. I will be looking at arguments of the second kind in chapter 4,[14] but here I want to address a number of arguments, each designed to prove that a tenseless token-reflexive analysis is inadequate to the task of accounting for the truth of tensed sentences. These arguments were put forward by Quentin Smith, the only philosopher to have launched such a sustained attack against the tenseless theory of time.[15]

Smith's intention throughout these arguments is to show that what is expressed by tensed sentences can be true or false independently of whether or not tokens of them are uttered. However, if the truth conditions are token-reflexive, such that the production of a sentence token itself constitutes part of that token's truth conditions, that would seem to suggest that the truth or falsity of what a tensed sentence expresses depends on whether or not tokens of it are produced. In other words, the token-reflexive account seems to suggest that truth is token-dependent, whereas Smith wishes to argue that it is token-independent. The first argument for the failure of tenseless token-reflexive truth conditions is thus directed at showing

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14 In particular, those put forward by Smith (1993) and Lowe (1987a, 1987b, 1992, 1993).

15 The arguments that I am about to propound were not put forward by Quentin Smith in direct opposition to the tenseless token-reflexive account that I have outlined above. Smith argues that the new tenseless token-reflexive theory collapses 'on pain of self-contradiction' (Smith (1993) p. 67) into the old tenseless token-reflexive theory. His arguments are thus directed wholly against the old theory. In chapter 6 I argue that the new theory can withstand this charge of Smith's. However, for the purposes of this chapter, his arguments against the old token-reflexive theory can be adjusted minimally so that they constitute objections to the new token-reflexive theory. It is in this adjusted form that I shall be examining them here.

that it is not possible to give such truth conditions for tensed sentences about past or future truths concerning times when no language users exist.

Smith examines the sentence:

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

His argument that this sentence cannot have tenseless token-reflexive truth conditions is based on the stipulation that 'this sentence is a past tensed ascription of a truth-value *true* to the truth vehicle expressed by the clause following the operator 'It was true that," (Smith (1993) p. 73). Smith goes on to put forward three conditions which together, he claims, are necessary and sufficient for the truth of (17):

(a) There is an era devoid of utterances earlier than the utterance of (17).
(b) There is some utterance-independent truth vehicle *V* that is expressed by the clause prefixed by 'It was true that',
(c) *V* is true during the era devoid of utterances.

Smith states these necessary and sufficient conditions tenselessly so as not to be seen to be presupposing a tensed theory. However, it is his contention that the truth vehicle *V* referred to in (b) and (c) is an irreducibly tensed truth vehicle. He goes on to argue for this aspect of his position later. As far as the truth conditions of (17) are concerned, Smith offers no argument for the necessity of conditions (b) and (c). His affirmation that they are necessary conditions for the truth of (17) is a mere stipulation with no reasons or argument offered to support it. Of course, his motivation for including them in the truth conditions of (17) is that the component of (17) that is operated on by the past tense sentential operator is a sentence that could never be truly uttered, and yet it expresses something of which we can clearly make sense. His explanation of this is that during the era devoid of linguistic utterances, a proposition, or some other truth vehicle, existed which expressed the presentness of that era.

I disagree with Smith's explanation. The token-reflexive theory has the conceptual equipment to deal with sentences such as (17). Let us examine first of all the core sentence 'The era devoid of linguistic utterances is present'. Any token, *u*, of this sentence type is true if and only if *u* occurs simultaneously with the era devoid of linguistic utterances. Quite clearly, no uttered token of this sentence type can

satisfy this schema, and thus, there can be no true tokens uttered of this type. The token-reflexive analysis explains why this is so. The content of the sentence type denotes the state of affairs constituted by the era in which no linguistic utterances occur. The truth-conditional schema requires that an utterance occurs simultaneously with this state of affairs. However, if such an utterance were to occur, the state of affairs denoted would not be the era devoid of linguistic utterances. Thus, the token-reflexive analysis shows how the meaning of the sentence depends on the meanings of its parts, and how there can be no true tokens of this sentence type.

When that sentence type is prefixed with a past tense sentential operator, as in (17), its token-reflexive truth-conditional schema can be given as follows. Any token, *u*, of 'It was true that the era devoid of linguistic utterances is present' is true if and only if the era devoid of linguistic utterances is earlier than *u*. Clearly, there can be true tokens of this sentence type, since its truth-conditional schema requires only that the era devoid of linguistic utterances occurs earlier than a given token of the type. It is quite possible for tokens of this type to occur *after* the era devoid of linguistic utterances. Thus, there is no need to invoke mysterious, abstract truth vehicles which come into and go out of existence depending on what the world is like to account for the truth of tokens of this type. Smith's mistake was tacitly to assume that (17) is a sentence whose primary function is to tell us something about the presentness of the era devoid of linguistic utterances. He wanted to prove that a token-reflexive account of the truth conditions of (17) would require a token utterance of the core sentence of (17) to exist simultaneously with the era devoid of utterances, which of course is logically impossible. However, the token-reflexive analysis is not forced to meet this impossible challenge.

The next argument that Smith puts forward against the tenseless token-reflexive theory also rests on the contention that such an account renders truth token-dependent. He aims to prove that this theory is committed to the token-dependence of truth, while offering counter-examples to prove that it is token-independent. He remarks that the sentence,

(18) I am not uttering anything

is logically contingent. If uttered aloud it is thereby false, but it can be thought silently to oneself, and thereby be true. He then suggests that a token-reflexive

analysis cannot account for the possibility for such true tokens of (18) because its token-reflexive 'translation' would be:

(19) I am not uttering anything simultaneously with this utterance

and (19) is necessarily false. The new tenseless theory does not seek to provide tenseless translations of tensed sentences, so as it stands this is no argument against that theory. However, it might be possible to modify Smith's argument to see whether a token-reflexive account of the truth conditions of (18) would require a token of it actually to be uttered. If it turns out that it does, then it cannot account for the truth of silent tokens of (18), and therefore could not be the correct account of the truth conditions of all tensed sentences. Taking (19) as an indication of how Smith would state the token-reflexive truth conditions of (18), it is likely that he would suggest the following:

(20) 'I am not uttering anything' is true if and only if I am not uttering anything simultaneously with this utterance.

It is clear that (20) does not state the correct truth-conditional schema of (18). No token of (18) could satisfy this truth-conditional schema, so if this were the correct schema there could be no true tokens of (18). As we have seen, there can be true tokens of (18), so this is not the correct truth-conditional schema. Moreover, it fails to distinguish between the sentence type and individual tokens of it, and the expression 'this utterance' is ambiguous. Does it refer to (20) or to (18)? The correct token-reflexive truth-conditional schema for (18) is:

(21) Any token *u* of 'I am not uttering anything' is true if and only if I am not uttering anything simultaneously with *u*.

I will leave aside any possible complications that might arise as a result of (18)'s being context-dependent in two different respects. Its truth-value depends not only on when tokens of it are produced, but also on who produces them. Clearly the truth-conditional schema (21) can only be satisfied by tokens of (18) that are not uttered. Smith states that he is taking 'utterance' to mean 'a spoken token or the earliest time-slice of an inscribed token, this time-slice being the period during which the token is being written down' (Smith (1993) p. 79). It follows that (21) can only

be satisfied by silent, mental tokens of (18), which are just the sorts of tokens that Smith uses to illustrate how tokens of (18) can be true. Therefore, provided that *u* in (21) can represent mental tokens of the sentence type as well as spoken ones, then (21) successfully states the token-reflexive truth-conditional schema for the sentence type (18). Smith remarks that the token-reflexive theory 'disallows the possibility that these sentences refer in some instances to *unuttered tokens* of sentences, to mental tokens' (Smith (1993) p.82). He does not make it clear what reasons he has for making this assertion, but it seems to me to be a dubious one. What reason could there possibly be for limiting the legitimate application of the term 'sentence token' to spoken and written such tokens? Smith gives none, and I can think of none. Indeed, the leading proponent of the tenseless token-reflexive theory of time, D.H. Mellor, writes:

> Thoughts can be tokens of sentence types just as written or spoken specimens can be - in particular, they can just as easily be true or false. I need not say 'It's raining', or write it, to generate a true or false token of that sentence type. A token of it occurs each time I think it. My making a mental judgment may not be a very audible or visible event, but it is an event nonetheless, and quite able to be a token of a sentence type. (Mellor (1981) p. 37).

Mellor allows all sorts of things to count as legitimate sentence tokens. The face of a clock with the minute hand pointing at '12' and the hour hand pointing at '2' is a token of the sentence type 'It is now 2 o'clock' according to Mellor. This unrestricted position with respect to the nature of sentence tokens seems to me to be perfectly reasonable, and I am quite happy to adopt it along with Mellor. It then follows that (21) is the correct tenseless token-reflexive truth-conditional schema for the sentence type (18). Any token of (18) that satisfies this schema will thereby be true. Because of the content of (18) only unuttered tokens will satisfy it, so only unuttered tokens of it will be true.

Smith's next argument is designed to reinforce the previous argument, which I have just shown to be ineffectual against the new tenseless token-reflexive theory of time. It will be worth disposing of this argument to reinforce the position of the token-reflexive theory. Smith argues that it is true of all 'normal' tensed sentences that they are utterance-independent, and that token-reflexive truth conditions cannot account for this. By 'normal' tensed sentences, Smith is referring to those tensed

sentences that are not 'token-mentioning'; sentences unlike 'This utterance is present'. He uses as an example the 'normal' tensed sentence,

(22) The forest is now burning

and remarks that it is possible silently to think to oneself a true token of (22). He goes on to argue that a token-reflexive account of the truth conditions of (22) would not be able to account for the truth of such a silent token because it requires the existence of an utterance of the sentence type. However, as we saw above, a token-reflexive truth-conditional schema can account for the truth of silent, mental tokens just as it can account for the truth of written or spoken tokens. I suggest that the tenseless token-reflexive truth-conditional schema for (22) is:

(23) Any token *u* of 'The forest is now burning' is true if and only if the burning of the forest is simultaneous with *u*.

If we assume that a person, *A*, thinks to herself a silent token of (22), and we call that token *a*, then the truth conditions of *a* are:

(24) *a* is true if and only if the burning of the forest is simultaneous with *a*.

Therefore, in response to all of Smith's arguments so far, a token-reflexive analysis of tensed sentences does not require those sentences to be uttered in order for them to be true. As a result, his attempts to show this account to be untenable have failed.

I turn now to Smith's fourth argument against the token-reflexive theory which, in many ways, is an embellishment of the conclusions he claims to have established with the first three arguments.[16] Smith's claim here is that normal tensed sentences express sentence-token-independent truth vehicles, but no token-reflexive sentence expresses such a truth vehicle. The repercussions of this for the token-reflexive analysis of the truth conditions of tensed sentences are that, if the claim is true, there is some aspect of the truth of tensed sentences that cannot be captured by a true token-reflexive sentence. In particular, therefore, that aspect cannot be captured by the token-reflexive sentence that purports to state the truth conditions of a tensed sentence. These truth conditions would thereby be inadequate to account

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16 Smith presents essentially the same argument in his (1987a).

for the truth of tensed sentences. Smith provides reasons for this claim by showing that it is borne out by the ordinary rules of usage to which tensed sentences adhere. The particular rule that Smith wishes to employ to this end is the rule that:

> If a normal *A* sentence is used on some occasion to express something true, what the *A* sentence expressed on that occasion would have been true then even if it had not been expressed. (Smith (1993) p. 83).

I intend to argue that this 'rule' represents a natural intuition that we have about the concept of truth, but that this intuition is better explained without appealing to the existence of abstract truth vehicles. The intuition that Smith is trying to convey here is that the way the world is as a matter of contingent fact does not depend on there being utterances expressing that the world is the way it is. Smith's mistake is to convey this intuition in terms of the semantic aspect of truth, rather than in terms of its ontological aspect. An example will illustrate my point here.

Suppose the forest burns between t_1 and t_2, and that during that period of time no one utters any sentence that expresses that the forest is now burning. Because the forest is actually burning during this period of time, our intuition concerning the concept of truth is that if someone had uttered such a sentence it would have been true. Smith interprets this intuition by postulating an abstract truth vehicle, a proposition that exists between t_1 and t_2, and that expresses that the forest is now burning. It is the existence of this proposition that, according to Smith, explains our belief that the sentence 'The forest is now burning' is true between t_1 and t_2 whether or not any token of it is actually uttered. I would explain it by putting forward the following counterfactual: between t_1 and t_2, if someone had uttered a token of the sentence type 'The forest is now burning', that sentence token would have been true. The reason why that token would have been true is that its tenseless token-reflexive truth conditions would have been fulfilled. The truth-conditional schema for that sentence type is, as we have seen,

(23) Any token *u* of 'The forest is now burning' is true if and only if the burning of the forest is simultaneous with *u*.

In order for this truth-conditional schema to be fulfilled two events must occur simultaneously: the burning of the forest and the production of a token of the relevant sentence type. Between t_1 and t_2 the forest burns so if, during that period of time, a token of the sentence type is produced, its truth conditions would *ipso facto* be fulfilled. However, if no such token is produced, it is still the case that the forest burns during that period of time, but there is no token the truth or falsity of which we have to account for.

The concept of truth is connected both to meaning and to reality. It is the connection between truth and reality that generates our intuition that the concept of truth is independent of the production of any sentence tokens. The world is the way it is independently of what anyone happens to say about it. Smith seeks to explain it by appealing to the connection between truth and meaning. His example constitutes a sentence type, a token of which would have been true if it had been uttered at a certain time, but no such token was uttered. Smith posits an abstract truth vehicle, a proposition that exists just when that sentence would have been true. He claims that it is the existence of this abstract truth vehicle that explains our intuition that what was expressed by a sentence would have been true then even if it had not been expressed. As I have illustrated, this intuition can be explained perfectly well without the existence of such abstract entities. I submit that we only need to account for truth if a legitimate truth bearer exists. Not all sentence types have a determinate truth-value, but sentence tokens do have a determinate truth-value. Consequently it is sentence tokens that are legitimate truth bearers. If a sentence token is produced it is determinately either true or false, depending on whether its truth conditions obtain. If no sentence token is produced there is no truth or falsity to account for, but reality remains the same whether or not sentences about it are produced.

Clearly, I have not established beyond all doubt that sentence tokens rather than propositions are legitimate bearers of truth. However, it seems to me by far the most plausible position to adopt.[17] Kirkham (1992) offers some 'practical philosophical advantages of choosing sentence tokens as truth bearers' (Kirkham (1992) p. 63). I present here Kirkham's reasons as evidence of the inherent plausibility of my position:

- Unlike some truth bearers, such as propositions, there is no dispute that sentence tokens exist.

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[17] This position is also defended by Haack and Haack (1970).

- Unlike beliefs, there is no ontological dispute about what kind of thing sentence tokens are. It is agreed on all sides that they are material objects. (Or at least *physical* objects if we do not want to count the sound waves of spoken sentence tokens as material.)
- Unlike beliefs and most other truth bearers, there is no dispute over what the *parts* of a sentence are. It is agreed on all sides that the parts are clause tokens, phrase tokens, word tokens, and letter tokens. (In another sense of 'part' it is agreed that the parts of a written sentence token are the molecules of ink or chalk or whatever.)
- There is no dispute on the criterion for individuating numerically distinct sentence tokens. If I state in writing that I am hungry and my father states in writing that his son is hungry, are there two *statements* here or only one? The answer is a matter of some dispute. On the other hand, it is agreed on all sides that there are *two* sentence tokens here, because the molecules of ink that make up my token are numerically distinct from the molecules that make up my father's. (Kirkham (1992) p. 63-64).

I turn now to Smith's final argument against the token-reflexive theory, which appears to present it with a serious difficulty. Smith argues that certain logical relations obtain between certain tensed sentences, and that these relations cannot be explained if these sentences have tenseless token-reflexive truth conditions. He uses as an example the logically equivalent sentences:

(25) The hurricane is occurring now,

and

(26) The hurricane is now occurring.

The tenseless token-reflexive truth conditions for a token *a* of (25) and a token *b* of (26) are as follows:

(27) *a* is true if and only if the hurricane is simultaneous with *a*,

(28) *b* is true if and only if the hurricane is simultaneous with *b*.

Smith argues that (27) and (28) cannot state the conditions necessary and sufficient for the truth of tokens of (25) and (26) because (25) and (26) are clearly logically equivalent, but (27) and (28) cannot account for this equivalence. This is because, he continues, where the relation of logical equivalence obtains between two sentences, that relation should also obtain between what those sentences express. According to Smith, a sentence expresses whatever occurs on the right hand side of the biconditional that constitutes that sentence's truth conditions. Thus, the tenseless token-reflexive truth conditions of tokens of (25) and (26) cannot account for the logical equivalence of those two sentences because a token, *a*, of (25) expresses 'that the hurricane is simultaneous with *a*' while a token, *b*, of (26) expresses 'that the hurricane is simultaneous with *b*'. It is clear that the relation of logical equivalence does not obtain between an expression of the simultaneity of the hurricane and *a* and an expression of the simultaneity of the hurricane and *b*. The truth of a token of (25) does not depend on a token of (26) being produced. Similarly, the truth of a token of (26) does not depend on a token of (25) being produced. This seems to constitute a genuine problem for the token-reflexive theory. As L. Nathan Oaklander puts it:

> [I]f one sentence logically implies a second, then we should be able to justify the inference on the basis of truth conditions; we should be able to show that what makes the first true must make the second true. If we cannot do this there would seem to be grounds for concluding either that we are mistaken about the putative entailment relations or that we have not got the right truth conditions for the sentences in question. (Oaklander (1991) p. 32).

In another essay[18] Oaklander responds to this problem put forward by Smith by arguing that it only constitutes an objection to the old tenseless theory of time, and is irrelevant to the new theory. Oaklander argues that it is not part of the goal of the new theory, in giving the truth conditions of tensed sentences, to account for the logical status and relations of these sentences. The aim of the new theory, in stating the tenseless truth conditions of tensed sentences according to Oaklander, is merely to provide an ontologically adequate representation of what temporal reality is like.

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18 Oaklander (1990).

I argued earlier in this chapter that the semantic and ontological aims of an account of the truth conditions of tensed sentences are subtly connected with one another. The new tenseless theory of time cannot evade Smith's most challenging argument simply by denying the responsibility for responding to it. The challenge must be met.

To recap briefly, Smith argues that (25) and (26) are logically equivalent, but that this fact cannot be accounted for if their truth conditions are tenseless and token-reflexive. Such truth conditions make explicit reference to the particular tokens of the sentence types (25) and (26) that are produced. Thus, such an account appears to preclude the logical equivalence of (25) and (26) because the truth of one does not depend on a token of the other being produced. I believe this problem can be resolved. Indeed, it only exists because Smith equivocates between the notions of sentence type and sentence token. The relation of logical equivalence obtains between sentence types if, and only if, they have the same truth-conditional schemata. Let us examine the truth-conditional schemata for the sentence types (25) and (26).

(29) Any token *u* of 'The hurricane is occurring now' is true if and only if the hurricane is simultaneous with *u*,

(30) Any token *u* of 'The hurricane is now occurring' is true if and only if the hurricane is simultaneous with *u*.

What occurs to the right of the biconditional in these truth-conditional schemata is the same in each case, therefore sentence types (25) and (26) are logically equivalent. Smith examined individual tokens of (25) and (26) which do not have the same truth conditions, and concluded from this that these truth conditions cannot explain the logical equivalence of the sentence types. However, it should come as no surprise that individual tokens of (25) and (26) have different truth conditions, as these tokens are context-dependent. Their truth-value depends on the temporal relation between the event referred to and the token itself. The token-reflexive analysis explains this feature and, if the distinction between types and tokens is maintained correctly it can also account for the logical equivalence of two such sentence types.

There is one remaining objection to the token-reflexive theory that Smith puts forward as a variation on the previous objection. What is the logical relation between two distinct simultaneous tokens of the same tensed sentence type? Quite clearly, the two tokens are synonymous as they are tokens of the same type. Smith

describes them as logically equivalent which, as I have suggested above, he is not entitled to do as logical equivalence is a relation that obtains between types and not tokens. I will temporarily overlook this point in order to examine this objection more closely. Consider a token, *c*, of 'It is now 1996' uttered by Chloë, and a token, *d*, of 'It is now 1996' uttered by Daphne, where *c* and *d* are uttered simultaneously. The tenseless token-reflexive truth conditions of *c* are that it is true if and only if *c* is simultaneous with 1996, while *d* is true if and only if *d* is simultaneous with 1996. The truth conditions of each token appear to have no bearing on the truth-value of the other token, and yet they are synonymous. Thus, whatever accounts for the truth of one token should also account for the truth of the other. In Smith's terminology, the fact stated by *c*, that *c* is simultaneous with 1996 is not logically equivalent to the fact stated by *d*, that *d* is simultaneous with 1996, whereas *c* and *d* themselves, being simultaneous tokens of the same tensed sentence type, are logically equivalent. My response is that it only appears that the fact stated by *c* is logically independent of the fact stated by *d*. It was stipulated in the premises of Smith's argument that *c* and *d* are simultaneous tokens. It is this relation of simultaneity, conjoined with their truth conditions that explains why *c* is true if and only if *d* is true and vice versa.

The relation between the two sentence tokens can be illustrated by the following full statement of Smith's argument:

(1) *c* is true if and only if *c* is simultaneous with 1996
(2) *d* is true if and only if *d* is simultaneous with 1996
(3) *c* is simultaneous with *d*
(4) *c* and *d* occur simultaneously with 1996

∴ *c* and *d* are synonymous

It can be seen from this argument that it was Smith's own stipulation that the two sentence tokens were simultaneous, and it is this premise of his argument, together with the fact that they are tokens of the same sentence type, that guarantees their synonymy. The sentence type is (of course) logically equivalent to itself, and hence, two simultaneous tokens of it are synonymous.

I have examined each and every objection of Smith's to the token-reflexive theory, and found none of them to be effective against it. Given the considerable advantages of this theory, together with the lack of any successful objections to it, I conclude that it does indeed provide the correct account of the truth conditions of

tensed sentences. Of course, it must be adopted in conjunction with a sensible adherence to the distinction between sentence types and sentence tokens. Furthermore, it may be that more justification is needed for the position that only sentence tokens are legitimate truth bearers. If that is the case I am sure that such justification will not be hard to find. It seems to me that the tenseless token-reflexive analysis constitutes a complete, coherent, and eminently sensible account of the truth conditions of tensed sentences.

2.5 Conclusion

Having examined the nature of truth conditions and their importance to the debate between the tensed and tenseless theories of time, I explored carefully two rival accounts of the tenseless theory. The date theory and the token-reflexive theory have each had their proponents over the years, and yet there never seemed to be genuine disagreement between them. It is clear now that the date theory fails, and I believe I have shown why it fails. It is equally clear that the token-reflexive theory succeeds in its aims. I believe that the reason for the lack of disagreement between proponents of each theory is that, essentially, they are the same theory. Each has the same ontological and semantic aims, and the same conceptual tools, except that the date theory introduces our conventional system of dates into its account of truth conditions. As we saw earlier, this is its downfall. It is possible to understand why dates were incorporated into the account; they constitute non-indexical expressions for referring to times. However, a modicum of logical investigation reveals quite plainly why they fail to achieve the objectivity they were thought to represent. Our man-made system of dates is a contingent convention, and it might have been otherwise than it is. Consequently, it cannot shoulder the responsibility for stating necessary and sufficient conditions for the truth of sentences.

I have defended the new tenseless token-reflexive analysis of the truth conditions of tensed sentences against the barrage of arguments put forward by Smith. I believe that it is capable of providing a complete and epistemically valuable account of the peculiarities of tensed language. When it is combined with arguments to the effect that any conception of temporal reality as tensed is inherently paradoxical, it will provide the basis of a theory according to which time is tenseless. In the next chapter I will examine various attempts to make sense of the notion of tensed reality, and I will argue, with McTaggart, that such a notion is inherently paradoxical.

Chapter 3

AN INVESTIGATION INTO THE COHERENCE OF THE TENSED THEORY OF TIME

In diametric opposition to the tenseless theory of time is the theory that time is tensed. It is my intention in this chapter to achieve a characterization of the tensed theory of time, and to examine it for coherence, applicability and explanatory power. The first step towards this goal is clearly to isolate the characteristic features of the tensed theory. So, what theses does it advocate? What are its central tenets? One could be forgiven for thinking oneself not too far from the truth if one said that central to the tensed theory is the proposition that time flows or passes. This is taken to express our natural intuitions, our 'common sense' beliefs about time. But, what does it mean to say that time flows or passes? Proponents of the tensed theory offer no simple answer to this question. Furthermore, the rather complex explanations that are offered of this thesis differ widely from each other, so that one is left wondering what this natural intuition is that is so hard to pin down. What is the common core that lies behind all these attempts to give theoretical weight to the 'common sense' view of time? In what follows I will put forward what I believe to be the central tenets of any genuinely tensed theory of time. After a brief overview I will examine each of these tenets in detail, exploring various ways in which they can be interpreted, and identifying some problems that they create for any theory that seeks to embrace them.

3.1 Core Components of a Tensed Theory

As a first attempt to capture the essence of the tensed theory we might say that it is the view that takes seriously the distinctions between past, present and future. It sees these distinctions as reflecting a genuine, ontological disparity. Events and moments that can truly be described as future are radically different in their ontological status from those that can truly be described as present or past. However, events and moments are not eternally classifiable as either past, present or future. An event that can truly be described as future will not always be thus describable. The Olympic Games of the year 2000 which, as I write, is a future event, is becoming less and less future, and will one day be present. Thereafter it will become a past event, and will continue to recede further and further into the past.

This suggests that another essential feature of the tensed theory is the proposition that the passage of time is an objective feature of temporal reality. Time flows, moves or passes in some sense. Making sense of this notion has proved to be a most elusive goal, and there is little consensus among proponents of the tensed theory over the extent to which this notion is metaphorical.[1]

The insistence of the tensed theory that the above two features are genuine constituents of temporal reality suggests a third essential component of the tensed theory. If the conceptual distinctions between past, present and future reflect real, ontological distinctions, and if the passage of time is an objective feature of temporal reality, then the language we use to describe these constituents of reality is an irreducible part of our conceptual scheme. Thus there is a linguistic component of the tensed theory of time which claims that any reduction of tensed language and thought to a tenseless language would result in some loss of vital temporal concepts. Tensed language and thought is irreducible, and according to the tensed theory, this justifies the claim that the ontology of time is intrinsically tensed.

Finally, I believe it is necessary to include among the core components of the tensed theory, a claim to the effect that time is relevantly disanalogous to any of the dimensions of space. There is no spatial analogue of any of the above features which, it is held, uniquely characterize time. It is important to include this tenet among the central features of the tensed theory in order to block the conclusions of any argument that substitutes spatial for temporal terms and follows the same lines of reasoning as the tensed theory. If this possibility were not explicitly ruled out, it could be claimed that a proponent of the tensed theory is committed, by parity of reasoning, to such theses as that the conceptual distinction between 'here' and 'there' represents a genuine ontological disparity. Alternatively, analogous reasoning might commit a tensed theorist to the view that the passage of space is an objective feature of reality; that space flows or passes inexorably. The claim of the tensed theorist is, however, that time differs from any dimension of space in precisely these respects.

From this brief overview of the claims of the tensed theory, I maintain that, characteristic of any tensed theory are the following core features:

(1) Tenseless language is inadequate to the task of providing a complete description of temporal reality.

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[1] For some, e.g. Schlesinger (1982), Levison (1987), Smith (1993) and Markosian (1993) it is not metaphorical at all, but for others, e.g. Prior (1968), Chapman (1982), Bigelow (1991) and Zeilicovici (1989) it is at least partly metaphorical.

(2) There is an ontological distinction between past, present and future.

(3) Temporal becoming is an objective feature of the world, and an essential feature of time.

(4) There is no spatial analogue of any of the features (1) - (3), which uniquely characterize the nature of time.

It is important to note at this stage that these characteristic features of the tensed theory are not normative, but merely descriptive. They are not essential features that any theory, if it is to be a tensed theory, must subscribe to. Rather, they are descriptive of the kinds of claims generally put forward by proponents of a tensed theory of time. As we will see throughout this chapter, the various tensed theories of time that have been propounded differ substantially from each other, so in outlining the features (1) - (4) I have tried to capture that which seems to be common to them all. Consequently, the general nature of the wording of theses (1) - (4) is a reflection of the variety of theories of time which can truly be described as tensed.

Furthermore, the theses have been stated in an order which reflects their progressive strength. Fewer tensed theorists subscribe to tenet (4) than to tenet (1). Tenet (1) is the weakest thesis. It is entailed by tenets (2) and (3), but does not entail them. However, as we saw in chapter 1, for some years the debate between the tensed and the tenseless theories centred on whether or not (1) is true. In the next four sections I will discuss each of these features in more detail. I will show how, under different interpretations, each can yield widely divergent tenets of diverse tensed theories. I will also explore some problems that face each of these theses. My ultimate aim is to show that any theory which seeks to embrace theses (1) - (4) faces insurmountable problems. I will argue that theses (2) and (3) capture the central claims of any tensed theory, and, through detailed examination of these theses I intend to establish that they cannot be consistently held together. Finally I will state the position of the theory I defended in the previous chapter, the new tenseless token-reflexive theory of time, with respect to theses (1) - (4).

3.2 Tenseless Language is Inadequate to the Task of Providing a Complete Description of Reality

This tenet is crucial for any tensed theory of time. According to tensed theorists, the irreducibility of tensed language and thought is taken as evidence that tensed language brings with it a tensed ontology. It is a widely endorsed thesis that tensed, indexical and egocentric language cannot be translated without loss of

meaning by tenseless, non-indexical or non-egocentric language. Since tensed language can convey information over and above that which can be conveyed by tenseless language, the tensed theorist takes this to imply that such language has ontological commitments over and above those of tenseless language. If that were the case, then there would indeed be tensed facts; the ontology of time would be tensed.

However, these ontological conclusions cannot be derived legitimately from the irreducibility of tensed language. The irreducibility of tensed language itself has no implications for whether temporal reality is tensed or tenseless. It is consistent with either ontology. Tenet (1) can also be embraced by the new tenseless token-reflexive theory of time. According to this theory, any completely tenseless description of reality would leave out an important component thereof. However, this component is not a part of the temporal ontology, which is wholly tenseless, but an essential aspect of our cognitive experience of time. Many philosophers have argued that tensed beliefs are essential for successful action.[2] Thus, it is a tenet of the new tenseless theory, as much as of the tensed theory of time, that tenseless language is inadequate to the task of providing a complete description of the contents of our representations of reality.[3]

3.3 There is an Ontological Distinction Between Past, Present and Future

How is one to understand this thesis? It has been interpreted and defended in many different ways. For example, consistent with this thesis is the position held by Prior (1970) and Christensen (1993) that only the present exists. If only the present exists, then it is certainly the case that there is an ontological distinction between the past, present and future. Similarly, the position that only the past and the present exist, the future being a mere realm of open possibilities is consistent with tenet (2). This position is held by, among others, Lucas (1989).[4] The view that the moment correctly characterized as 'now' has a significant, elevated ontological status is another possible interpretation of this tenet. According to this view, the ontological status of the 'now' is something that cannot be explained simply by the token-reflexivity of the term 'now'. The moment that is, objectively, 'now' is, in some sense,

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2 See, for example, Mellor (1981), Perry (1979), MacBeath (1983), Kaplan (1990), Moore (1987), Oaklander (1993) and Peacocke (1981).

3 I will discuss the concept of tensed meaning in chapter 6.

4 The position of McCall (1976, 1984, 1994), according to which the past and the present exist determinately, but the future consists in a branching model of alternative possible outcomes, is also an example of this position.

more real than any other moment. Consequently, this interpretation of tenet (2) is consistent with one's taking the past and the future to be real in some sense. Such a position might claim to be the theoretical backing to the intuition that 'the present is more real than the past, but the past is more real than the future'.

The status of this intuition is dubious as, arguably, taking it seriously would require one to subscribe to the notion of 'degrees of reality'. I believe that, within a tenseless framework, the motivation behind this intuition can be accounted for. Ordinary experience provides us with different kinds of knowledge of the past, present and future. We know about present events directly, through perception. Our knowledge of past events is based on inference, both from memory and from traces, such as written evidence. Our knowledge of future events, however, is of a different order. We anticipate, expect, predict or plan future events, but any *knowledge* of future events is usually highly circumspect. These considerations are of an epistemological nature, and as such they entail nothing about the ontological status of past, present and future. These epistemological distinctions are quite consistent with a tenseless ontology whereby all times are equally real. Any inference from such epistemological considerations to an ontological distinction between past, present and future is invalid.

Throughout the preceding characterizations of possible interpretations of tenet (2), the language which we use to talk about past, present and future is suggestive of the notion that these terms signify realms, or the temporal analogue of places. We say that an event is located in the past, or that we are moving towards the future. I do not think that such a characterization of past, present and future is logically sustainable. It is likely that expressions which suggest that it is are merely metaphorical. In any case, there have not been any serious attempts to account for the notions of past, present and future in this way. The most common position among tensed theorists is that past, present and future signify temporal properties of some kind. Such a characterization is consistent with ordinary language, since it makes sense to talk of describing an event as past, just as it makes sense to talk of describing a ruler as straight. Furthermore, just as we can ascribe properties to other properties, for example, by saying 'Straightness is a geometrical property', we can talk of pastness, presentness and futurity as possessing higher-order properties. In any case, since the position that past, present and future signify properties of events

is the most commonly defended among tensed theorists, it is the position that I will consider.[5]

If it is the case that past, present and future are genuine, monadic properties, how might a tensed theorist account for their status as properties? Clearly, an account of the nature of properties in general must be given, together with an explanation of how past, present and future satisfy one's criteria for what it is to be a property. According to current debate about the metaphysical status of properties various possible positions have emerged. I will consider two general accounts of the nature of properties, and I will show that neither can support the claim that past, present and future constitute properties. I will then point to a general feature of the notion of properties that any theory of properties must be able to account for. I will argue that any account of past, present and future as properties necessarily fails to meet the requirements of this general feature, and that this explains why the two general accounts of properties failed to make sense of past, present and future as properties. The two general accounts of properties that I will discuss are the theory that takes properties to be identical with their extensions, and the theory that takes properties to be universals, metaphysically distinct from the particulars which can ordinarily be said to instantiate them.

According to one widely held theory of properties, a property is identified with the set of all things, or particulars, to which we pre-theoretically ascribe that property. For example, the property *F* is identical with the set of all things which, we ordinarily say, instantiate the property *F*. Proponents of this theory delineate the group of all things to which we ordinarily ascribe a given property as the set which includes everything that has, does, and will (pre-theoretically) possess that property. Thus, a property is identified with its timeless extension. For example, the property of being furry is identified with the set of all things that have been, are and will be furry. How might such a theory give an account of past, present and future as properties?

Any theory that supports the claim that there is an ontological distinction between past, present and future is also committed to the claim that events continually change in respect of these characteristics. To endorse the first claim but not the second would yield a very strange picture of time, one in which there is a genuine distinction between past, present and future, but that distinction remains

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[5] The view that past, present and future signify properties is defended by, among others, Smith (1986, 1993), Markosian (1993) and Zeilicovici (1986).

static, the same events always possessing the same temporal characteristics in this tensed manifold. Thus, a theory that takes past, present and future to be temporal properties is committed to the claim that events continually change in respect of the tensed properties they possess. Events successively acquire and shed the properties of less and less remote futurity, then they acquire and shed the property of presentness, and finally they acquire and shed successive properties of more and more remote pastness.

In order to see how a theory that identifies properties with their timeless extensions might account for the notions of past, present and future as properties I will take, as an example, the general property of pastness. The set of all things that have been, are and will be past is identical with the set of all things that have existed, exist and will exist. If the property of pastness is identical with its timeless extension, then it is identical with the timeless set of actual existents. Furthermore, the set of all things that have been, are and will be present is also identical with the set of all things that have existed, exist and will exist, as is the set of all things that have been, are and will be future. Since events undergo continual and inexorable change with respect to the temporal properties that they possess, everything successively possesses them all. Consequently, a theory that identifies properties with their timeless extensions is unable to distinguish between the extensions of the properties of pastness, presentness and futurity, and hence is unable to distinguish between these properties themselves. The distinction between these tensed properties, on this theory of properties collapses.

One possible escape route from this conclusion would be to stipulate that the extension of the property of pastness is to be taken as the set of all things that are *now* past. This set is distinct from both the set of all things that are now present and the set of all things that are now future. By making this stipulation the distinction between the extensions of these properties, and hence between these properties themselves, can be retained. There is a cost, however. As we have seen, events and times are continually changing from future to present to past, so the distinction between all things past, present and future that obtains now is not the distinction that will always obtain. By specifying a time at which the extensions of these properties are determined, we are effectively ruling out the possibility that events and times change in respect of these properties. A theory of tensed properties such as this inevitably finds itself in an unsustainable position. By claiming that properties are to be identified with their timeless extensions, it necessarily collapses the distinction between the properties of pastness, presentness and futurity, which have the same

timeless extensions. The only way to avoid this is to anchor the extensions of these properties to a particular time. However, this move renders temporal becoming incompatible with the absolute distinction between the three properties.

One possible objection to this argument is to claim that the timeless extensions of the three temporal properties are only identical if there is no first or last moment of time. If there is a first or a last moment of time, then it is never true that the first moment of time is future, and it is never true that the last moment of time is past. Hence, the extensions of the three properties do not overlap absolutely. Now, it seems to me that questions of the metaphysical nature of time should not depend on the particular topological properties that time happens to have. However, despite this, the objection can be met. Suppose time does have a first and a last moment. In that case, the extension of the property of presentness is identical with the extension of the disjunctive property of 'being past or future'. Thus, a theory that takes properties to be identical with their timeless extensions cannot distinguish between these two temporal properties.

According to the second theory of properties under discussion, a property is a sui generis entity, a universal that is metaphysically distinct from the particulars which are ordinarily said to instantiate it. It seems at first sight that a theory such as this has the conceptual wherewithal to preserve the distinction between the properties of pastness, presentness and futurity. This is because, by asserting that properties are sui generis entities, it can stipulate that these three properties are irreducible entities, and irreducibly distinct from one another. However, the timeless extensions of these three properties are identical. Indeed, they are necessarily identical because the nature of tense dictates that if an event possesses any tensed property, then it possesses them all. Everything that exists possesses every tensed property. Thus, the claim that they are distinct sui generis entities is metaphysically impotent. Furthermore, I believe that a theory of properties such as this cannot preserve the distinction that it stipulates between these tensed properties. This is because there is a general principle to which any theory of properties must adhere, and the doctrine that past, present and future are properties contravenes this principle.

The role of the notion of properties in our conceptual scheme is to enable us to carve up the ontological landscape. It allows us to differentiate between objects, and to judge that certain objects are the same in certain respects. Thus, whatever the metaphysical nature of properties, it is crucial to any coherent account of them that it provides the means for delineating their extensions. I contend that it is a general

principle to which any theory of properties must adhere, that if any two putatively distinct properties are necessarily co-extensive, then they are the same property.[6] That is, if the extensions of any two properties are the same in all possible worlds, then there is no possible means of individuating them. Thus, although a theory that takes properties to be sui generis universals may *stipulate* that the properties of pastness, presentness and futurity are distinct, it has no means of individuating them, because they are necessarily co-extensive. Such a theory is equally unable to preserve the distinction between them. Furthermore, each of them applies to everything that has existed, exists and will exist. Therefore, not only are they necessarily co-extensive, but their identical extensions correspond to the timeless sum total of existence. The distinction between them cannot be preserved, and moreover, their application in the world does no metaphysical work. They do not enable us to carve up the ontological landscape, since they each apply to everything.

It is open to this theory of properties, just as it was to the previous theory, to anchor the extensions of these temporal properties to a particular time. In this way the extensions of the properties of pastness, presentness and futurity would remain distinct, and the means with which to individuate them would be preserved. However, just as with the previous theory, this move renders the distinction between past, present and future incompatible with tensed change. The distinction between the three properties can be maintained only at the cost of ruling out the possibility that events and times change from future to present to past.

The objection to the previous theory, that the properties of pastness, presentness and futurity are not co-extensive if there is a first or a last moment of time can also be made with respect to this theory. However, it can also be met. If there is a first or a last moment of time, then the property of presentness is necessarily co-extensive with the disjunctive property of 'being past or future'. Hence this theory is unable to individuate between these two properties.

I conclude that any theory that seeks to account for past, present and future as properties will fail. The two essential features of tense are that past, present and

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[6] In his (1996), Oliver asserts that there are four adequacy conditions that any theory of properties must meet. These are (i) that it must provide an account of the truth of the sentence 'Particular *a* instantiates the property *F*', (ii) that it must preserve the truth of the sentence 'different particulars can have the very same property', (iii) that it must preserve the truth of the sentence 'A particular can have many properties', and (iv) that it must provide identity conditions for properties. Each of these four adequacy conditions relates to the application of properties in the world. It is my belief that what underlies them all is the general principle stated in the text. If a theory of properties is unable to meet that principle, then it follows that it will not be able to meet Oliver's four adequacy conditions.

future are ontologically distinct, and that events and times continually change from future to present to past. Taking past, present and future to be properties is one way of accounting for the first feature. However, the inclusion of the second feature guarantees that the extensions of these three properties are necessarily identical. Thus, any theory of past, present and future as properties will not be able to individuate between them. The general principle that if any two putatively distinct properties are necessarily co-extensive, then they are the same property rules out the possibility that past, present and future are properties.

It is possible that the correct account of the nature of tensed properties is not to be found within any account of ordinary properties such as being furry and being square. One 'last-ditch' attempt to account for past, present and future as properties is to follow Zeilicovici (1986), and classify them as 'non-ordinary properties'. Zeilicovici begins by noting that the supposed properties of pastness, presentness and futurity flout the principle of the identity of indiscernibles. Two entities, *a* and *b* may differ insofar as *a* is past and *b* is future, and yet the terms 'a' and 'b' may name the same entity. He concludes from this that tensed properties are non-ordinary properties. It seems to me that one would be justified in concluding from this that the supposed tensed properties are not properties at all. The introduction of a new category of 'non-ordinary' properties seems rather ad hoc. Zeilicovici offers very little in the way of explanation as to the way in which non-ordinary properties differ from ordinary properties, apart from the fact that the former do not obey the principle of the identity of indiscernibles, while the latter do. However, he does offer the following comparison in order to clarify the nature of tensed properties:

> The attribution of pastness operates somewhat like the attribution of existence in the Kantian sense: it applies to the event complete with all its properties, and only defines its status. (Zeilicovici (1986) p. 189).

Thus, pastness is a non-ordinary property that is attributed to events complete with all their properties. One might describe it as a second-order property. As such, how might we delineate its extension? Does it apply to all events that have been, are and will be past? If so, it is necessarily co-extensive with the second-order properties of presentness and futurity, and so the distinction between them collapses. If, on the other hand, its extension includes only those events that are now past, the distinction between past, present and future remains, but at the cost of rendering it

incompatible with tensed change. Thus, introducing a fundamentally different kind of property, a higher-order, or 'non-ordinary' property, does not avoid the difficulties that appear to beset every account of tensed properties. The problem simply reappears at this higher-order level of existence.

An awareness of the difficulties that beset any account of tensed properties has prompted some alternative responses by tensed.theorists. Some have denied that pastness, presentness and futurity are properties at all. Lucas (1989) remarks:

> If we assume that the words 'past', 'present' and 'future' are, logically speaking, predicates denoting properties of events, inconsistency follows at once. (Lucas (1989), p. 10).

However, an alternative account of their ontological status has not been forthcoming. Others have admitted that they are properties, but have refused to offer an explanation of their nature. An example of this sort of response is provided by Markosian (1993):[7]

> Suppose that there really are genuine, monadic temporal properties like *being nine years past*. Then a number of questions naturally arise concerning the nature of *A* properties. What exactly are *A* properties? Which things may possess them? What are the conditions under which it is true that a thing possesses an *A* property? I don't know exactly how to answer all of these and related questions about the nature of *A* properties. In fact, I'm not even sure that it would be appropriate to try to answer all of these questions. (Markosian (1993), p. 834).

I can only conclude that the task of accounting for tensed properties generates one of three responses. Either, an account is offered that leads to inconsistency, or the existence of tensed properties is denied, but the distinction between past, present and future is still retained, or they are embraced into the ontological scheme of things together with an outright refusal to explain their nature. I cannot countenance any of these conclusions.

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7 Bigelow makes a similar remark. He says 'Nor have I said anything about how the properties of past, present and future are to be understood. They seem, in fact, very likely to be unanalyzable and utterly mysterious.' (Bigelow (1991) p. 18).

3.4 Temporal Becoming is an Objective Feature of the World, and an Essential Feature of Time

The incorporation of this tenet, under some interpretation or another, is an essential component of the tensed theory of time. As we have seen, to omit this feature from a tensed theory of time would not result in inconsistency, but it would yield a strange, and rather counterintuitive picture of time. Without the passage of time thesis, a tensed account of time would involve there being a genuine distinction between past, present and future that remains fixed and unchanging. The moments and events that are, as a matter of fact, characterized by being present would possess this characteristic eternally. To avoid such a picture of time tensed theorists seek to incorporate temporal becoming into their account of temporal reality.

Temporal becoming is taken, by its proponents, to be a real, objective feature of the world. It involves some kind of temporal change, such that events which are future gradually become less and less so, then they become present and then past. An alternative description of this phenomenon is that presentness or the 'Now' successively characterizes later and later moments and events. At first sight, these descriptions of this phenomenon, this passage of time, seem perfectly intuitive and reasonable. It is only when we seek to understand it fully, and in particular, when we attempt to reconcile it with tenet (2) of the tensed theory, that it begins to lose its intuitive appeal. In this section I will examine four very different attempts to provide theoretical support for the intuition that time flows in some sense.

3.4.1 The Property Acquisition and Loss Hypothesis

The first interpretation of the passage of time that I will look at is perhaps the most common, and also the most problematic. It involves pastness, presentness and futurity being thought of as properties, and the passage of time being constituted by the successive acquisition and loss of these properties by moments and events in time. We have already seen how the notion of tensed change is incompatible with the view that tenses are properties of some kind. Whatever criteria one fixes upon to distinguish past, present and future from each other, that distinction collapses once it is recognized that every event possesses each property successively. In order to retain the distinction between these three tense determinations, one must specify a moment at which a particular distribution of past, present and future obtains. However, this produces a static 'snap-shot' picture of tensed time. In order to incorporate tensed change into the account we must recognize that different

distributions of past, present and future obtain at different times. However, this recognition removes our means of retaining the distinction between past, present and future. The account thus collapses under the weight of this contradiction.

The contradiction that I have identified here is essentially the same as McTaggart's, now famous, paradox of time. I discussed this paradox in chapter 1 of this thesis, so here I will merely summarize his argument. McTaggart argued that past, present and future are incompatible determinations of events, but that every event has them all. He concluded that these determinations, and the change in respect of them that events undergo are not part of reality. The usual response to McTaggart's paradox is that no event has these three incompatible characteristics simultaneously, but only successively, and there is no contradiction in something's possessing incompatible properties at different times. However, this response fails, as I outlined in chapter 1. In the terms in which I characterized the contradiction in section 3.3 of this chapter, this response fails in precisely the following way.

Tensed theorists object to the assumption that past, present and future apply to each event non-successively. If we will only recognize that these mutually incompatible properties apply to events and times *successively*, we avoid all contradiction. This is true, but the price of avoiding all contradiction is to give up the only means we have of distinguishing between past, present and future as properties. Thus, we give up the only means we have of rendering the notions of past, present and future meaningful. The distinction between the application of these three tensed properties collapses unless we relinquish the reality of tensed change. These two features of tense, interpreted in this way, cannot consistently be held together.

Any theory of time which seeks to incorporate an account of the tenses as properties, or characteristics of some kind must reconcile this thesis with the notion of temporal becoming. Yet, from the foregoing discussion, this would seem to be a futile enterprise, as the two notions are inconsistent with one another. Many philosophers, throughout the history of the debate about tense, have attempted to give an account of temporal becoming that remains coherent while past, present and future are taken to be properties. As an illustration of the problem posed by McTaggart's paradox for the tensed theory I will look at one such account which is,

in many ways, typical of all the others. It is the response to McTaggart's paradox offered by Quentin Smith.[8]

Smith presents an outline of McTaggart's paradox, and then attempts to undermine it in the following way. He challenges the validity of the claim that the tensed theory of time implies that every event is past, present and future. He maintains that there is only a contradiction here if an event, E, is taken to possess these mutually incompatible properties non-successively. He goes on to argue that the claim that the tensed theory of time entails that every event possesses each tensed property non-successively is an unwarranted assumption:

> Without this initial assumption, there is no contradiction in the first set of terms that needs to be escaped. The tenser, of course, rejects this initial assumption; according to him, the tensed theory of time entails not (1) [Event E is past, present and future], but
>
> (4) E will be past, is now present, and was future; or E is now past, was present, and was (still earlier) future; or E is now future, will be present, and will (still later) be past.
>
> Item (4) is consistent since the properties of pastness, presentness and futurity are ascribed to E at different times. (Smith (1993) p. 171).

Item (4), however, tells us nothing about the tensed property that E possesses at any given time. At best it amounts to the simple (tensed) truism that, assuming E to exist at some time or another, E is either past, present or future. But how do we distinguish between past, present and future? We specify a time at which each of the properties past, present and future range over a particular, exclusive set of events. However, the distribution of tensed properties that obtains at this specified time will not obtain at any other time, because of the reality of temporal becoming. Thus, as we have already seen, the distinction between past, present and future collapses.

Smith's attempt to avoid McTaggart's paradox fails. I conclude that any attempt to make sense of the reality of temporal becoming in terms of the successive acquisition and loss of tensed properties faces insurmountable problems.

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[8] Smith (1993). Other similar defences against McTaggart's paradox are given by Gale (1968b), Swinburne (1990), and Whitrow (1980).

3.4.2 The Moving Now Hypothesis

An alternative way of interpreting the passage of time thesis is to appeal to the existence of a moving Now.[9] This entity is taken to be perpetually sliding along the series of events ordered by the relations 'earlier than', 'later than', and 'simultaneous with'. The movement of the Now along this series of events is taken to be that which renders it a temporal series. The set of simultaneous events that momentarily coincides with the Now are those events which are objectively present, and which are more real than any other event. One philosopher who adheres to this position is Schlesinger (1982). He writes:

> Temporal points from the future, together with events that occur at those points, keep approaching the NOW and, after momentarily coinciding with it, keep on receding into the past. The NOW is of course not conceived as some sort of an object but rather as a point in time at which any individual who is temporally extended experiences that point as being in the present, has, so to speak, the spotlight of time focused momentarily on it. (Schlesinger (1982) p. 502).

The problem with Schlesinger's characterization of the Now is that it applies to every moment, simply in virtue of the token-reflexivity of the term 'now'. Every moment is now relative to itself. Every moment is a 'point in time at which any individual who is temporally extended experiences that point as being in the present' (Ibid.). As an illustration of the moving Now hypothesis, this characterization is empty. However, let us give Schlesinger the benefit of the doubt, and assume that there is something more to the Now than merely the token-reflexivity of the expression. According to Schlesinger, moments that are characterized by the Now are privileged in some sense. Events become momentarily more real as they are embraced by the Now. Thus, it carries with it some ontological status that it conveys onto temporal entities that come into contact with it. Let us allow all this, and see what follows.

The first thing to note about this position is that if the Now is merely an alternative expression for the property of presentness, as contrasted with the properties of pastness and futurity, then this characterization of temporal passage

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[9] Proponents of this hypothesis include Schlesinger (1982) and Brandon (1986).

merely collapses back into the previous account, with all its attendant problems. If the thesis of the moving Now is to avoid the contradictions that beset the property acquisition and loss hypothesis, it will have to be relevantly different. Let us assume then, that the moving Now has a role that is relevantly different from the ascription of the property of presentness to moments and events.

The moving Now is thus an entity that bestows a privileged ontological status onto the events and moments with which it successively coincides. In what sense does the moving Now move? The paradigm case of movement occurs when an object changes in respect of its spatial location as it changes in respect of its temporal location. This is not the sense in which the Now moves, as the Now does not move from one place to another. If its movement consists in its changing its temporal location as it changes its temporal location, then it does not constitute a genuine instance of movement. That is, we cannot say that the Now genuinely moves unless we postulate a higher-order temporal series in respect of which the Now changes its location as it changes its ordinary temporal location. However, according to this theory, the distinguishing mark of a temporal series is that it contains a moving Now. Thus, in order for this higher-order temporal series to be a genuine temporal series, it too must have a moving Now. In order to make sense of the movement of this Now, we will need to postulate yet another temporal series. This line of explanation leads to an infinite regress of temporal series, and is thus unsatisfactory.

A similar criticism of this account of temporal becoming has been made by Broad (1923, 1938). Broad describes the movement of the Now along a series of events by analogy with

> The spot of light from a policeman's bull's-eye traversing the fronts of the houses in a street. What is illuminated is the present, what has been illuminated is the past, and what has not yet been illuminated is the future. (Broad (1923) p. 59).

However, he notices the following difficulty with this picture of the nature of temporal becoming:

> The lighting of the characteristic of presentness now on one event and now on another is itself an event, and ought therefore to be itself a part of the series of events. (Ibid. p. 60).

Clearly, the event which is the becoming present of event E cannot be a part of the series of events of which E itself is a part. That event is part of a different series. There is a series of events constituted by the becoming present of E_1 followed by the becoming present of E_2, and so on. As Broad notes:

> All the problems which the policeman's bull's-eye analogy was invented to solve are simply taken out of other events to be heaped on that particular series of events which is the movement of the bull's-eye. (Ibid. p. 60).

Once again we are left with something that does not constitute genuine movement unless the existence of higher-order temporal series is recognized. However, the recognition of their existence does not solve the problems that assail the ordinary, first-level temporal series. It merely shifts those problems onto the next temporal series.

Smart (1949) has identified a number of problems with this conception of temporal becoming. If the Now moves along a series of events, and if the verb 'to move' is used in its ordinary sense, then it should make sense to ask at what rate the Now moves along the series of events. A rate of change implies a correlation between a temporal series and another series, usually a series of spatial locations. In order for there to be a rate at which the Now moves along the series of events, we must either introduce a higher-order time series, or offer the empty answer that time flows at the rate of one second per second. Neither response is satisfactory, and the notion of the moving Now remains mysterious and unexplained.

It seems that the only way to make sense of the moving Now without postulating higher- and higher-order time series is to introduce into the picture static reference points relative to which the Now can be said to move. Thus, at one time, t_1, event E is future. The Now has not yet coincided with E. At a later time, t_2, E is embraced by the Now; E is present. Then, at a still later time, t_3, the Now has moved on to later events, and E is past. However, the problem with this account of the moving Now is that, by anchoring the Now to a sequence of temporal reference points, it has ceased to be a genuine case of tensed change. There is nothing tensed in this account at all. It merely informs us that E occurs at t_2, and is thus later than t_1 and earlier than t_3. It is not a case of movement, but rather a case of a certain particular, E, standing in different dyadic relations to different temporal entities. I

conclude that an account of the moving Now cannot be the correct metaphysical interpretation of temporal becoming.

3.4.3 The Worldly Becoming Hypothesis

In the face of the overall failure to make any kind of sense of the notion of temporal becoming, there have recently been a number of defences of a new and innovative account of transience. I will refer to this approach as 'worldly becoming'. Its two main proponents are Schlesinger (1991, 1994) and Bigelow (1991), although neither acknowledges the other when presenting his own account. This approach can ultimately be seen as a response to the failure of the various moving Now theories of temporal becoming. At the end of section 3.4.2 it was seen that some kind of reference point is needed relative to which the Now moves. Employing times for this purpose reduces the account to one that does not involve tensed change at all. Bigelow and Schlesinger respond to this impasse by suggesting that the reference points we use should be not times, but worlds.

Bigelow's attempt to explain temporal passage seems to deal effectively with the very problem that other accounts have come up against. That is, he confronts the difficulty of reconciling the claim that past, present and future are distributed objectively throughout all temporal entities, with the claim that temporal entities continually change with respect to these characteristics. Bigelow postulates

> A series of worlds, each containing the same things, and differing only in which of those things are past, which are present, and which are future. (Bigelow (1991) p. 11).

He then employs this series of worlds in his explanation of the passage of time. According to Bigelow, the passage of time is expressed by such sentences as that 'what is present, was future, and will be past'. He intends to provide a non-indexical account of how such sentences can be both non-contradictory and meaningful. In the face of McTaggart's paradox he cheerfully remarks:

> We just need to find points of reference other than moments of time. I nominate possible worlds. Not only can contrary properties attach to the same object at different times, but also in different possible worlds. (Ibid. p. 5).

Bigelow relativizes the possession of the incompatible tensed properties to possible worlds in the following way. If an event, E, is present, was future, and will be past then, in Bigelow's terminology, E is present in world w, past in some world x which is in w's future, and future in some world y, which is in w's past. Talk of worlds that are 'in the past or future of' other worlds is idiomatic for talk of worlds that contain all and only the same temporal objects as each other, but whose distribution of past, present and future is sequentially different.

Nathan Oaklander (1994) has effectively disposed of this account of temporal becoming by pointing out that, despite Bigelow's efforts to avoid it, his account ultimately succumbs to its own version of McTaggart's paradox:

> If all worlds are actual, then a contradiction results, and if only one world is actual, then there is no tensed time and change. (Oaklander (1994) p. 246).

The crux of this objection is that it forces a proponent of this account to address some rather difficult questions. Are all the worlds in this tensed multiverse actual, or is just one of them actual, the rest being merely possible? Bigelow seems to want to say that each of these worlds successively *becomes* actual, and then, presumably fades back into mere possibility. If this is the picture intended by Bigelow, then it seems to relativize actuality to B series times. A world, w, is merely possible at t_1, actual at t_2, and then merely possible again at t_3. Oaklander firstly considers whether the worlds in w's past and future are actual, or merely possible. If they are merely possible, then there is no tensed change. To see this, Oaklander asks us to,

> Compare an apple that is green at t_1 in the actual world and red at t_2 in a possible world. The existence of these worlds does not constitute change in the apple unless the possible world becomes actual later than the 'currently' actual world. (Ibid. p. 246).

Thus, if only one of these worlds is actual, then there is an objective distinction between past, present and future, but there is no tensed change. If, on the other hand, each possible world successively becomes actual, then every event is (actually) past, present and future, so the distinction between them collapses. Bigelow's account of worldly becoming thus falls prey to the very paradox it was set up to avoid.

Schlesinger (1991, 1994) also postulates a set of possible worlds which are all qualitatively identical, but which differ from each other in that each assumes actuality at a distinct moment in their common *B* series of events. In Schlesinger's account a two-dimensional account of time is generated, with the communal *B* series running along the *x*-axis, and a series of possible worlds situated along the *y*-axis, each with its own unique moment of actuality.

Schlesinger's account also succumbs to its own version of McTaggart's paradox, which can be arrived at in at least two different ways. In the first place, an objection similar to the one that Oaklander brought to Bigelow's account is applicable here. If one of these worlds is actual, then the distinction between past, present and future is retained, but there is no tensed change. However, if each world is actual in its turn in order to accommodate tensed change, the distinction between past, present and future collapses, as every event in the common *B* series is actually past, present and future.

An alternative route to paradox is to argue that, in order to accommodate tensed change, every world must be actual. Yet, if one world, *w*, is actual, as it is when one moment in its *B* series is present, then every other world must be merely possible. However, by that rationale, every world is both actual and merely possible, yet actuality and mere possibility are mutually incompatible modalities. Thus, according to this position, every world is both actual and non-actual.[10] One can avoid this contradiction if one relativizes actuality, such that each world is actual at itself, but this strategy rules out Schlesinger's account of tensed change. This is because, according to Schlesinger, the actual world is 'unique - not merely from its own perspective, but absolutely so - in that it is unreservedly actual' (Schlesinger (1991) p. 429). The passage of time, according to Schlesinger, is the acquisition and loss of this absolute, non-relational property by successive worlds, each with its own unique present. Just as relativizing tense to particular times rules out the possibility of tensed change, so relativizing actuality to particular worlds rules out the possibility of worldly becoming. Thus, Schlesinger's account requires that actuality is an absolute, non-relational property, but as we have seen, the successive acquisition and loss of such a property leads to paradox.

It seems then, that the strategy of finding points of reference other than moments of time to which one relativizes past, present and future, is unsuccessful. The same paradox arises, albeit in a more roundabout fashion. However, even if this

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10 A similar objection has been made to this theory by Buller and Foster (1992).

had not been the case, the hypothesis of worldly becoming involves many other metaphysical perplexities. In the first place, no mention is made by either Bigelow or Schlesinger about the account of possible worlds to which they subscribe. Are they Lewisian realists, such that each world is real and concrete, but none are actual absolutely? Schlesinger denies that this is the case, but Bigelow is silent on the issue. However, this account of modal reality cannot .be adopted in conjunction with worldly becoming because the latter hypothesis involves worlds successively becoming absolutely actual, but according to Lewisian modal realism actuality is token-reflexive and not absolute. It is possible that proponents of worldly becoming would adopt fictionalism over possible worlds, or see possible worlds as maximal consistent sets of sentences, or some other ersatz version of modal realism. However, it is not clear what sense can be made of such abstract entities becoming *actual*. Whatever account of modal reality is adopted, none are without their problems, so the problematic doctrine of temporal becoming is conjoined with a problematic doctrine concerning the nature of possible worlds. However, having led the worldly becoming hypothesis to its paradox, I will not labour these additional metaphysical problems.

3.4.4 The Accretion of Facts Hypothesis

The final attempt to account for the passage of time that I will examine here is the position, varieties of which are held by, among others, Broad (1923), Zeilicovici (1989), Lloyd (1978) and Lucas (1989). It is the position which is most eloquently stated by Broad as follows:

> It will be observed that such a theory as this accepts the reality of the present and the past, but holds that the future is simply nothing at all. Nothing has happened to the present by becoming past except that fresh slices of existence have been added to the total history of the world. The past is thus as real as the present. On the other hand, the essence of a present event is, not that it precedes future events, but that there is quite literally *nothing* to which it has the relation of precedence. The sum total of existence is always increasing. (Broad (1923) pp. 66-67).

This appears to be an entirely different picture of temporal becoming from the preceding accounts. It does not appear to involve properties of pastness,

presentness and futurity, so it can avoid all the difficulties inherent in theories which incorporate them. Neither does it involve a moving Now, so it can avoid the problems that beset such an entity. Its ontological advantage is that it only involves one world, a world of existence that is continually growing; a world that is constituted by a continual accretion of facts.

I will first examine an objection to the accretion of facts hypothesis made by Oaklander (1984) which I believe to be unsuccessful. Oaklander attacks Broad's account of becoming on similar grounds to those which defeated the moving Now hypothesis. He claims that it leads to an infinite regress of higher-order time series. His argument goes as follows:

> The sum total of reality is always changing. At one moment, it includes a certain number of existents and then at a later moment it includes a greater number of existents. But with becoming and time being essential to each other the members of the series of moments at which the sum total of existence is *x*, and then *y*, must themselves undergo becoming which requires a second series of moments and so on. (Oaklander (1984) p. 87).

The problem with the property acquisition and loss hypothesis, and the moving Now hypothesis is that they are qualitative accounts of becoming. Whether the moving Now is a characteristic, or an object with which events enter into relations, this account, no less than the property acquisition and loss hypothesis, involves the qualification of moments and events by tense. This was problematic in the various ways we have seen. The only escape was to treat the tensed characteristics as relational, but that led to the breakdown of tensed change itself. It seems, at first sight, that Broad has avoided all the problems and contradictions involved in a qualitative approach to temporal becoming. His approach, by contrast, is quantitative. Becoming, on this account, is not something that *happens to* a series of events and moments. It is rather, something that reality undergoes; an expansion. Thus Oaklander is mistaken to talk as if there is a series of moments which are subjected to a process of becoming. It is this move that allows him to identify a further series of moments (the moments *at which* each moment is present), which, in turn, must be subjected to this process of becoming. Oaklander is interpreting Broad as putting forward a hypothesis similar to the moving Now hypothesis. However, this is precisely the position Broad attacked with his 'policeman's bull's-eye' analogy.

Thus, Oaklander's allegation that Broad's account sets up an infinite regress of temporal series is unwarranted. It springs from a misrepresentation of Broad's account. It is not legitimate to argue that an increase in the sum total of reality generates a series of moments that must themselves undergo temporal becoming.

However, despite the fact that this account is quantitative rather than qualitative, we still need a criterion for establishing the distinction between past, present and future. I propose the following definitions as illustrative of this position:

(1) x is present $=_{Df}$ x is at the limit of existing reality
(2) x is past $=_{Df}$ x exists and is not at the limit of existing reality
(3) x is future $=_{Df}$ x does not exist

There is a difficulty with (3), in that we need to be able to distinguish between what does not exist in virtue of being future, and what does not exist in virtue of being, say, fictional, impossible, or contingently non-existent. However, the major problem is with (1) and (2). Every temporal entity is, at the dawn of its existence, present. Thereafter it is past. Thus, every temporal entity is both present and past. But these characteristics are mutually incompatible. If we apply the definitions of past and present so that there is a genuine distinction between them, such that one moment satisfies the definition of present, and all the rest satisfy the definition of past, then the continual increase in reality is effectively halted at that point. It is no longer consistent with this distinction. The accretion of facts hypothesis eventually leads back to its own version of McTaggart's paradox.

Broad and the other proponents of this hypothesis appeared to have fixed upon what is problematic for accounts of temporal becoming, and to have omitted it from their own account. However, it seems that, despite their best efforts, their account is covertly qualitative, and thus, they are unable to construct an account of becoming that steers clear of paradox and contradiction.

I conclude that no account of the doctrine of temporal becoming has been put forward which avoids the paradox originally identified by McTaggart. It is my belief that the two essential components of the feature of time known as tense cannot consistently be held together. The claim that there is a genuine ontological distinction between past, present and future cannot be preserved together with the claim that events and times continually and inexorably change from future to present to past. Theses (2) and (3) of the tensed theory are mutually incompatible.

3.5 *There is No Spatial Analogue of Any of the Features (1) - (3) which Uniquely Characterize the Nature of Time*

Central to the tensed theory is the doctrine that time is relevantly different from any of the dimensions of space. The tensed theory is opposed to what its proponents often refer to as the 'block universe' theory. According to the 'block universe' theory time is seen as merely a fourth dimension of essentially the same kind as the three dimensions of space. Tensed theorists, on the other hand, hold, as we have seen, that temporal becoming is an objective feature of time, but there is no analogous phenomenon in any of the dimensions of space. They also hold that past, present and future mark genuine, ontological distinctions, but there is no such distinction between, for example, here and there, North and South, or left and right. Spatially tensed language is thought by proponents of the tensed theory to be covertly relational, while temporally tensed language is irreducibly non-relational.

It is important that tenet (4) is incorporated into the tensed theory, since it can be used to block any spatial analogues of arguments in favour of tensed time. A common strategy among tenseless theorists is to construct spatial analogues of arguments in favour of temporal becoming, or of the genuine distinction between past, present and future.[11] If an analogous spatial argument can successfully be constructed, then this presents a challenge to the tensed theory of time. Its proponents must find a flaw in the spatial reasoning in order to block the analogy, or find themselves committed to the conclusion that space flows, or that there is a genuine, ontological distinction between here and there.

An alternative strategy, when faced with spatial analogues of arguments for tensed time, is that adopted by Swinburne (1990) and Sosa (1983a, 1983b). Their approach involves what we might call 'biting the bullet'. Faced with spatial analogues of reasoning that leads to tensed time, they accept the spatial reasoning on the same grounds as those which support the temporal reasoning. They embrace the challenge that they are committed, by parity of reasoning, to a spatially tensed ontology. Swinburne writes:

> But the proper response must be that there are indeed spatially tensed facts. It is a well known phenomenon to have a map of some area with towns such as Oxford and Cambridge, and their latitude and longitude well marked, and yet not to know whether Oxford is here

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11 This strategy has been adopted by, among others, Mellor (1981).

> or somewhere else. Where here is is indeed an additional fact beyond those of latitude and longitude. (Swinburne (1990) p. 127).

According to Swinburne and Sosa there is no distinction between reality and the contents of our representations of reality. Swinburne's example illustrates that he takes it to be the case that where there is an unanswered question about a state of affairs, there is a further *fact* about that state of affairs that has been omitted. Thus, when I look at a map and I am unaware that the town represented on the map is also the town that can truly be described as 'here', then I am unaware of the *fact* that that town is here. According to a more usual tenseless account of space, the fact that I am unaware of is a relational fact constituted by the town and myself *being at the same location*. In any case, the view expressed by Sosa and Swinburne is exceptional. Tensed theorists usually maintain that, while time is irreducibly tensed, space is not.

3.6 Conclusion

I have identified and examined closely the central doctrines of any tensed theory of time. The position of the theory I defended in the previous chapter, the new tenseless token-reflexive theory of time, with respect to theses (1) - (4) is as follows. The tenseless theory accepts tenet (1), that tensed language is irreducible, but denies the ontological conclusions that tensed theorists draw from it. It denies that there is an objective, ontological distinction between past, present and future. It also denies that there is any genuinely real phenomenon of temporal becoming. Consequently, it does not face the problem of trying to reconcile tenets (2) and (3) with each other. Finally, it claims that there is an analogy between time and space, in that neither is tensed. From my analysis of tenets (1) to (4), under all their possible interpretations, I conclude that (2) and (3) are not mutually compatible. (2) without (3) is not acceptable to a tensed theorist. (3) without (2) is not coherent. Thus, attempts to conjoin these two theses into a coherent theory of time will inevitably result in paradox.

Chapter 4

THE TENSELESS THEORY OF TIME AND MODAL REALISM

The tenseless token-reflexive theory of time consists essentially of two components. Firstly, there is the claim that the truth conditions of all tensed sentence tokens are token-reflexive, and can be stated in entirely tenseless terms. The second claim is that time is tenseless. All times are equally real, and tense is not a constituent of temporal reality. That is, there is no genuine, ontological distinction between past, present and future, and temporal becoming is not a real feature of time. These two features of the tenseless token-reflexive theory of time are parallel, in some ways, to the essential features of David Lewis' theory of genuine modal realism.[1] At the semantic level Lewis offers an indexical account of actuality which is formally analogous to an indexical account of temporal terms such as 'now' and 'present'. At the ontological level there appears to be an analogy between Lewis' account of all possible worlds being equally real, and the doctrine of the tenseless theory that all times are equally real.

My concern in this chapter is to examine this apparent analogy between these two theories. How strong is it? How closely does it bind the two theories together? Is it strong enough to commit a tenseless theorist, by parity of reasoning, to genuine modal realism? My attempt to answer these questions will involve a close examination of each theory, an analysis of some attempts to undermine the analogy, and a consideration of some attempts to reinforce it. Ultimately I hope to prove that, as a proponent of the new tenseless token-reflexive theory of time, I am not forced to countenance Lewis' plurality of worlds.

4.1 The New Tenseless Token-Reflexive Theory of Time

To recap briefly, this is the theory that, although tense is ineliminable from thought and language, nevertheless it does not constitute part of temporal reality. So the theory does not aim to provide an analytic reduction of all tensed sentences to tenseless sentences. It recognizes that this is not possible. Instead, it claims to provide an ontological reduction of tense to tenseless temporal relations. This is

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1 In this essay, where I refer to modal realism, it is *genuine* modal realism I intend to discuss, except where I indicate explicitly that I am discussing *ersatz* modal realism.

achieved by giving the truth conditions of tensed sentences in entirely tenseless terms. The token-reflexivity of these truth conditions explains how different tokens of the same tensed sentence type can have different truth-values. A token of 'The sun is rising' uttered before dawn is false, as is a token of the same type uttered at noon. It is only tokens of this type uttered *simultaneously* with the rising of the sun that are true. The metaphysical implications of this truth condition project are that, although tense is a fundamental aspect of language and thought, it does not exist in reality. All that is needed to account for the objective truth or falsity of tensed sentences are tenseless temporal relations between events. Thus, the distinction between past, present and future constitutes no part of reality whatsoever, and all times are ontologically on a par.

4.2 David Lewis' Theory of Genuine Modal Realism

As I see it, there are two essential components of David Lewis' theory of modality. First of all, there is the indexical theory of actuality, which is given its fullest expression in Lewis (1970). According to Lewis, 'actual' is an indexical term and should be subject to an analysis of the same kind as that appropriate for other, more familiar indexicals such as 'here', 'now' and 'I'. The appropriate analysis for these indexicals is that their reference is wholly determined by, and varies according to, particular features of the context in which they are uttered.[2] The reference of the indexical expression 'here' varies according to the place at which it is uttered or inscribed, so a token of 'here' refers to the place at which it is produced. Tokens of 'I' refer to the person who produces them, so their reference varies according to a different feature of the context of utterance: the utterer. Similarly, 'now' refers to the time at which it is uttered or inscribed, so non-simultaneous tokens of 'now' refer to different times. What then, is the appropriate feature of the context of utterance

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[2] The analysis of indexical expressions here is essentially the direct reference theory of indexicals. In chapter 6 I will argue that, strictly speaking, the tenseless token-reflexive theory of time is not consistent with the direct reference theory of indexicals, since the latter theory requires times to be incorporated into the truth conditions of sentences containing indexicals, but the former theory only invokes events, utterances and temporal relations in stating their truth conditions. However, I will also argue that the reasons which motivate the direct reference theory of indexicals are consistent with the tenseless token-reflexive theory of time. Consequently, the tenseless token-reflexive theory can preserve the central insights of the direct reference theory of indexicals without explicitly invoking times into the truth conditions of tensed sentences. Hence, there is no genuine inconsistency between these two theories. Consequently, in this chapter I will continue to employ the terminology of the direct reference theory of indexicals.

according to which the reference of the supposed indexical term 'actual' systematically varies? Lewis writes:

> I suggest that 'actual' and its cognates should be analyzed as *indexical* terms: terms whose reference varies, depending on relevant features of the context of utterance. The relevant feature of context, for the term 'actual', is the world at which a given utterance occurs. According to the indexical analysis I propose, 'actual' (in its primary sense) refers at any world *w* to the world *w*. (Lewis (1970) pp. 184-5).

If, as Lewis claims, 'actual' is an indexical expression, such that its reference varies from world to world then, he maintains, we can explain why skepticism about our own actuality is absurd:

> How do we know that we are not the unactualized possible inhabitants of some unactualized possible world?.....The indexical analysis of actuality explains how we know it: in the same way that I know that I am me, that *this* time is the present, or that I am here. All such sentences as 'This is the actual world,' 'I am actual,' 'I actually exist,' and the like are true on any possible occasion of utterance in any possible world. That is why skepticism about our own actuality is absurd. (Lewis (1970) p. 186).

Another consequence of the indexical theory of actuality is the rejection of the thesis that actuality is an absolute, non-relational quality. The indexical theory of actuality denies that what is actual is, in some sense, ontologically superior to what is merely possible. If the indexical theory of actuality is true, it is not the case that one world, the actual world, is more real than all the other merely possible worlds. For Lewis, this is a benefit of the indexical theory of actuality as it complements the other component of his position: modal realism.

Modal realism is 'the thesis that the world we are part of is but one of a plurality of worlds, and that we who inhabit this world are only a few out of all the inhabitants of all the worlds' (Lewis (1986) p. *vii*). Each world in this plurality is as real and concrete as every other world, although they are causally and spatiotemporally isolated from each other. Other worlds differ from the world we

happen to inhabit, not in kind, but only in what goes on at them. The world we inhabit might have been different from the way it is, an intuition that we frequently express by the use of modal sentences, for example, 'The pyramids might have been built by aliens'. According to Lewis, this sentence, if true, is made true by there being a world in which the pyramids (or a counterpart thereof) *were* built by aliens.

Genuine modal realism has one immediately obvious disadvantage: it generates an ontological inventory that is uneconomical in the extreme. There are many who would not countenance such a vast multitude of existents. Lewis is aware of this opinion, admitting that 'modal realism *does* disagree, to an extreme extent, with firm common sense opinion about what there is' (Lewis (1986) p. 133). However, he argues that its ontological disvalue is outweighed by its pragmatic value: there are 'many ways in which systematic philosophy goes more easily if we may presuppose modal realism in our analyses' (Lewis (1986) p. *vii*). What then, are these pragmatic reasons for adopting modal realism; in what ways does it assist the progress of philosophy?

One reason in favour of genuine modal realism is that it disposes of the question 'Why should anything exist?'. A world is a 'maximal mereological sum of spatiotemporally interrelated things,' (Lewis (1986) p. 73). On that analysis there is no world where there is nothing at all, so it would seem to be necessary that there is something. Lewis does not claim to provide a genuine explanation of *why* there is something rather than nothing. It is merely a feature of his account that it turns out to be necessary that something exist, thus disposing of the question by making it irrelevant.

A more powerful reason in favour of genuine modal realism is that it affords remarkable clarity to analyses of modal expressions, and to modal reasoning.

> The standards of validity for modal reasoning have long been unclear; they become clear only when we provide a semantic analysis of modal logic by reference to possible worlds and to possible things therein.....Modal reasoning can be replaced by non-modal, ordinary reasoning about possible things.....Once we have a non-modal argument we have clear standards of validity; and once we have non-modal translations of the premises, we can understand them well enough to judge whether they are credible. (Lewis (1970) p. 175).

The problem that Lewis identifies here, and purports to solve, is that there are many ways in which modal reasoning is abstruse if we take modal expressions such as 'possibly' and 'necessarily' to be primitive and irreducible sentential operators. For one thing, modal contexts are intensional such that co-referential terms cannot be substituted within them while the sentence as a whole retains the same meaning, or even the same truth-value. However, a theory that transforms opaque modal locutions into transparent ordinary locutions about modal things (possible worlds and possibilia) has the advantage of 'extensionalizing' modal reference and inference. Under this approach to modal reasoning the modality is contained within modal objects, so that we can refer to them and quantify over them in just the same way as we do for ordinary objects. According to this analysis, a sentence of the form 'Actually *p*' is true if and only if *p* is true in the world of utterance; 'Possibly *p*' is true if and only if *p* is true in at least one world;[3] 'Necessarily *p*' is true if and only if *p* is true in all possible worlds, and 'Not possibly *p*' is true if and only if *p* is true in no possible world. This approach yields an analogy with temporal expressions which quantify over times in a similar way. 'Actual' is thus analogous to 'present'; 'possible' is analogous to any tensed expression which locates an event at some time other than the present; 'necessarily' is analogous to 'always' or 'at all times', and 'not possibly' or impossibly' is analogous to 'never' or 'at no time'.

We now have before us a clear picture of Lewis' modal realism and his indexical theory of actuality, as well as a reminder of the central tenets of the tenseless token-reflexive theory of time. These brief excursions through the main tenets of each theory have already revealed some of the ways in which these two theories might be thought to be analogous. In the next section I will spell out this alleged analogy in more detail.

4.3 Tenseless Time and 'Modeless' Modality

The tenseless token-reflexive theory of time offers a token-reflexive analysis of tensed language. According to this analysis present tense sentence tokens are true if and only if they occur simultaneously with whatever they are about. The truth of such tokens requires only that they stand in the tenseless relation of simultaneity to

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[3] For Lewis, 'Possibly *p*' is true if and only if *p* is true in at least one world *accessible from* the world of utterance. The accessibility relation, within Lewis' theory, is one whose purpose is to define different modalities by delineating subsets of all the possible worlds. I will ignore the accessibility relation in this essay, as I am concerned with possible worlds *per se* and not with particular subsets of them. This relation does not contribute significantly to the discussion concerning whether there is an analogy between time and modality.

the event that they refer to. It does not, as some tensed theorists would maintain, require that the events or times referred to possess any non-relational property of presentness. Nor does it require that the relevant events or times occupy some uniquely elevated ontological status, such that the present is more real than the past or the future. Every event and moment, according to this analysis, is present relative to itself. Thus the token-reflexive analysis of tensed language is consistent with a tenseless ontology whereby all times are equally real, and none are uniquely distinguished from all the others by some characteristic of presentness. It does not entail that time is tensed in any way. A tensed theorist who wished to adopt the token-reflexive analysis of tensed language would be obliged to provide independent arguments for the conclusion that time is tensed, together with arguments for the conclusion that a tensed ontology is consistent with the token-reflexive analysis of tensed language. The two components of the tenseless token-reflexive theory of time are thus consistent with one another, and indeed, complement each other.

The two components of genuine modal realism appear to be consistent with one another, and to complement each other in precisely the same way. If one espouses an indexical analysis of the term 'actual', such that each world is actual relative to itself, is one thereby committed to the view that all worlds are equally real? If the indexical theory of actuality is true, then it is not the case that actuality is a metaphysically privileged status that one world, our world, attains. Analogously, if the status of presentness consists simply in the token-reflexivity of present tense terms and the temporal indexical 'now', then it is not the case that presentness is a metaphysically privileged status that one moment, this moment, attains. I maintain that there is a close connection between an indexical analysis of tensed language and a tenseless ontology. This connection consists in the fact that, in the absence of arguments to support a tensed ontology, together with arguments to defeat the claim that a tensed ontology is inherently paradoxical, the only temporal ontology that can consistently be maintained in conjunction with a token-reflexive analysis of tensed language is a tenseless one. If there is an equally close connection between an indexical analysis of actuality and an ontology of genuine possible worlds, then a question naturally arises concerning whether a tenseless theorist with respect to time is committed, by parity of reasoning, to genuine modal realism. My main objective in this chapter is to undermine any suggestion that a proponent of the tenseless theory of time is committed by analogy to genuine modal realism. As a first step towards that objective I will examine some attempts by other philosophers to undermine the apparent analogy.

4.4 An Examination of Some Attempts to Undermine the Analogy

There have been some attempts to uncouple these particular conceptions of time and modality from each other. Various strategies have been adopted in order to achieve this end. E.J. Lowe, for example, argues that there is a significant disanalogy between times and possible worlds that is sufficient to undermine any suggestion that the two theories may be analogous in any way. He describes this disanalogy as:

> An important dissimilarity between temporal relations and relations between possible worlds, consisting in the fact that the former put instants of time into a unique linear order not paralleled by any analogous linear ordering of possible worlds. In short, time constitutes a *dimension* in a way that possibility does not. (Lowe (1986) p. 195).

Essentially the argument is that there is a lack of ordering in the domain of possible worlds, and that this constitutes an inherent difference between worlds and times, such that they cannot be assimilated to one another, or treated in a similar metaphysical fashion. That there is a disanalogy here at all has been denied by Yourgrau (1986), and of course Lewis,[4] who both argue that the relation of similarity between worlds is sufficient to provide them with an ordering, even if we are unable, in principle, to determine precisely what that ordering is.

It seems to me that this objection, and the response to it, both miss the mark. Whether or not possible worlds constitute a dimension seems to be irrelevant to the question of whether our reference to our own world, and reference to other worlds by their inhabitants, with the use of the expression 'actual' succeeds via an indexical mechanism.[5] It is also irrelevant to the ontological status of the worlds thus referred to. If we take the terms 'now' and 'I' as being, fairly uncontroversially, indexical expressions, we can see clearly that whether the domain of objects referred to by these expressions is ordered or not is irrelevant to their indexical nature, and is irrelevant to the question of whether every object in the domain is on the same ontological level.

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4 See, for example, Lewis (1973).

5 Although, this is not the point that concerned Lowe in the article I quoted from.

The reference of the expression 'now' varies according to when it is uttered, and the reference of the expression 'I' varies according to who utters it. The domain of reference for 'now' is constituted by times which, as Lowe pointed out, are ordered by the temporal relations in which they stand to each other ('earlier than' and 'later than'), in such a way as to constitute a dimension. The domain of reference for 'I' is constituted by speakers of a common language, and although spatiotemporally related to each other, they are not ordered by any 'personal' relation analogous to the temporal relations, and do not collectively constitute a dimension. None of this prevents 'I' from functioning successfully as an indexical, nor does it provide any grounds for denying that all speakers of a language exist on the same ontological level. So, whether the domain of reference of an indexical expression is well ordered (as in the case of times), or not (as in the case of speakers of a language) does not appear to have any consequences for whether that expression qualifies as an indexical, or for whether the objects in that domain of reference are on the same ontological level. This objection has indeed focused on a dissimilarity between times and possible worlds, but I maintain it is an irrelevant dissimilarity. That is, it has no consequences for the existence or otherwise of a semantic or metaphysical analogy between genuine modal realism and any theory of temporal reality.

Graeme Forbes adopts a rather different strategy in his attempt to undermine the suggestion of an analogy between time and modality. He argues that our experience of time differs significantly from our experience of modality. He concludes from this that, metaphysically, times are not analogous to possible worlds. Consequently there is no threat of there being analogous theories of time and modality. We may infer from this that if the tenseless theory of time and modal realism appear to be analogous, this is no more than an appearance because there are significant underlying differences between the categories of time and modality. The difference that Forbes chooses to describe is that 'we move through time.....but do not move through the other possible worlds in which we exist,' (Forbes (1983) p. 127). Is this difference enough to unhitch tenseless time from modal realism?

For the tenseless theory of time the claim that we move through time is a mere figure of speech used to convey the truth that we have different temporal parts that exist at different times. Thus, if the difference identified by Forbes is decisive enough to undermine any supposed analogy between times and possible worlds, we ought to cash it out in terms consistent with the tenseless theory of time and modal realism. In these terms Forbes' disanalogy reduces to the claim that we have different temporal parts at different times, but we do not have different 'modal' parts

at different possible worlds. Restating the disanalogy in these terms results in its dissolution. According to modal realism we have many counterparts that exist in many different possible worlds. Analogously, according to the tenseless theory of time, we have many different temporal parts that exist at many different times.

However, there are some tenseless theorists who deny that individuals have temporal parts, and altogether reject temporal part theory.[6] It may be that Forbes' disanalogy is more effective in divorcing tenseless time from modal realism if understood in terms consistent with the tenseless theory of time that rejects temporal part theory. According to such a theory, the notion of movement through time is an allusion for an individual's standing in different temporal relations to different events and moments of time. For us to recognize an event, *e*, as being first future, then present, and then past, is just for us to judge at some time, *t*, that *e* is later than *t*, and at some later time t_1 that *e* is simultaneous with t_1, and at some still later time t_2 that *e* is earlier than t_2. Within such a theory Forbes' disanalogy reduces to the claim that we stand in different temporal relations to different times, but we do not stand in analogous relations to different possible worlds. Once more the alleged disanalogy dissolves. Tenseless time and modal realism are indeed analogous in this respect. Just as we stand in different temporal relations to different times, other possible worlds are related to the world we inhabit in virtue of being more or less similar to our world. Employing the disanalogy that Forbes fixes on to attempt to release the tenseless theory of time from its association with modal realism is unsuccessful.

Martin Davies' strategy looks far more promising in the bid to uncouple tenseless time from modal realism. He argues that the indexical theory of actuality is false. 'Actual' is not an indexical expression, according to Davies, so there is no analogy between it and 'now' or 'present'. If Davies' argument is successful, the allegedly analogous reasoning does not even get past the first premise. Davies writes:

> If a speaker uses 'now'.....in an utterance, then it is not sufficient for understanding of that utterance that an audience should merely know the meaning of the sentence uttered. He must be able to identify the time.....of the context of utterance; only then will he know what has been said.....But one can hardly hold that understanding of an utterance involving 'actually' requires identification of the actual

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6 For example, Mellor (1981,1991) and MacBeath (1983).

> world from amongst the set *W* of possible worlds. (Davies (1983) p. 132).

The force of this disanalogy lies in the claim that indexicals typically change their reference from one context of utterance to another, and that to understand how the reference changes is to understand the indexical expression. The argument continues that while this is true for indexicals, it is not true for the term 'actually' because its reference does not change in our experience; it always refers, for us, to the world we inhabit. To understand this term then, we do not have to identify the context in which it is uttered, and so it is not a genuine indexical. A similar objection is made by Peter van Inwagen (1980a), who argues that treating 'actually' as an indexical is a gratuitous and illegitimate extension of the notion of indexicality, for much the same reasons as those offered by Davies. My response is equally applicable to both arguments.[7]

Based on the notion of what it is for an expression to be an indexical, this objection begs the question against the indexical theory of actuality. It is true that all utterances in this world of 'This is the actual world' are true in this world, but this is in accordance with Lewis' position. It does not follow from this that utterances in other worlds of the same sentence type are not true in those worlds in virtue of the term 'actual' referring indexically to those worlds. This objection only has any force if one has already decided that 'actually' and its cognates do not function as indexicals. It can only be claimed that this is a gratuitous extension of the notion of indexicality if one provides solid grounds for that claim. If the only reason offered is merely the assumption that the claim is true, then the objection has no force whatsoever.

I believe that the arguments I have discussed in this section are representative of objections to the existence of an analogy between time and modality. They singularly fail to undermine any such analogy. That being so, the analogy not only appears at first sight to be compelling, it is also able to withstand the objections that have so far come its way. I turn in the next section to scrutinize one particular formulation of the analogy put forward by M.J. Cresswell. D.H. Mellor defends McTaggart's argument for the unreality of tense, and adopts a tenseless theory of

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7 In a similar vein Gale (1989) argues that 'actual' is not an indexical because certain salient features of the more common indexicals are not features of the term 'actual'. I believe that Gale's arguments beg the question against Lewis in the same way that Davies' and van Inwagen's arguments do so.

time as an alternative to McTaggart's own conclusion that time is unreal. Cresswell argues that if Mellor's argument for the tenseless theory is successful, and there are many who believe that it is, then so too is an equally powerful argument for David Lewis' theory of genuine modal realism.

4.5 A Modal Version of McTaggart's Paradox

According to McTaggart tense is unreal because the supposition of its existence yields a contradiction. If tense is real then the following two propositions must be true:

(1) Past, present and future are incompatible determinations. Every event must be one or the other, but no event can be more than one.

(2) But every event has them all. If *M* is past, it has been present and future. If it is future, it will be present and past. If it is present, it has been future and will be past. (McTaggart (1927) Reprinted in R. Le Poidevin and M. MacBeath (eds.), (1993) p. 32).

These two propositions clearly contradict one another, so McTaggart concludes that tense is unreal. Since he believes that tense is also essential to the reality of time itself, he concludes that if tense is unreal, so too is time.[8] Mellor draws a different conclusion from this contradiction. Since tense is unreal, but time exists, time must be tenseless. M.J. Cresswell constructs a modal analogue of McTaggart's paradox with the aim of proving that, just as tense is unreal, primitive modality is unreal, and consequently modal reality must consist in a plurality of Lewisian worlds. The modal analogue goes as follows:

> Many *M* positions are incompatible with each other. An event which is merely possible for example cannot also be actual. Being merely possible and being actual are mutually incompatible properties of things and events. But because they are contingencies everything has to have them all. Everything occupies every *M* position from merely possible to actual. But nothing can really have incompatible properties, so nothing in reality has modal properties. *M* positions are a myth. (Cresswell (1990) p. 165-6).

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8 For a fuller discussion of McTaggart's paradox, see chapter 1 of this thesis.

First of all, what are we to understand by an '*M* position'? Cresswell intends it to be the modal analogue of an *A* series position, which is a position in time identified as either past, present or future. Let us suppose then, that an *M* position is a position in 'modal space', identified as, for example, actual, merely possible, impossible, necessary and so on. However, if this is the correct interpretation of an *M* position, then the argument is quite disanalogous to McTaggart's temporal argument. There are many *M* positions that are quite compatible with each other. An event may be, for example, both actual and necessary, actual and contingent, or possible and necessary. So, it would seem that, for many of these *M* positions there is really no difficulty in saying that events can occupy more than one of them. McTaggart, on the other hand, is quite right to say that every *A* position is mutually incompatible with every other *A* position. However, it is possible that Cresswell intends to talk only of actuality and mere possibility as representing *M* positions. Since these two *M* positions are incompatible, the argument goes through, up to this point at least, although it remains puzzling just what Cresswell means when he says 'Everything occupies every *M* position from merely possible to actual'. What *M* positions are there between actual and merely possible?

The next move in McTaggart's argument, after establishing that every *A* position is incompatible with every other *A* position, is to note that every event occupies every *A* series position. Because the tenses of events are forever changing, every event has to have them all. The modal counterpart of this move in Cresswell's argument is to say that because *M* positions are 'contingencies', every event has to have them all. Cresswell appears to imply that there is an analogy between the continual change of tense that events undergo, and the contingency of modal properties. If there is an analogy here at all it is a weak one, certainly too weak to support the inference to the claim that everything occupies every *M* position. Furthermore, is it really the case that *M* positions are occupied contingently? Modalities are generally taken to be ascribed necessarily and not contingently, for instance, it is necessarily necessary that 2 + 2 = 4. Is Cresswell suggesting that we dispense with this practice so that mathematical truths are merely contingently necessary?

In seeking to construct a modal analogue of McTaggart's paradox, Cresswell faltered when it came to invoking a modal analogue of the continual change of tense that events undergo. He appealed to the 'contingency' of modal properties, but it clearly does not validate the analogous modal inference. Thus, this modal analogue

of McTaggart's paradox fails to force one into the position either of rejecting modality as incoherent (as McTaggart rejects tense as incoherent) or of adopting modal realism (as Mellor adopts tenseless time). It fails, I believe, because there is no clear modal analogue of the change of tense that events and times appear to undergo. Modal realism may be analogous to tenseless time in many respects, but it is not the case, as Cresswell claims, that a modal analogue of McTaggart's paradox commits us to modal realism. The analogy may be powerful, but it is not that powerful. However, it may still be powerful enough to compel a tenseless theorist to adopt modal realism or admit inconsistency. In order to avoid facing that choice I turn now to examine Lewis' theory a little more closely.

4.6 Token-Reflexivity and Real Worlds

Lewis' conception of modal reality consists in his genuine modal realism together with the indexical theory of actuality. Aware that the major disadvantage of his position is its extreme ontological requirements, Lewis invites us to peruse its advantages, which are largely pragmatic, and to consider whether the ontological price is worth paying. Many of its pragmatic benefits derive from its association with the indexical theory of actuality. But what precisely is the relation between the two components of his theory? Does the indexical theory of actuality entail modal realism, or does modal realism entail the indexical theory of actuality? I maintain that neither entailment relation obtains.

To see that the indexical theory of actuality does not commit us to a plurality of worlds, consider the following example. According to the indexical theory of actuality, a token of the sentence 'It is actually the case that the sky is blue' is true if and only if the sky is blue in the world in which that token is produced. So far there is no commitment to the existence of any world except the world in which the token occurs. What if things had been different? What if the sky had been khaki? In that case the expression 'the actual world' would have denoted a different world if the indexical theory of actuality were true. However, this does not commit me to the existence of a world where the sky, as seen from a counterpart of the planet earth, is a uniform shade of khaki. One can adopt the indexical theory of actuality even if the expression 'actual' only applies to one world.

To illuminate this restriction, it might be useful to consider the indexicality of the pronoun 'I' as understood by a solipsist who believes that, as a matter of fact, no other minds exist apart from her own. Sally the solipsist will be quite happy to adopt an indexical analysis of 'I' such that it refers, on each occasion of use, to the one who

utters it, even though there is, as a matter of fact, only one speaker that this indexical expression ever successfully refers to: herself. The fact that Sally believes herself to be the only person who genuinely exists will not cause her to redefine the meaning of 'I' such that it is an alternative name for herself. She already has a perfectly good name. No, the indexical analysis of 'I' is the most useful and explanatory account of that expression, despite the effective limitation in its genuine reference.

Thus, one can hold the indexical theory of actuality without thereby being committed to genuine modal realism. The indexical theory of actuality is quite consistent with a picture of modal reality according to which only one world genuinely exists It is noteworthy that one can also adopt genuine modal realism without thereby being committed to the indexical theory of actuality. One can hold that there is a plurality of genuine worlds, except that one of them differs from all the others by possessing the absolute, non-relational quality of actuality. Such a theory is attributed by Armstrong to Leibniz, although he notes that 'the textual warrant for this is dubious,' (Armstrong (1989) p. 3). According to a theory of this kind,

> Over and above the actual world there are an indefinite multiplicity of merely possible worlds. They constitute all the ways the world could have been.....It is natural to develop this view by saying that it involves *two levels of being*. The actual world has the superior sort of being: actuality. The merely possible worlds have some sort of being, but they lack actuality. (Armstrong (1989) pp. 3-4).

Arguably, a proponent of such a theory faces even more difficulties than Lewis. Not only does this theory have the ontological drawbacks of Lewisian modal realism, but it must also provide an account of that in virtue of which *this* world is actual, and not some other world. Indeed, on this view, our world might not be actual and we may be deluded in thinking that it is. It must also account for the fact that it seems to involve two levels of being: actual existence and merely possible existence.

The indexical theory of actuality and genuine modal realism can be prized apart from one another. Opponents of genuine modal realism can adopt the indexical theory of actuality, with all its attendant pragmatic benefits. One might object that, as a theory for illuminating modal expressions of ordinary language, the indexical theory of actuality is effectively rendered useless without the notion of possible worlds. Arguably it *would* be rendered ineffectual without the notion of possible worlds, but we can employ the notion without admitting their concrete existence.

We simply need to find some ontologically benign substitute for Lewis' possible worlds. There are a number of alternative theories of modality which employ the notion of possible worlds, but which stop short of recognizing their concrete existence. For example, those who espouse what Lewis calls *ersatz* modal realism take possible worlds to be abstract entities that represent ways this world might have been. They have been construed as, among other things, maximal consistent sets of sentences (Stalnaker (1976)), as true stories (Adams (1974)) and as idealized representational pictures. An alternative account of the nature of possible worlds is given by Armstrong (1989), who suggests that we should see possible worlds as useful fictions, very much like the notion of the ideal gas, the average family or the economic man.[9] We can usefully employ these notions, distinguish true from false statements about them, yet there is no need or reason to postulate their very existence. I do not mean to take up any particular one of these theories of modality, I merely wish to point out that there exist more palatable alternatives to Lewisian modal realism.

The fact that the two components of his theory can be divorced from one another in this way will not deter Lewis from retaining modal realism. He has presented a substantial number of arguments against the various alternative accounts of possible worlds, which suggests he has no intention of giving up his own conception of modal realism in favour of such a theory. In fact, it is more likely to be the case that his primary commitment is to modal realism, from which he takes an indexical account of actuality to follow:

> This makes actuality a relative matter: every world is *actual at* itself, and thereby all worlds are on a par.....The 'actual at' relation between worlds is simply identity.....Given my acceptance of the plurality of worlds, the relativity is unavoidable. I have no tenable alternative. (Lewis (1986) p. 93).

Lewis will still adopt modal realism, even though it is not entailed by the indexical theory of actuality, believing it to have, on balance, greater pragmatic value than any competing alternative account of modality, or any alternative account of the nature

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9 Other proponents of modal fictionalism include Menzies and Pettit (1994) and Rosen (1990).

of a possible world. However, I believe that genuine modal realism faces a serious problem.

Lewis claims to offer us a completely reductive analysis of modality. He maintains that it is a positive advantage of his account that it leaves no unanalyzed modal primitives awaiting explanation. Bearing this in mind, let us examine how he accounts for the modal notion of impossibility. Nathan Salmon argues that 'whatever grounds there may be for believing that there really are possible worlds yield the same, or related reasons for believing that there are impossible worlds' (Salmon (1984) p. 116). Margery Bedford Naylor (1986) and Takashi Yagisawa (1988) have argued that Lewis' own arguments for possible worlds, if successful, work mutatis mutandis for impossible worlds. However, Lewis refuses to include impossible worlds among his plurality of worlds. William G. Lycan (1991a) has argued that, this being so, Lewis' concept of a world, of which he espouses a plurality, invokes a modally primitive notion.

Lycan's reasoning is that if an argument for the existence of a possible world yields an equally good argument for the existence of an impossible world, then his rejection of impossible worlds and retention of possible worlds depends on our antecedent understanding of the notion of 'possible'. The concept of a possible world is itself dependent on an unanalyzed modality. This is a serious problem for Lewis because he claims to offer us a completely reductive analysis of modality if only we will accept his plurality of worlds. He urges that this is what makes his theory superior to any ersatz modal realism, because the latter theories must retain some modal notion as primitive. If, however, it turns out that his theory too retains a modal notion as primitive, then, ontologically, we ought to reject his theory.[10]

Richard B. Miller defends Lewis by offering the following as a definition of 'world' that supposedly appeals to no modal primitive:

(1) Individuals are worldmates if they are spatiotemporally related.

(2) A world is a mereological sum of worldmates. (Miller (1989) p. 477).

Lycan responds:

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10 Rosenberg (1989) has also argued that Lewis' modal realism is either ungraspable, or it reduces to ersatz modal realism, or it covertly relies on modal notions and so its explanations are circular.

> Since nothing but the impossibility of round square cupolas in the first place keeps a round square cupola from being spatiotemporally related to another, perhaps less exotic object, Miller's Lewis would not be able to rule out *worlds* containing round square cupolas. (Lycan (1991b) p. 212).

Miller is not convinced:

> 'Round square cupola' purports to be a description of a possible object, but it is not. It is a contradictory description and so describes nothing. Hence it describes no individual. Hence it describes no individual having spatiotemporal relations. Hence it describes no worldmate. So there is no need to amend the definition of world to limit worlds to possible worldmates. (Miller (1993) p. 159).

I submit that Miller's response does not succeed in overturning Lycan's objection. He claims that 'round square cupola' does not describe a possible object because it is a contradictory description. What does Miller mean by 'contradictory' in this context? Perhaps he means that it is not possible for any individual to possess both of these properties at the same time. If so, then he has failed to find a non-modal reason for excluding impossible objects, and hence impossible worlds from the modal landscape. Miller anticipates this response and defends his use of the term 'contradictory':

> Genuine modal realism provides the resources to define 'contradictory' without the primitive modal operator. We require only quantification over worlds and define 'contradictory' as false in every world. (Miller (1993) p. 160).

At this point I contend that Miller has led the argument full circle without ultimately defeating the objection. 'Contradictory' means false in every world simply because Miller and Lewis reject the existence of impossible worlds. If there were any impossible worlds, then 'contradictory' would have to be defined as 'true in some impossible world'. Miller and Lewis must reject the existence of impossible worlds because their stipulation that worlds are concrete, physical things prevents there being any impossible ones. However, this rejection of impossible worlds is based on

the prior distinction between possible and impossible - a modal distinction. I conclude that there is an inherent circularity in Lewis' genuine modal realism because he cannot eliminate modally primitive notions from the account, while claiming to provide a completely reductive analysis of the modalities. This difficulty, taken together with the extreme ontological disvalue of genuine modal realism, renders it a highly problematic account of modality.

The difficulties I have identified with Lewis' modal realism are at least twofold. First of all, the pragmatic value of Lewis' theory as a whole derives largely from its association with the indexical theory of actuality together with some notion of possible worlds over which one can quantify. However, as it turns out, one can adopt these highly illuminating aspects of Lewis' position without having to take on board his genuine modal realism. The indexical theory of actuality is what one might call a promiscuous theory, able to attach itself to any coherent account of the nature of a possible world. Given any such coherent account, we can also quantify over possible worlds thus retaining these two important benefits, but dispensing with the drawback of a plurality of genuine worlds.

Lewis himself does not agree with that conclusion. He believes that the alternative accounts of possible worlds, on balance, run into more problems than does his own account of them. He asks us to grit our teeth and embrace an ontology of genuine possible worlds. It is worth it, he tells us, for only by doing so can we achieve a completely reductive analysis of modality. However, the Miller-Lycan problem reveals that it is only apparently completely reductive. There are primitive modalities hidden away among those possible worlds. On the whole then, I choose to reject genuine modal realism. However, it remains to be seen whether I can consistently do so while retaining a tenseless and token-reflexive account of time.

4.7 Token-Reflexivity and Real Times

Earlier in this paper it became clear that there are reasons to suppose that a tenseless token-reflexive theory of time is closely analogous to Lewis' genuine modal realism. In the previous section I identified some serious problems for the latter theory. My task in this section is to consider whether the problems that infected Lewis' theory have temporal analogues that do analogous damage to the tenseless token-reflexive theory of time.

The first difficulty for Lewis was that the indexical theory of actuality and quantification over worlds can both be adopted independently of a genuine ontology of possible worlds. These two beneficial aspects of his theory can be prized apart

from its problematic aspect. Can an indexical account of 'now' and 'present', together with quantification over times be similarly prized apart from a genuine tenseless ontology whereby all times are equally real?

A token-reflexive analysis of tensed sentences appeals to the existence of events, times and the temporal relations of precedence, subsequence and simultaneity. For the tenseless theory, these temporal relations are constitutive of time. Thus, the fact that the token-reflexive analysis of tensed language requires their existence gives us reason to suppose that the semantic and the ontological aspects of this theory complement each other. However there are at least two tensed theories that purport to adopt a token-reflexive analysis of tensed language in conjunction with a tensed ontology. These are the theories of Quentin Smith and E.J. Lowe. The existence of these theories suggests that, perhaps a token-reflexive analysis of tensed language is not as closely tied to a tenseless ontology, according to which all times are equally real, as tenseless theorists would like to think.

Quentin Smith's theory of temporal reality incorporates a token-reflexive analysis of tensed language into an ultimately tensed theory of time. He argues that tensed sentence tokens have token-reflexive rules of usage, but that this is insufficient to ensure the truth of a tenseless theory of time. Indeed, he argues, the hypothesis that tensed sentences express non-relational tensed propositions is not only consistent with these tenseless rules of usage, but also explains why tensed sentences obey them. For example, on this account, a token *T* of the tensed sentence 'The storm is approaching' is true if and only if both *T* and the storm's approach are present. That is, they both possess the irreducible, non-token-reflexive property of presentness (Smith (1993) p. 98). If these events are both present, it follows that the token-reflexive truth conditions of *T* also obtain. That is, *T* is simultaneous with the storm's approach.

Now, what makes Smith's theory tensed is his inclusion in it of tensed, non-token-reflexive properties, such as pastness, presentness and futurity. However, there is nothing in the token-reflexive analysis of tensed language itself which entails the existence of such properties. Independent reasons need to be given to invoke their existence. In my view, Quentin Smith's position does not threaten to divorce the token-reflexive analysis from a tenseless ontology. Rather, Smith is introducing an additional category of temporal entity into his ontology, a move which leaves the onus firmly with him to provide justification for it. Furthermore, his account must overcome the problems inherent in adopting a tensed ontology that I identified in chapters 1 and 3 of this thesis. That is, Smith must defeat McTaggart's argument for

the conclusion that real tense is inherently self-contradictory. He must also provide an account of how the notions of past, present and future can coherently be thought of as properties, together with an account of how the existence of such properties is consistent with the notion of temporal becoming. In chapter 3 I argued that the possibility of providing such accounts seems remote.

The theory espoused by E.J. Lowe purports to accommodate the token-reflexivity of tensed sentences. Lowe offers token-reflexive truth conditions for tensed sentences that relate utterances to the events they are about according to the temporal relations of 'earlier than', 'later than' and 'simultaneous with'. However, what makes Lowe's theory tensed is that the times at which these events occur, and between which these relations obtain, are *A* series times rather than *B* series times. As he remarks in his (1993) 'I don't believe that times can ultimately be specified in purely tenseless terms,' (p. 173). As I noted earlier, the ontological requirements of the token-reflexive analysis of tensed language are that times, events and temporal relations exist. Lowe's theory, it seems, fulfils those requirements, leaving nothing out and smuggling nothing additional in to the ontological inventory. The token-reflexive analysis requires the existence of times, but it is silent as to the requisite nature of those times. It seems that there is nothing to prevent Lowe from adopting the token-reflexive analysis in conjunction with an ontology of *A* series times. Just as the ersatz modal realists are free to adopt the indexical theory of actuality in conjunction with their own account of the nature of possible worlds, so Lowe, it seems, is free to adopt the token-reflexive analysis of tensed language together with his own account of the nature of times.

Lowe's theory seems so similar to the tenseless token-reflexive theory of time, that one is tempted to ask why he advocates the reality of the *A* series rather than the *B* series. What is the point of maintaining that the *A* series is real? The point is, of course, to support the claim that there is a real, non-relational distinction between the past, present and future. To attest the reality of this distinction is not merely to recognize a semantic distinction, but to hold that there is a real, ontological disparity between what can truly be described as past, present and future. The belief that there is such an ontological distinction is sometimes thought to underlie the intuition that the future does not exist as the present and the past do. Indeed, Lowe admits to recognizing some such distinction when he says:

> Unlike the definite description 'the past', the definite description 'the future' is non-denoting, by virtue of the fact that there are (barring

> determinism) many possible futures, no one of which is ontologically privileged, but only one (actual) past. (Lowe (1993) p. 173).

It seems to me that there is nothing in the token-reflexive analysis of tensed language that would support the existence of such an ontological asymmetry. Indeed, it is arguable that the token-reflexive theory requires the reality of all times. If a future tense sentence has truth conditions that relate the present utterance to the future event that it is about, then the fulfilment of those truth conditions arguably requires the existence of that future event to stand in that temporal relation. I submit that Lowe must supplement his theory in the following way. He must provide independent support for the ontological asymmetry between past, present and future, together with arguments to the effect that the token-reflexive analysis is consistent with such an asymmetry. Furthermore, he too must overcome arguments such as McTaggart's for the conclusion that real tense is inherently self-contradictory. Hence, I contend, Lowe's position is similar to that of Smith's. Each of them has yet to prove that the token-reflexive analysis is consistent with a tensed ontology. However, its ontological requirements show that it is most naturally associated with a tenseless ontology.

In the preceding discussions I do not claim to have defeated either Smith's theory or Lowe's. What I hope to have shown is that, unlike Lewis' opponents, these two theorists have not managed to drive a wedge between the semantic aspect of the tenseless token-reflexive theory and its ontological conclusions. What they have both done is to attempt to supplement the ontological commitments of the token-reflexive analysis with additional tensed entities. I have argued that there is insufficient reason to suppose that temporal ontology is lacking without these additional tensed items, and that the onus remains with them to prove that it is.

I intimated above that Lowe's strategy is rather similar to that of the ersatz modal realists who argue that they can employ possible worlds discourse while offering their own account of the nature of possible worlds. Lowe claims to employ a token-reflexive analysis of tensed language while offering his own account of the nature of times. However, there is a significant difference between these two strategies. Ersatz modal realists, as well as other philosophers who employ the notion of possible worlds without admitting their concrete existence, claim that possible worlds are not worlds in the sense that *this* world is. They take worlds to be entities of a wholly different kind, for example, maximal consistent sets of sentences or useful fictions. I do not think Lowe would maintain that past and future

times are entities of a wholly different kind from the present time. However, there is a theory of the nature of temporal reality that advocates just such a position. It is worth taking a look at this position because it has an obvious modal counterpart.

The position with respect to time known as temporal solipsism[11] holds that only the present exists. As Prior put it:

> The present simply *is* the real considered in relation to two particular species of unreality, namely the past and the future. (Prior (1970) p. 245).

The parallel with the modal position known as actualism should be clear. According to actualism only one world exists, the actual world, other possible worlds being a mere species of unreality. Temporal solipsism has received its fullest treatment to date in Le Poidevin (1991). As a theory of time it poses a potential threat to the tenseless token-reflexive theory of time in a way that the theories of Smith and Lowe failed to do so. It threatens to drive a wedge between the token-reflexive analysis of tensed language and a genuine tenseless ontology. We saw earlier that it is quite consistent to adopt an indexical analysis of actuality, such that utterances of 'actual' refer indexically to the world in which they occur, while holding that, as a matter of fact, only one world exists. Similarly, it is quite consistent to adopt an indexical analysis of 'I' even if, as a solipsist, one holds that there is only one existent to which 'I' ever genuinely refers. Temporal solipsism is able to exploit this feature of indexicality, adopting an indexical analysis of 'now' while holding that only the present moment genuinely exists. If this theory is genuinely workable, then it represents a radical schism between a token-reflexive analysis of tensed language and a tenseless ontology.

Temporal solipsism, however, is not a genuine alternative to the tenseless token-reflexive theory of time. In his (1991) Le Poidevin issues several decisive blows against temporal solipsism, rendering it, in my view, untenable as a theory of time. In what follows I will examine one of Le Poidevin's arguments against temporal solipsism, which illustrates how this theory actually differs substantially from its apparent modal counterpart, actualism.

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11 This position is held by Prior (1970) and Christensen (1993). A similar view is put forward by Romney (1978).

The temporal solipsist is faced with the task of providing a reductionist account of instants. Since she maintains that the past and the future are unreal, she must either 'regard all talk of past and future instants as contentless, which is absurd,' (Le Poidevin (1991) p. 54), or else she must 'reconstrue such talk' (Ibid.). Le Poidevin examines various alternative entities which the temporal solipsist may choose to identify with past and future instants, but concludes that,

> The only remotely plausible reductionist strategy open to him is to identify instants with *propositions*: an instant is the conjunction of propositions which would ordinarily be said to be true at that time. (Ibid.).

Such a propositional theory of instants is quite analogous to that particular brand of ersatz modal realism which construes possible worlds as maximal consistent sets of sentences. However, the propositional theory of instants faces a serious problem. The temporal solipsist takes past and future times to be identical with conjunctions of propositions and, according to Le Poidevin, must do so. It follows that she cannot, without circularity, hold that times are part of the content of those propositions. Thus, two tokens of the same tensed sentence type uttered at different times must express the same proposition. This is because all that differentiates them is the time at which they are uttered, but it is not open to the temporal solipsist to invoke this difference in order to distinguish them from each other. As Le Poidevin remarks:

> On the solipsist's picture, then, different tokens of the same tensed type, *even when uttered at different times*, express the same proposition. The consequence is that the very same tensed token (e.g. this very inscription of 'Socrates is sitting') can be true at one time and false at another. This makes nonsense of tensed assertion. (Le Poidevin (1991) p. 55).

There is no analogous problem for theories of ersatz modal realism which take other possible worlds to be, for example, maximal consistent sets of sentences. The very same sentence token can be located at different worlds, under this picture of modal reality, and possess different truth-values at some of those worlds. The ersatzer does not have to invoke 'occurrence at a world' to distinguish between different tokens of the same sentence type. This is because there is nothing

incoherent in supposing that different tokens of the same type express the same proposition in different worlds and yet differ in truth-value in those worlds. Their individual truth-values depend on what is the case in the world in which they are uttered, which of course, differs from world to world. Consequently, it is perfectly coherent to maintain that any two such tokens express the same proposition and yet differ from each other in truth-value. All this, in my view provides more reason to let go of the idea of an analogy between time and modality. The 'common sense' modal position of actualism has a far-fetched and ultimately untenable temporal analogue.

To conclude this section I will briefly consider whether the tenseless token-reflexive theory of time suffers from a difficulty analogous to the circularity problem that infected Lewis' genuine modal realism. Lewis claims to offer a completely reductive analysis of modality, although the Miller-Lycan discussion revealed that his theory in fact retains the modal distinction between possible and impossible as primitive. Lewis is forced to deny the existence of impossible worlds. There is no temporal analogue of this problem. Within Lewis' theory there are modal reasons for rejecting the existence of impossible worlds. There are no temporal reasons for rejecting the existence of non-existent times. Such times might have existed. There is no temporal principle which rules out non-existent times, as there is a modal principle which Lewis employs to rule out non-existent worlds. Thus, the tenseless theory of time does not suffer from the same kind of circularity as Lewis' modal realism because, whereas Lewis smuggles irreducibly modal notions into his analysis of modality, there is nothing irreducibly tensed in the ontology of the tenseless theory of time.

To put the point more simply, Lewis claims to offer a completely reductive analysis of modal notions in terms of possible worlds discourse. The new tenseless theory of time, by contrast, does not claim to offer a completely reductive analysis of tense in terms of a tenseless language. The claim of the new tenseless theory of time consists merely in an ontological reduction of tense to tenseless relations, but it retains tense as an irreducible feature of language and thought. Thus, the new tenseless theory of time cannot be charged with claiming to offer a completely reductive analysis of tense while retaining irreducibly tensed notions in the account, since it does not claim to provide a completely reductive analysis of tense.

An alternative interpretation of a temporal analogue of Lewis' circularity problem might be as follows. Lewis' rejection of impossible worlds could be construed as a rejection of worlds which are inaccessible from the world of

utterance, or worlds that are modally disconnected from the world of utterance. Furthermore, the arguments of section 4.4 of this chapter showed that Lewis is forced to deny the existence of such worlds, but he has no real, non-modal justification for rejecting them. The temporal analogue of the problem construed in this way would arise if the tenseless theory of time is forced to reject the existence of times which are temporally disconnected from the time of utterance, while having no justification for rejecting such times. However, the possibility of the existence of temporal series which are temporally disconnected from each other is not an incoherent one. Indeed, there is a sense in which the existence of this possibility supports the tenseless theory of time over the tensed theory.

If there exists more than one temporal series, each temporally disconnected from the others, then it is conceptually coherent to conceive of the events and times within those series being temporally related to each other by the tenseless relations of precedence, subsequence and simultaneity. However, it is not easy to make sense of the distinction between past, present and future applying to those series. This is because, arguably, one needs to be temporally located *within* a temporal series in order coherently to apply the concepts of past, present and future to the events and times of that series. Thus, one cannot coherently apply the concepts of past, present and future to a temporal series that is temporally disconnected from the temporal series in which one is located. This supports the conclusion that the concepts of past, present and future are not intrinsic to a temporal series, but merely dependent on one's being temporally located within it. By contrast, the temporal relations of 'earlier than', 'later than' and 'simultaneous with' are, arguably, intrinsic to a temporal series, since their application to such a series is not dependent on one's being located within it.[12]

To sum up the conclusions of this section, I argued that tensed theories such as those offered by Lowe and Smith do not threaten to divorce the token-reflexive analysis of tensed language from a tenseless ontology in the same way that alternative accounts of modality can divorce possible worlds discourse from an ontology of genuine modal realism. Temporal solipsism offered, at first sight, a more palpable threat to the tenseless theory of time, since it is capable of adopting the

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12 In his (1996) Le Poidevin argues that the possibility of disunified time is harder to reconcile with the tensed theory of time than with the tenseless theory of time. Currie (1992) provides further support for this conclusion by arguing that the events in a fictional time series, and thus in a time series temporally disconnected from our own, are ordered by temporal relations, but do not have tenses.

token-reflexive analysis of tensed language in conjunction with an ontology in which only the present exists. However, I argued, with Le Poidevin, that temporal solipsism is ultimately untenable as a theory of time. Finally I considered whether the circularity problem that infected Lewis' account of modality had a temporal analogue that might undermine the tenseless theory of time. I argued that, under one possible account of such an analogy, there is no problem generated for the tenseless theory of time. Under another possible account the temporal analogue generated, far from being incoherent, actually supports the tenseless theory, while creating serious problems for the tensed theory.

4.8 Conclusion

It seems at first sight that there is a compelling analogy between genuine modal realism and the tenseless token-reflexive theory of time. A consideration of some earlier attempts to undermine any such analogy showed that they failed, thus giving us more reason to suppose that the analogy is robust. For a tenseless theorist who did not wish to be compelled, by parity of reasoning, to adopt genuine modal realism, things were looking grim. I then examined an attempt to construct a modal analogue of McTaggart's paradox, and concluded that it failed. Hence, one route towards the adoption of a tenseless ontology did not yield an analogous modal path towards Lewis' genuine ontology of possible worlds. A detailed analysis of Lewis' position revealed that his indexical theory of actuality does not entail, nor is it entailed by his possible worlds ontology. These two elements of his theory can be prized apart. For those who endorse the indexicality of actuality, but reject a plurality of worlds, this is good news, but Lewis himself continues to endorse the plurality of worlds. It then became clear that genuine modal realism fails in its quest to provide a completely reductive analysis of modality, because its treatment of the notion of impossibility reveals that primitive modal notions are retained within the account. All this is reason enough for me to reject Lewis' genuine modal realism. It remained for me to consider whether these lines of thought spawned analogous reasons to reject the tenseless theory of time.

I examined the theories of Smith and Lowe which purport to combine a token-reflexive analysis of tensed language with a tensed ontology. Neither theory managed to divorce token-reflexivity from a tenseless ontology. Instead, they sought to introduce additional tensed items into their temporal ontology. In each case more argument is needed to accept the existence of such items. Temporal solipsism initially appeared to pose more of a threat to the tenseless ontology, with its ability to

combine a token-reflexive analysis with the ontological position that only the present exists. The arguments of Le Poidevin proved this position to be untenable. Finally I examined whether tenseless time suffers from an analogous circularity problem to that which infects Lewis' modal realism, and concluded that it does not.

In conclusion, I admit that the analogy between these two theories appeared cogent, but I have argued that this was only an appearance of cogency. Proponents of the tenseless token-reflexive theory of time do not find themselves unwittingly committed by analogy to the concrete existence of a plurality of worlds.

Chapter 5

TENSELESS TEMPORAL ASYMMETRY AND THE DIRECTION OF TIME

The metaphysical implications of the new tenseless token-reflexive theory of time are that there is no ontological asymmetry between past, present and future, and that temporal becoming is not a constituent of temporal reality. Since, according to this theory, all times are equally real, and time does not flow in one direction, the question naturally arises as to whether it can adequately account for the claim that time has a direction. In this chapter I will examine the nature of the claim that time has a direction, and assess various interpretations of what it has been taken to mean. I will then undertake a conceptual analysis of some of the key concepts employed in making claims about the direction of time. I will then consider whether the tensed and the tenseless theories of time have the necessary conceptual equipment to account satisfactorily for the notion of the direction of time.

5.1 What Do We Mean By 'The Direction of Time'?

There seem to be many aspects of our own temporal existence which suggest that there is a sense in which time has a direction. For example, our knowledge of the past seems to be significantly greater than our knowledge of the future. We have memories that enable us to recall events and states of affairs from earlier times but not from later times. We see traces of the past all around us, but never traces of the future. We make decisions and undertake actions that are intended to, and indeed sometimes do, affect the future, but there seems to be something mildly absurd about acting in order to affect the past. Furthermore, we seem to care more about what will happen to us in the future than about what has happened. For example, I am more concerned about a forthcoming driving test than I am about one that I have already failed; we generally hope that the good times are ahead and not behind us. In these and other ways our experience of time appears to be, at the very least, asymmetric. Does this provide us with sufficient grounds to conclude that time has a direction?

Discussions of the direction of time have often focused on the existence of temporal asymmetries in the world around us. For example, the order of cause and effect in the world appears to be temporally biased in that effects never seem to precede their causes. In addition, although the laws of nature are theoretically time-

symmetric,[1,2] the temporal inverses of many processes never occur in nature. For example, an oak tree never decreases in size until finally becoming an acorn. Do these time-biased physical phenomena provide us with sufficient grounds for concluding that time has a direction?

There is yet another feature of time that seems to provide evidence of a marked asymmetry with respect to the past and the future. I refer here to the pervasive phenomenological feeling that we 'move through time in the direction of the future', or, to put it another way, the impression that time 'flows' past us. If time flows, and flows in one direction only, then arguably there is a clear sense in which time has a direction.[3] The expressions we use to convey this temporal phenomenological feature are clearly metaphorical, at least to a certain extent, and I have argued in chapter 3 that they must be understood as wholly metaphorical. However, these metaphorical expressions convey a truth of some kind about the nature of our temporal experience. Whatever the precise nature of that truth, and of the underlying temporal facts, it is clear that this phenomenological feeling remains an aspect of our experience. Furthermore, it is an aspect of our experience that leads us to talk of there being a fundamental asymmetry between the direction of time into the past, and the direction of time into the future.[4] There is a need to examine the features of temporal reality that lead us to draw such conclusions. Does time itself exhibit a fundamental asymmetry between its two directions; that into the past and that into the future, or does this asymmetry originate from the way in which we experience events in time? I have argued in chapter 3 that it is simply incoherent to suppose that time flows in any real sense. However, it seems pertinent to ask what

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1 According to Gardner (1979), there are certain anomalous, weak interactions that have occurred in laboratory conditions that 'can go only one way' (p. 240), and are thus genuinely time-asymmetric. However, it has not been suggested that these irreversible phenomena could be the underlying basis for the 'arrow of time'. Furthermore, despite the existence of these phenomena, the basic laws of nature remain time-symmetric.

2 Further on in this chapter, a discussion of Earman (1969) will reveal that the laws of nature can be time-symmetric in at least two different ways.

3 McGilvray (1979) argues that the claim that time has a direction provides support for the tensed view that time flows.

4 In the current discussion I have referred to the idea that time has a unique direction, and to the idea that time has two distinct directions, that into the past, and that into the future. These two notions need to be disambiguated. Clearly, by defining one direction of anything one thereby defines its converse, so one will always be able to identify two distinct directions. For example, one can pick out one direction along the M1 motorway, the direction towards Leeds, but by identifying this direction, one is thereby able to pick out its converse, the direction towards London. However, our intuitions concerning time's direction lead us to question whether time has a unique direction. By asking this question we are effectively asking whether one of time's directions is more important, or is of more interest to us than its converse.

gives rise to our apparent phenomenological experience of the flow of time, and whether the basis of this experience can provide us with sufficient grounds to conclude that time has a direction.

The preceding discussion has illustrated that there is at least an intuitive sense in which one would assent to the claim that 'time has a direction'. However, it is far from clear precisely what is meant or entailed by such a claim. There do indeed seem to be many temporal phenomena that systematically exhibit a preference for one of the directions of time over the other. However, it is unclear precisely what information this provides us with about the nature of time itself. In addition, there are many metaphors and truisms that express our intuition that 'time has a direction', but again, it is unclear just what underlies this intuition. Indeed, does the question of whether or not time has a direction have a clear and unequivocal meaning?

I maintain that there is a great deal of conceptual confusion and lack of clarity surrounding the issue of the direction of time. To approach the issue without establishing the nature of the questions we are asking; without clarifying the distinctions between, say, direction, asymmetry and anisotropy, would be futile. I intend to initiate the process of conceptual clarification by examining and analysing the key concepts that recur throughout discussions of this issue. I aim to arrive at a satisfactory and workable account of the key concepts, together with some suggestions as to possible accounts of the underlying basis of the intuition that 'time has a direction'. I will then proceed to ask how the tensed and tenseless theories of time might incorporate these concepts into their overall account of temporal reality. In addition, I will consider how each theory might approach the problem of accounting for the underlying basis of the intuitive 'direction of time'.

5.2 A Conceptual Analysis

5.2.1 Asymmetry

The concept of asymmetry, broadly speaking, implies non-conformity or incommensurability between the parts of a substance or a system. This preliminary attempt at capturing the essence of this concept is necessarily vague and ill-defined, since the concept of asymmetry applies in different ways to the many different kinds of entity to which it is genuinely applicable. I intend to examine the various applications of the concept of asymmetry, to establish the connections between them, and to consider the results they might yield when applied to time.

A core application of the concept of asymmetry is in geometrical contexts. An object, a figure, or a dimension is asymmetric about a median plane, line or point

if its parts fail to correspond metrically to each other with reference to that median. Clearly, this geometric application of the concept of asymmetry applies primarily in spatial rather than temporal contexts. A three-dimensional object is asymmetric if it has no plane of symmetry as described above. Similarly, a two-dimensional figure can be asymmetric about a median line, as described above, but this too is a spatial application of the concept of asymmetry. However, it is also possible for a one-dimensional series of figures, or one dimension of an object or figure to be asymmetric in this respect about a median point. Could there be a temporal analogue of this one-dimensional asymmetry?

A series of figures along one spatial dimension is asymmetric if its parts fail to correspond metrically to each other with reference to a median point. The temporal counterpart of a spatial point is most naturally conceived as an instant or moment.[5] Thus, the temporal counterpart of this kind of asymmetry would be a series of temporal items whose parts fail to correspond metrically to each other about a median instant. This sounds plausible as a basis for providing an account of the way in which time could be thought to be asymmetric, but there is a problem. If we are considering whether time itself is asymmetric, which temporal item constitutes the median instant?

A natural response to this question may be to suggest that the present moment should be taken as the median, since it is generally taken to be the moment that divides the past from the future. However, this response relies on one's having adopted a tensed theory of time. The tenseless theory denies that there is any ontological significance to the attribution of presentness to a moment of time. Thus, if no moment is objectively present, we are unable to use this criterion to pick out an instant as the median instant about which the asymmetry or otherwise of time can be established. A tensed theory would be able to employ this criterion, but according to the tensed theory the attribution of presentness is constantly shifting to later and later moments. According to this criterion therefore, the median instant is constantly changing from one instant to the next. Thus, we are unable to specify a unique instant as the median instant, since each instant successively becomes the median as it becomes present.

In order to avoid this difficulty, a proponent of the tensed theory might adjust the question so that, instead of asking 'Is time asymmetric in this geometric sense?',

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[5] This discussion in terms of 'instants' and 'moments' does not commit me either to a substantival or a relational conception of time. In the same way, talking of spatial points does not commit one either to a substantival or a relational conception of space.

she asks 'Is time asymmetric *now* in this geometric sense?'. It seems to me that this question avoids one difficulty at the expense of facing another. We are concerned to establish whether time is asymmetric *simpliciter*, not whether it is asymmetric at a certain moment of time. However, I shall pursue the question for the sake of completeness. Having identified a moment, the present moment, as the median point of the temporal dimension, the question now arises: do the parts of the temporal dimension correspond metrically to each other about that median? This is equivalent to asking whether the past corresponds metrically to the future. Consequently it is a question concerning the temporal extensions of the past and the future, and whether they correspond to each other. It is my contention that, although this is an important issue in itself, concerning as it does the existence of the past and the future, and the notions of the beginning and end of time, it is not the issue we are aiming to clarify in discussions of the direction of time.

An alternative approach to the question of whether time is asymmetric in this geometrical sense would be to consider whether the concept applies to a finite series of events in time. As I pointed out in the introduction to this chapter, many temporal processes are asymmetric insofar as there is a significant distinction between the earlier and later parts of such processes and insofar as they are not reversible. However, it is reasonable to suppose that this tells us more about the asymmetry of the sequence of events we have selected for investigation than about the asymmetry of time itself. I maintain that any attempt to apply this geometric concept of asymmetry to time will be problematic, and will fall short of providing an explanation of what we mean by the direction of time. Consequently, our intuition that 'time has a direction' is not to be explained by time's exhibiting asymmetry in this geometric sense.

There is a logical application of the concept of asymmetry. A relation, R, is asymmetric if, for any x and y, if x stands in R to y, then y does not stand in R to x. In logical notation this can be represented as:

$$\forall x \forall y(Rxy \rightarrow \sim Ryx)$$

So, for example, comparative relations such as 'larger than', 'wider than' and 'lower than' are asymmetric in this sense. If x is larger than y, then y is not larger than x. According to this application of the concept, asymmetry is a logical property of relations. In what way then, might it be possible for time to be asymmetric in this sense?

According to the tenseless theory of time, the temporal relations 'earlier than' and 'later than' are constitutive of time itself. Both of these relations are asymmetric in the logical sense under discussion.[6] If x is earlier than y, then y is not earlier than x. Conversely, if y is later than x, x is not later than y. The other logical properties that these relations exhibit are transitivity and irreflexivity. A relation, R, is transitive if, for any x, y and z, if x stands in R to y, and y stands in R to z, then x stands in R to z. This can be represented in logical notation as:

$$\forall x \forall y \forall z((Rxy \ \& \ Ryz) \rightarrow Rxz)$$

Thus, if x is earlier than y and y is earlier than z, then x is earlier than z. A relation, R, is irreflexive if, for any x, it is not the case that x stands in R to itself. Symbolically:

$$\forall x \sim Rxx$$

Clearly, nothing is earlier than itself, nor is anything later than itself.

Any relation with the logical properties of transitivity, irreflexivity and asymmetry is capable of generating an ordered series. For example, the ordered series of natural numbers can be generated by the relation 'greater than', or its converse 'less than'. Similarly, any number of non-simultaneous times or events can be ordered according to the temporal relation 'earlier than' or its converse 'later than'. Since the generating relation of such a series exhibits logical asymmetry, the series itself can also be correctly described as asymmetric. Is this, then, the underlying basis to the intuition that 'time has a direction'? According to Newton-Smith (1980) it is in precisely this sense that time has a direction:

> In what follows the term *directed order relation* will be used to refer to any two-place asymmetrical, transitive relation. The statement that time has a direction can be construed as the claim that it is appropriate in giving the order of things in time (and of temporal

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[6] In the following discussion I am making the reasonable assumption that time is not closed. If it were, then both of these relations would be symmetrical, i.e. $\forall x \forall y(Rxy \rightarrow Ryx)$. The question of the logical properties of temporal relations is closely connected to the question of the topology of time.

> items) to employ a directed temporal ordering relation. (Newton-Smith (1980) p. 202).

I would dispute Newton-Smith's claim. If all there is to the notion of the direction of time is the fact that the generating relation of a temporal series is logically asymmetric and transitive, then, it follows, any other kind of series with a logically asymmetric and transitive generating relation must also have a direction in the sense in which we intuitively ascribe a direction to time. A group of people standing in order according to their height must have a direction in the same sense that time has a direction. The natural number series must also have a direction in the same sense. The natural number series is logically asymmetric because the generating relations 'greater than' and 'less than' are asymmetric. This enables us to distinguish between the two directions along this series. We can distinguish between the direction from smaller to larger numbers and the direction from larger to smaller numbers. However, this does not give us any grounds for picking out one of these directions as *the* direction of the natural number series. Similarly, we can distinguish between the direction from earlier to later and the direction from later to earlier, but this distinction does not provide us with sufficient grounds for picking out one of these directions as *the* direction of time. I am not disputing that time is asymmetric in this logical sense. It may even be the case that this notion is partly constitutive of the concept of the direction of time. I am simply disputing the claim that this notion is all there is to the concept of the direction of time.

There is a further possible application of the concept of asymmetry to time. My initial attempt to capture the essence of asymmetry made reference to non-uniformity or incommensurability between the parts of a substance or a system. If, as the tensed theory would have it, the distinction between past, present and future is objectively real, such that there is an ontological distinction between these three temporal categories, then it would be the case that time exhibits an *ontological* asymmetry. Clearly, this is one of the main points at issue between tensed and tenseless theories, and I have argued in chapter 3 that no such ontological distinction exists. It is my position that time is not ontologically asymmetric in this sense. It is worth noting that if such a distinction did exist, it would follow automatically that time was asymmetric in this sense.

However, the supposition that past, present and future are ontologically distinct would not, I submit, provide grounds for assigning a direction to time. Unicorns and horses are ontologically distinct in that the former do not exist while

the latter do. As such, there is an ontological asymmetry between them, yet this has no connection with the concept of direction. If the tensed theory is capable of accounting for the direction of time it is more likely to be as a result of the doctrine of temporal becoming, according to which time 'flows' in one direction. The supposition of ontological asymmetry between past, present and future alone is incapable of accounting for the direction of time. I will argue shortly that the doctrine of temporal becoming is equally incapable of grounding the direction of time.

I have distinguished three different senses of the concept of asymmetry. Geometrical asymmetry is primarily a spatial concept. The only sense in which it might plausibly apply to time yields questions of whether past and future are finite or infinite in extent. This application of the concept of asymmetry offers no clarification of the notion of time's direction. Time exhibits logical asymmetry insofar as the temporal relations 'earlier than' and 'later than' are logically asymmetric. This fact has some bearing on time's direction in that it enables us to distinguish between the direction from earlier to later and that from later to earlier, but it fails to account completely for the direction of time. It gives us no grounds for picking out one of these directions as the direction of time. I have argued that there is more to the direction of time than mere logical asymmetry. Finally, I considered the tensed supposition that time exhibits ontological asymmetry. I argued that even if this application of the concept of asymmetry were genuinely applicable to time, it would not be sufficient to account for the direction of time.

This discussion of the concept of asymmetry has shown that there is a connection between asymmetry and direction. However, the relationship is not straightforward. Not everything that exhibits asymmetry, under any of its interpretations, thereby has a direction. It is my belief that this complex relationship is partly responsible for the widespread conceptual confusion surrounding the issue of the direction of time. Similarly, the concept of direction has also been confused with that of anisotropy. In what follows I will examine this latter concept to see what light it sheds on the issue of the direction of time.

5.2.2 Anisotropy

To be isotropic is to have uniform physical properties in all directions. To be anisotropic is therefore to have non-uniform or different physical properties in different directions. The concept of anisotropy is thus closely connected to at least one interpretation of the concept of direction. It has already been established that

the logical asymmetry of the temporal relations enables us to distinguish between the two directions of time. It is now necessary to establish whether the two directions of time differ from each other in their physical properties. This, in itself, is a question not without ambiguity. What sort of physical properties does time possess?

It is possible that this question is concerned with time's topological properties, and whether they differ along each of time's directions. For example, if time has a branching topology, then that would suggest that time differs significantly along each of its directions, and therefore that time is anisotropic. However, even if time does exhibit anisotropy in this sense, it is not clear that this is the sense in which time has a direction. Discussions of the anisotropy of time usually focus on physical processes that are irreversible. There are many physical processes that occur along the temporal direction earlier to later, but which never occur along the temporal direction later to earlier. I intend to examine the significance of this for the anisotropy, or for the direction of time.

Grünbaum (1964) discusses the anisotropy of time. Earman (1969) summarizes Grünbaum's position as follows:

> Time is anisotropic if and only if the 'directions' of the sequence of states of the world ordered by the relation of temporal betweenness are distinguished by the structural property that some kinds of sequences encountered along one direction are not encountered along the other. (Earman (1969) p. 277).

Grünbaum here identifies the relation of temporal betweenness as the fundamental temporal ordering relation. This relation is not logically asymmetric in the same way that 'earlier than' and 'later than' are asymmetric. If an event, *y*, occurs between events *x* and *z*, then it is consistent with this that the events occur in the order *xyz* or in the order *zyx*. Grünbaum thus takes as basic a temporal relation that does not distinguish between the two directions of time. He then stipulates that the anisotropy of time is to be determined by the sequences of events that occur along the two directions of time. This suggests that, if time is anisotropic it is merely as a result of the anisotropy of physical processes that take place in the world.

Earman (1969) offers an interpretation of Grünbaum's claim:

> A fair restatement of Grünbaum's position would seem to be: time is anisotropic if and only if there are kinds of physical processes that

> occur in nature but whose temporal inverses do not occur. (Earman (1969) p. 277).

Thus, according to Grünbaum, all that is required in order for us to conclude that time is anisotropic is the existence of certain processes, the temporal inverses of which do not occur in nature. For example, if someone drops a bone china tea cup so that it hits a hard surface, it is highly likely that the tea cup will shatter into many pieces. However, one never observes many fragments of bone china simultaneously leaping off a hard surface and coming together to form a tea cup. Thus, we have a physical process that is quite familiar, but whose temporal inverse fails to occur in nature. This, for Grünbaum, is sufficient to establish the anisotropy of time.

Earman argues, successfully I think, that such de facto irreversible processes are insufficient to establish the anisotropy of time. His reason is that de facto irreversible processes, and even low level nomological irreversibilities can be explained by more fundamental laws. The pertinent question then becomes, 'do the fundamental laws of nature exhibit anisotropy, thereby giving us reason to conclude that time is anisotropic?'. Earman offers a spatial analogy to support his claim that the question of anisotropy should be directed at fundamental laws of nature rather than mere de facto processes:

> One feels that the low level biological law that 'Most humans have their heart on the left side' does not establish anything about the handedness of space since one believes (or hopes, if you will) that such low level laws can be explained from more fundamental laws and initial conditions and that the more fundamental laws do not show any preference for right or left. (Earman (1969) p. 291).

Earman's own position is that time is anisotropic if and only if the fundamental laws of nature are not symmetric with respect to time. However, he distinguishes two senses in which laws can be 'time-symmetric'. They can either be invariant under time reversal or invariant under the interchange of the roles of earlier and later in the expression of those laws. The first kind of time-symmetry is best expressed as follows: '$-t$ can be substituted for t in the statement of any basic law and the law remains as applicable to the world as before; it describes something nature can do' (Gardner (1979) p. 240). The second kind of time-symmetry would require that the roles of 'earlier than' and 'later than' could be interchanged with each other in

the sentences expressing the laws of nature, and the resulting sentences would express the same laws. For example, if C is a consequence of law L, and C' is obtained from C by interchanging the roles of earlier and later,[7] we must ask whether C' is equally a consequence of L. If C' is a consequence of L, then L is invariant under the interchange of roles of earlier and later. If C' is not a consequence of L, then L is not invariant under the interchange of roles of earlier and later. Earman argues that, while the fundamental laws of nature are invariant under time reversal, they are *not* invariant under the interchange of roles of earlier and later. He uses this distinction to lay to rest the commonly stated 'puzzle':

> The universe seems asymmetric with respect to past and future in a very deep and non-accidental way, and yet all the laws of nature are purely time-symmetric. So where can the asymmetry come from? (Earman (1969) p. 282).

Earman resolves the puzzle by pointing out that, while the laws of nature are time-symmetric insofar as they are invariant under time reversal, they are not invariant under the interchange of roles of earlier and later. The implication of this is that this latter kind of time-asymmetry is responsible for our sense that the universe is asymmetric in a 'deep and non-accidental way'. Thus, the fact that the laws of nature are symmetric as a result of being invariant under time reversal does not conflict so directly with our sense of the universe's past-future asymmetry. This concurs with Horwich's (1987) position according to which all the empirical evidence points to the conclusion that 'our fundamental physical theories do not incorporate a time bias' (Horwich (1987) p. 55). This leads Horwich to conclude that 'time itself has no intrinsic directionality or asymmetry' (Horwich (1987) p. 12).

I believe that Earman's distinction between the two kinds of temporal invariance of physical laws is highly revealing. The laws of nature are invariant under time reversal, so under this interpretation of temporal asymmetry, the laws of nature can tell us nothing about the direction of time. However, in the statements that express laws of nature, we cannot exchange occurrences of the relation 'earlier than' with occurrences of the relation 'later than', and vice versa, without

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[7] Earman notes that 'The interchange is not accomplished simply by replacing every explicit occurrence of *earlier* by *later* and vice versa, but by also making appropriate changes in expressions that implicitly rely on these relations; e.g. 'moves from P to Q' is replaced by 'moves from Q to P'; reference to a state s is replaced by reference to the reversed state s^R, etc.' (Earman (1967) p. 548n).

fundamentally altering what has been expressed. As we saw above, Earman believes that it is this feature of laws of nature that underlies our profound sense of there being a past-future asymmetry. Thus, it seems, if the laws of nature are to tell us anything about the direction of time, it is only as a result of the occurrence in the statements of those laws of the temporal relations of earlier and later. The peculiar features of these temporal relations are responsible for the anisotropy of time under Earman's interpretation of that concept. We have already seen that these relations are logically asymmetric, so it is a reasonable supposition that it is the temporal relations and their essential characteristics that are the proper focus for a discussion of the direction of time.

The ongoing discussion concerning the anisotropy of time, carried out in terms of the symmetry or otherwise of physical laws and physical processes is, no doubt, an important one. However, it is my contention that this discussion is not central to the question of the direction of time. In the first place, it is no simple matter to determine how much time-asymmetric physical processes and laws tell us about time, and how much they tell us about, say, bone china and the effects of gravity. Furthermore, if the question of time's anisotropy is rightly directed at laws of nature rather than de facto asymmetries, then the fact that these laws are time-symmetric in at least one sense leaves us without an explanation as to time's anisotropy in terms of those laws. Finally, my discussion of Earman (1969) revealed that the only sense in which the physical laws of nature may support the notion of temporal anisotropy is through the occurrence of the temporal relations of earlier and later in the expression of those laws. We have already seen that these relations are logically asymmetric. All this suggests to me that the proper focus for an investigation into the direction of time is not the concept of anisotropy, nor the fact-like or law-like physical asymmetries that occur in nature. Rather, it is the temporal relations of 'earlier than' and 'later than' themselves.

In order to render my conceptual analysis of the relevant concepts complete, I will turn next to the concept of direction itself.

5.2.3 Direction

We have already seen some of the ways in which the concepts of asymmetry and anisotropy overlap with each other and with the concept of direction. In this section I intend to examine the various possible interpretations of the concept of direction, and consider how they might apply to time.

Chapman (1982) identifies three senses of 'direction':

> (i) conventional and relational in which sense something is in a 'northerly' direction or to the left of something else; (ii) the objective sense employed in the distinction between vector and scalar quantities; (iii) the sense in which a series that exhibits serial order has a 'direction'. (Chapman (1982) p. 87).

I would further subdivide the first sense in the following way. Something can be *moving* in a northerly direction or *facing* in a northerly direction. Thus the conventional sense of direction can either be connected with the idea of motion, or be used to describe the position of a stationary object. Furthermore, when it is connected with motion the concept of direction can be associated with ordinary spatial motion, where something moves from one place to another, but it can also be associated with other kinds of change. Leaves can change *from* green *to* brown; a political party can become more right wing, so that it moves *in the direction of* the right; an historian might describe England in the eighteenth century as changing *from* an agricultural *to* an industrial society. These are all legitimate uses of the concept of direction in connection with motion or change.

Where the conventional sense of direction is used to describe the position of a stationary object, for example, 'the signpost is pointing in a northerly direction', the concept of direction is closely associated with the concept of geometrical asymmetry, as discussed in section 5.2.1 above. If a three-dimensional object is asymmetric, then we can distinguish different parts of it, and say that it 'faces' or 'points' in one direction rather than another. This stationary sense of direction is also involved when we speak of one object being related to another object along a specified direction. Thus, 'Leeds is north of London' conveys that Leeds and London are spatially related with respect to a given direction. The conventional sense of direction can thus be used to describe the position of a stationary object relative to another object, with reference to a specified direction.

The second sense of direction identified by Chapman is that used to distinguish vector from scalar quantities. In a clear and straightforward sense a scalar quantity is one that has magnitude but not direction, such as a given temperature. A vector quantity is one that has magnitude and direction, such as a given force. Chapman remarks that:

> The only sense of 'has a direction' which is clearly distinct from 'is asymmetric' is the second one mentioned above and it appears to be fairly clear that in this sense time does not have a direction at all. (Chapman (1982) p. 88).

I am happy to concur with Chapman on this point. The distinction between vector and scalar quantities is a fairly specialized notion, and I believe that there is sufficient conceptual equipment in the first and third senses of direction to enable me to provide a satisfactory account of the sense in which time has a direction.

The third sense of 'direction' identified by Chapman is that in which a series that exhibits serial order has a direction. We have already seen that 'earlier than' and 'later than' are asymmetric, transitive and irreflexive, and that they are capable of generating a series. Furthermore, any series so generated will be asymmetric insofar as there is a basis for distinguishing each of its directions from the other. Hence, a series generated by the temporal relations 'earlier than' and 'later than' possesses direction in the third sense identified by Chapman. Thus, in Chapman's third sense of 'direction', a series of times has a direction in virtue of the logical properties of the generating relations 'earlier than' and 'later than'. However, as Chapman points out with respect to a series of numbers generated by the relation 'less than',

> They increase from left to right, so one might assign the direction with an arrow.....but it is worth noting that one could equally well give a reason for drawing the arrow pointing in the opposite direction. (Chapman (1982) p. 87).

Thus, as we saw in the discussion of logical asymmetry, a relation which exhibits the logical properties of asymmetry, transitivity and irreflexivity is capable of generating a series. Furthermore, those logical properties provide a basis for distinguishing between the two directions of any series so generated. However, they do not provide a basis for picking out one of these directions as more fundamental than the other. Since the temporal relations of 'earlier than' and 'later than' exhibit the requisite logical properties, they provide us with a basis for distinguishing between the direction from earlier to later and the direction from later to earlier. However, they do not provide us with a basis for picking out one or these directions as *the* direction of time.

What connection, if any, is there between Chapman's first and third senses of

'direction'? The notion of serial direction can clearly be applied to time, and may prove explanatory in accounting for the direction of time. The conventional notion of direction, however, seems to apply primarily in spatial contexts. In what follows I will attempt to identify the connections between these two notions of direction, and to establish the relevance of these connections for the notion of the direction of time.

The conventional sense of direction, I argued, has two principal kinds of application. It applies in contexts involving motion or change, where the motion or change itself is ascribed a direction. It also applies in contexts where no motion is involved, in which case it applies either to asymmetrical objects that can be described as pointing or facing in a particular direction, or to objects that are spatially related with respect to a specified direction. The application of direction to asymmetrical objects is closely associated with the notion of geometrical asymmetry. Indeed, I would argue that it is necessarily associated with this notion. An object can only be described as pointing or facing in a particular direction if it is geometrically asymmetric. Since geometric asymmetry is not a concept that can satisfactorily be applied to time, insofar as one is concerned to explain the direction of time, I submit that this application of direction will not help to clarify the notion of the direction of time. The alternative stationary application of the concept of direction in its conventional sense is that in which two objects are spatially related to each other and that spatial relation is itself ascribed a direction. For example, each of the relations '*x* is to the north of *y*' and '*x* is to the left of *y*' convey that *x* and *y* stand in a spatial relation to each other. They also convey that the spatial relation itself is invested with a particular direction.

There are thus, two remaining conventional senses of direction that may prove explanatory in accounting for the direction of time: that connected with motion, and that connected with spatial relations. Of these, the latter is clearly related to the notion of serial direction. Serial direction is generated by relations with particular logical properties. Do the spatial relations that exhibit direction possess the same logical properties (asymmetry, transitivity, irreflexivity)? Clearly, the two relations I have picked out for scrutiny, 'being to the left of' and 'being to the north of', are logically asymmetric, transitive and irreflexive. However, there are some crucial differences between these spatial relations which are capable of determining direction and the temporal relations 'earlier than' and 'later than'.

According to Black (1959) the spatial relation 'being to the left of' is an incomplete relation. By this he means that the truth of a statement '*x* is to the left of *y*' cannot be determined without reference to at least one additional object or spatial

location. This is correct, as far as it goes, since x can be to the left of y from my standpoint, but from the standpoint of someone facing me, x is to the right of y. However, the temporal relations 'earlier than' and 'later than' are not incomplete in a temporally analogous sense. Whether x is to the left of y depends on a third spatial reference point. Whether x is earlier than y does not depend on any further temporal reference point. If the statement 'x is earlier than y' is true, then it is true no matter when it is tokened.

Grünbaum (1964) makes a closely related point concerning the difference between 'being to the left of' and 'being earlier than'. He notes that there is a distinction between extrinsic and intrinsic serial order. Earman (1967), commenting on this distinction noted by Grünbaum, clarifies it as follows:

> The serial order of the points on a line is *extrinsic* in that it is conventional or involves an essential reference to an external observer; to give a serial order to the points we must choose two reference points P, Q and lay down as a matter of convention that, say, P is to the left of Q, or else we must make some reference to an external observer, Jones, and his orientation with respect to the line. (Earman (1967) p. 547).

We can conclude from this that the direction exhibited by the spatial relation 'to the left of' is extrinsic to the relation itself. It is an additional component of the relation that is dependent on an external spatial reference point, or on a convention. The same is true of the spatial relation 'to the north of'. The direction expressed by this relation is extrinsic to the relation itself, since it is dependent on an implicit reference to an additional spatial location. In order to determine objectively whether x is to the north of y, we need to determine which of x and y is closer to the North Pole. This location has been adopted as a conventional reference point, so the direction expressed by 'to the north of' is a matter of convention. It is thus extrinsic to the relation.

It would seem, therefore, that among relations that express direction, the direction can be either intrinsic to the relation or extrinsic to the relation. What determines whether direction is intrinsic or extrinsic to a relation? I submit that whether direction is intrinsic or extrinsic to a relation depends on the nature of the relata, and whether they stand in the given relation essentially or merely accidentally.

A property is essential to an entity if, necessarily, the entity cannot exist without being an instance of the property. Conversely, a property is accidental to an entity if it is possible for the entity to exist without being an instance of the property. Whether or not the essential-accidental distinction can legitimately be applied to relations as well as to properties is not wholly uncontroversial. However, I think there is good reason to suppose that an entity does stand in some of its relations to other entities essentially. For example, the essence of a number consists in the place it occupies in a system of other numbers, or the relations it stands in to other numbers. Similarly, it is arguable that I stand in an essential relation to my parents. That is, I could not have been the person that I am and have had different parents.

Consider now an entity standing in a spatial relation to another entity. For example, my printer stands to the left of my keyboard. Clearly, being to the left of the keyboard is not an essential property of the printer. It would still be the same printer if it stood to the right of the keyboard. Strictly speaking, the place an object occupies is extrinsic to that object. I am located in Leeds and my sister is located in London. Clearly, the situation could have been reversed without affecting who each of us is. The situation is not quite so straightforward for less mobile objects. For example, would Leeds have been the same city if it had been located 1,000 miles further south, or the Eiffel tower if it had been 500 miles further north? However, I think a case can be made for arguing that the spatial location of an entity, and the spatial relations it stands in to other entities are accidental properties of that entity. Can the same be said for the temporal location of an entity and the temporal relations it stands in to other entities?

It is usual to talk of events being the typical temporal entities which stand in temporal relations to other events. It is reasonable to suggest that the temporal location of an event, and the temporal relations it stands in to other events are at least partly definitive of the event itself. According to Davidson (1969) 'events are identical if and only if they have exactly the same causes and effects'. This entails that the temporal relations an event stands in to the events which are its causes and those which are its effects are essential to that event. To put it another way, an event could not be the event it is if it did not stand in certain temporal relations to certain other events. According to Wilson (1974), who takes facts to be less problematic entities than events, a time is an essential component of a fact:

> The point is that the fact is constituted by an individual, a property and a time and it cannot have fewer components.....Obviously this is

> not the only kind of fact there is. There will be facts containing an individual, a relation, an individual and a time, as, for example, the fact that Columbus discovered America in 1492. (Wilson (1974) p. 311).

Thus, it follows from Wilson's account of the identity conditions of facts and events, no less than from Davidson's account, that the time at which an event occurs is essential to that event. Hence, it would seem that a case can be made for the conclusion that events stand in temporal relations to other events and times essentially.

A further consideration in favour of my contention that events stand in temporal relations essentially concerns the relationist conception of times. If this conception is correct, a time simply is the set of simultaneous events ordinarily said to occur at that time. Thus the relation of simultaneity an event stands in to other events is essential to the identity of the time constituted by that set of events. It follows straightforwardly from this that the temporal relations that obtain between times and events are essential to those times and events. If, on the other hand, the substantival conception of times is correct, then times, at least, could be said to stand in their temporal relations essentially. None of this is conclusive proof that temporal relations are essential to their relata but, I submit, a reasonable case can be made in favour of this conclusion.

I conclude from all this that, although spatial and temporal relations possess the same logical properties (asymmetry, transitivity and irreflexivity), so that they are both capable of generating a series with a direction, they differ in the following respect. Direction is intrinsic to a series generated by the temporal relations, but extrinsic to a series generated by spatial relations. This is so for two reasons. Firstly, a direction can only be ascribed to a spatial relation if reference is made to a third spatial location or observer external to that relation. A temporal relation, by contrast, can be ascribed a direction without any reference being made to any third temporal location or observer external to the relation. Furthermore, the temporal relations in which an event stands to other temporal items are essential to the identity of that event. However, the spatial relations in which an entity stands to other spatial entities are accidental to that entity. Thus, I now jettison the conventional sense of 'direction' that is associated with spatial relations, as it is unable to account for the direction of time. Since temporal relations possess direction intrinsically, this can be accounted for by the sense of 'direction' associated with serial order. The

conventional sense of 'direction' associated with spatial relations is extrinsic to those relations, so this notion will be unable to account for the sense in which time has a direction.

I have now worked systematically through all the concepts associated with the notion of time's direction. I have rejected some concepts as being unable to provide a satisfactory account of this notion, and I am left with two possible contenders for the explanatory basis of the direction of time. These are the conventional sense of direction associated with motion or change, and the sense of direction associated with serial order. The latter sense is closely connected with the logical asymmetry of the temporal relations, and the intrinsic direction they generate in any temporal series. Consequently, I maintain that the 'direction of time' is either to be explained by some kind of temporal motion in a specified direction, or by the intrinsic direction generated by the temporal relations. The first kind of explanation would be consistent with a tensed account of time, and the second would be consistent with a tenseless account. In the following two sections I will examine both tensed and tenseless approaches to the problem of the 'direction of time'.

5.3 The Direction of Time: A Tensed Account

If temporal reality includes a moving Now which is in perpetual motion along the temporal series in the same direction, from earlier times to later times, then, it would seem we have a straightforward and unequivocal sense in which time has a direction. I have argued in chapter 3 that the concept of a moving Now is incoherent, and thus cannot characterize any part of temporal reality. However, I intend to show in this section that, even if we allow as sensible talk of a moving Now, this concept is incapable of providing a satisfactory explanation of the direction of time.

In my discussion of the conventional sense of direction associated with motion or change, (5.2.3), I noted that the concept of direction can either be connected with ordinary spatial motion, or with other kinds of change. It was noted in chapter 3 that there are different possible interpretations of the doctrine of temporal becoming. In this section I intend to look at those interpretations of temporal becoming that are most likely to yield an explanation of the direction of time in terms of motion or change. These interpretations are the moving Now hypothesis and the property acquisition and loss hypothesis.

The moving Now hypothesis appears at first sight to be the most promising interpretation of temporal becoming to yield an account of the direction of time.

According to this hypothesis the Now is an entity taken to be continually sliding along the series of events ordered by the relations 'earlier than' and 'later than'. When the Now coincides with a set of simultaneous events, those events are deemed objectively present. Thus, we have an entity which moves along the temporal series in the direction from earlier times to later times. Is this not exactly analogous to the spatial case of motion from one place to another place? There is, in fact, no analogy between spatial movement and the motion of the moving Now, as will become clear in the ensuing discussion.

Spatial movement is characterized by an entity's being in one place at one time, and then at another place at a later time, so it is a change in spatial position relative to a change in temporal location. A direction can then be assigned to the motion between the two places. In the case of the moving Now however, the Now is located at one time, t_1, and then at another time, t_2. There is no change in temporal location *relative to* a change along any other dimension. The correct spatial analogy of this situation would be, for example, an object that exists at one place, s_1, and *further on*, at another place, s_2. Any spatial object of finite size fits this description. The extremities of any object exist at distinct places, so an object can exist at one place, s_1, and further on at another place, s_2. This does not describe change or motion, because there is no change in spatial location relative to change in any other dimension. The same is true for the alleged motion of the moving Now. Existing at one time and then existing at another time is a description that applies to anything with any temporal extension. Any temporal entity that exists for a finite duration exists first at one time, and then later on at another time. This does not involve motion or change because there is no change relative to any other dimension.

Thus, the moving Now hypothesis is misleading since it involves no motion or change. Consequently, there is no motion to which we can ascribe a direction. The moving Now hypothesis cannot provide the basis for an explanation of the direction of time. However, reference was made in the initial description of the moving Now to the temporal direction 'from earlier times to later times'. We have already seen that the series of times ordered by the tenseless temporal relations 'earlier than' and 'later than' have direction, although not in the conventional sense involving motion. I believe that it is the logically asymmetric sense of direction, which is possessed intrinsically by any temporal series, that lends initial plausibility to a description of a Now that moves from earlier times to later times. The confusion is this: in everyday conventional discussion, that which is in motion also has direction. Of course, it does not follow that everything that has direction is thereby in motion.

However, I maintain that it is this fallacious inference that is drawn by those who talk of a Now that moves in a given direction. That is, since time has an intrinsic direction, the fallacy is committed that it must thereby involve some kind of motion. In the next section I will expand on the sense in which I believe time has a direction, and provide a full explanation for it.

The doctrine of temporal becoming is most often characterized as a change in temporal properties that events and times continually undergo. That is, events change from being future to being present to being past. It might be argued that this kind of change is analogous to the change in properties that objects undergo through time. For example, in Autumn the leaves on the trees change from being green to being brown. This is a change in properties that leaves undergo, and furthermore, it is a change that can be ascribed a direction; it is a change *from* green *to* brown. Is the change in temporal properties from future to present to past truly analogous to ordinary change, and can it be ascribed a direction? I would argue that, even if the temporal properties of 'being past', 'being present' and 'being future' could be construed as genuine properties (and I have argued in chapter 3 that they cannot), this change in properties by itself cannot account for the direction of time.

I will start by taking a closer look at ordinary change, such as the change from green to brown that leaves undergo. I submit that ordinary change such as this can only be assigned a direction because the dimension along which it occurs itself has an intrinsic direction. That is, the temporal dimension ordered by the relations of 'earlier than' and 'later than' has an intrinsic direction. The change in properties from green to brown occurs along this dimension, such that the property of being green is instantiated earlier than the property of being brown. It is the fact that these property instantiations stand in this temporal relation to each other that enables us to assign a direction to the change in properties. Direction is inherent in the temporal relation, and this confers direction on the distinct property instantiations that constitute the relata of this relation.

If the property instantiations stood to each other in a relation without intrinsic direction then there would be no possibility of assigning an intrinsic direction from one to the other. For example, consider a football pitch that is green at one end and brown at the other. The distinct property instantiations stand in a spatial relation to each other, but as we have seen, spatial relations do not have intrinsic direction. Thus we have no grounds for saying that the pitch changes from green to brown along a spatial dimension, or for saying it changes from brown to green. Direction can only be assigned to a change in properties if the distinct

property instantiations stand to each other in a relation that has an intrinsic direction. Temporal relations have such intrinsic direction, and since ordinary change occurs along the temporal dimension ordered by these relations, we have grounds for assigning a direction to ordinary change.

I will now examine the tensed theorist's claim that the direction of time can be explained in terms of the change in tensed properties that events undergo from future to present to past. Once more, I would argue that even if such properties exist, and events continually change in respect of them, this process could not, by itself, explain the direction of time. The change in tensed properties that events are claimed to undergo can only be ascribed a direction because the property instantiations stand in temporal relations to each other, and those temporal relations possess an intrinsic direction. Thus, the extended event which constitutes the Olympic Games changes from being future to being present and then on to being past. This change could only be ascribed a direction because the futurity of the event is earlier than the presentness of the event which in turn is earlier than the pastness of the event. The change in properties occurs along the temporal dimension which is ordered by relations with an intrinsic direction. It is this that underlies the possibility of assigning a direction to that change. Hence, the property acquisition and loss account of temporal becoming alone is incapable of accounting for the direction of time.

Of course, proponents of the tensed theory would dispute my conclusion because according to them, events and times only stand in temporal relations to each other derivatively. That is, the temporal relations that events and times stand in to each other depend on the tense determinations of those events and times. For example, according to Broad (1923):

> Now the intrinsic sense of a series of events in Time is essentially bound up with the distinction between past, present and future. *A* precedes *B* because *A* is past when *B* is present. (Broad (1923) p. 58).

However, if Broad is correct and the primary constituents of temporal reality are the tense determinations, then time is left without a direction. The change in tensed properties would be more akin to the variation of colour across a football pitch that is green at one end and brown at the other, than to the change in colour from green to brown that leaves undergo. There would be no grounds for assigning a direction

to the change in tensed properties, because the fundamental temporal constituents lack direction in any sense of the word. Monadic properties do not express direction. Change in monadic properties only expresses direction if it occurs along a dimension ordered by a relation with an intrinsic direction. Consigning the temporal relations to the status of being ontologically dependent on the tensed monadic properties thus abandons the grounds for assigning a direction to time. If the tensed theorist still maintains that time has a direction, then that direction is introduced on an ad hoc basis and is left unexplained.

Thus, the two interpretations of temporal becoming which seemed most likely to offer an explanation of the direction of time in terms of the conventional sense of direction have shown themselves unable to do so. In both discussions I appealed to the intrinsic direction possessed by the temporal relations, and the temporal series generated by those relations to provide the basis for the direction of time when the tensed concepts failed to do so. In the next section I will expand on my claim that the intrinsic direction of temporal relations grounds the direction of time.

5.4 The Direction of Time: A Tenseless Account

It is my belief that the direction of time can be at least partly accounted for by the intrinsic direction possessed by the temporal relations and the series generated by them. We have already seen in the preceding section how this intrinsic direction provides us with grounds for assigning a direction to ordinary change. I believe it is also responsible for our intuitive sense in which time has a direction. However, it will not have gone unnoticed that in section 5.2.1 I quoted Newton-Smith (1980) making almost exactly the same claim, and yet I disputed it. My position stands in need of justification, and in what follows I will provide it.

The temporal relations 'earlier than' and 'later than' indubitably have an intrinsic direction. Their logical properties of asymmetry, transitivity and irreflexivity allow them to generate an asymmetric series of temporal entities. They also provide a basis for distinguishing between the two directions along that series: that from earlier to later, and that from later to earlier. Furthermore, the direction expressed by these temporal relations is intrinsic to them. All this I have argued for, and I find myself in agreement with Newton-Smith up to this point. However, as I have already remarked, this cannot be all there is to the direction of time. Time is intuitively unidirectional, yet all this only provides us with grounds for distinguishing the two directions along a temporal series from each other. As yet there is no basis

for picking out one of these directions as *the* direction of time. Time has a direction in a more profound sense than, say, a series of people ordered according to the relation 'taller than', or even than the natural number series which is ordered according to the numerical relations 'greater than' and 'less than'. However, if the logical properties of the temporal relations, together with the fact that they express direction intrinsically, provided the entire basis for the direction of time, then all these series would have a direction in the same sense.

There is, I submit, an additional element to the notion of the direction of time. It is an empirical element which combines with the logical elements I have already discussed, and it concerns the way in which we experience temporal succession. In my view, the experience of temporal succession is equivalent to a series *in the process of* being generated by the relation 'earlier than'. Each successive moment that we experience is a new member of the series being generated by the 'earlier than' relation. Each experience is earlier than its subsequent successor. Hence, our experience of temporal succession emphasizes the earlier to later direction, rather than its converse the later to earlier direction. To put it another way, the earlier to later direction defines our experience of temporal succession.

Consider an analogy. The natural number series, as I said, is generated by the relations 'less than' and 'greater than' which are analogous to 'earlier than' and 'later than' in their logical properties. However, the logical properties only allow us to distinguish between the two directions along the natural number series. They do not provide us with sufficient grounds to pick out one direction as *the* direction of the natural number series. However, the process of counting involves an additional empirical element. If we begin at 1 and count upwards (as it were), we embark on the process of generating the natural number series according to the relation 'less than'. Each new member of the series is less than its subsequent successor (1 is less than 2, which is less than 3, and so on). Hence, this process of generating the series can be assigned a unique direction. It exhibits the direction *from* lesser *to* greater numbers. Conversely, if we began the counting process at, say, 1,000 and counted backwards, we would be generating the converse series which would exhibit the direction *from* greater *to* lesser numbers.

Thus, the logical properties of the generating relations of the natural number series guarantee that this series has direction intrinsically. However, the logical properties only provide grounds for distinguishing between the two directions of the natural number series. The process of counting contributes an additional empirical element to the logical nature of the natural number series, and provides us with

grounds for picking out one of its directions as more fundamental than the other. In the case of a temporal series, the logical properties of its generating relations guarantee that the series has direction intrinsically, and provide grounds for distinguishing between its two directions. Experience of the temporal succession of events contributes an additional empirical element to the logical nature of a temporal series, providing us with grounds for picking out one of its directions as more fundamental than the other. Since we cannot choose the direction in which we experience temporal succession, as we can choose the direction in which to count the numbers of the natural number series, we assign to time a unique direction; that from earlier to later.

I have, thus, identified two distinct aspects of the notion of the direction of time. In the first place there is the notion that time intrinsically has direction, which I have accounted for by my discussion of temporal relations having direction intrinsically. Temporal relations differ from spatial relations in this respect, since the relata of temporal relations stand in those relations essentially, but the spatial relations of an entity are merely accidental to it. Thus, time intrinsically has direction, but space does not. Secondly, there is the notion that time is unidirectional; that one of time's directions is intuitively more important than its converse. I have sought to explain this aspect of the direction of time phenomenologically, in terms of our experience of temporal succession being akin to a logically asymmetric series in the process of being generated. This aspect of my account, taken separately, would be consistent with time itself being directionless, as Horwich (1987) and Mellor (1981) believe. I choose to combine it with my account of time having direction intrinsically.

5.5 Conclusion

My account of the direction of time is, as I have just described, composed of two parts. The logical part consists in the logical properties of the generating relations 'earlier than' and 'later than', together with the fact that direction is intrinsic to temporal series generated by these relations. The empirical part consists in the fact that the experience of temporal succession is a temporal series in the process of being generated by the relation 'earlier than'.[8]

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[8] I would like, tentatively, to suggest at this point that the fact that temporal experience is akin to a process may be one of the factors responsible for the pervasive metaphor of temporal flow. However, this idea clearly needs to be worked out fully before I can advocate and defend it.

Thus, I am equipped to provide a full and coherent account of the intrinsic direction of time, and of our experience of time being unidirectional, in entirely tenseless terms. This in turn allows me to distinguish the temporal dimension from the three spatial dimensions in a non-circular and fruitful way. It is a common criticism of the tenseless theory of time that it is unable to distinguish the temporal dimension from the three spatial dimensions. On the face of it, it appeared that the tensed theory had the best explanation for the direction of time and for the distinction between time and space. After all, if time flows, that distinguishes it from space. If it flows in one direction, that provides it with a unique direction. We saw in chapter 3 that the proposition that time flows cannot be sustained. We have seen here that even if it could be, it would fail to provide an explanation for the direction of time.

In conclusion, the metaphysical implications of the new tenseless theory of time, that all times are equally real and that time does not flow, do not prevent this theory from providing an adequate account of the direction of time. I examined the various senses in which we intuitively ascribe a direction to time. I then provided a conceptual analysis of the key concepts employed in expressing this intuition; asymmetry, anisotropy and direction itself. I examined various ways in which these concepts might be thought to provide the explanatory basis of the direction of time, and systematically excluded those that proved to be inadequate to the task. The two concepts that remained after this process of elimination were then revealed to be one that was consistent with a tensed theory of time and one that was consistent with a tenseless theory of time. I examined how a tensed theory might account for the direction of time, and found that it was incapable of doing so. The tenseless theory, on the other hand, has the conceptual equipment necessary to provide a satisfactory account of the direction of time.

Chapter 6

TIME, TENSE AND MEANING: A TENSELESS ACCOUNT

Throughout the course of this thesis I have been defending and developing the new tenseless token-reflexive theory of time. There is, however, a potentially devastating objection to Mellor's (1981) version of the theory I defend put forward by Smith (1987b, 1993). I will begin this chapter by examining this objection, and ultimately resolving the problem. However, my resolution of this problem raises an important question for the new tenseless theory of time, which concerns the notion of tensed meaning. It appears that a tensed sentence token and the tenseless sentence that states its truth conditions both have the same truth conditions, while remaining untranslatable by each other. Thus, there is an objective difference in meaning between them that cannot be discerned in their truth conditions. What is this difference? How can it be accounted for? Would an explanation of the underlying basis of this difference have any significant implications for the issue of whether temporal reality is tensed or tenseless? Once I have resolved the problem created by Smith's objection I will address these questions. I will examine various possible responses to the problem, considering their appropriateness as solutions to the problem in hand, and whether they carry any implications for a tensed or tenseless reality. Finally, I will argue for the position with respect to this problem that I believe to the correct one.

6.1 A Problem for the New Tenseless Token-Reflexive Theory of Time?

Quentin Smith claims that Hugh Mellor's version of the new tenseless theory of time, as put forward in *Real Time* (1981) fails. According to Smith, Mellor's theory is self-contradictory. He sets out five tenets of Mellor's theory, and goes on to argue that they cannot all be held together. These five tenets are:

(1) Tensed sentences have different truth conditions than tenseless sentences, and thus are untranslatable by them.

(2) Tensed sentences have tenseless truth conditions, viz., tenseless facts.

(3) These tenseless facts are the only facts needed to make tensed sentences true.

(4) Tensed sentences state the facts that are their truth conditions.

(5) Tensed sentences state the same facts that are stated by the tenseless sentences which state the former sentences' truth conditions. (Smith (1987b) p. 374).

Smith backs up tenets (1) - (4) with quotes from Mellor, and then claims that tenet (5) follows from the others, an entailment that I shall accept in order to facilitate an internal critique of Smith's argument. He goes on to state three assumptions he takes to be implicit in Mellor's theory:

(a) Facts correspond to true tokens of sentences, but not to false sentence tokens.

(b) Truth conditions, conditions necessary and sufficient to make sentences true, are facts.

(c) If a sentence as tokened on some occasion states a fact, F_1, then the sentence as tokened on that occasion is true if and only if F_1 and every fact implied by F_1 exists. (Smith (1987b) p. 376).

From his statement of the assumptions implicit in Mellor's theory, Smith goes on to make the following inference:

> Now, assumptions (a), (b) and (c) entail the *principle of the identity of truth conditions* (as I choose to call it):
>
> PITC: If two tokens of the same sentence or two tokens of different sentences state the same fact, F_1, they have the same truth conditions, i.e. are true if and only if F_1 and every fact implied by F_1 exists. (Smith (1987b) p. 376).

Smith then claims that the conjunction of tenets (1) and (5) contradicts PITC, and thus, Mellor's theory contradicts its own assumptions. The contradiction explicitly stated is that Mellor holds both that tensed and tenseless sentences have different truth conditions, and thus, by (1), cannot translate one another, and that tensed and tenseless sentence tokens can state the same fact, and thus, by PITC, must have the *same* truth conditions.

Smith goes on to suggest a way out of this contradictory predicament, this being that Mellor can reject tenet (1). This appears to be a sensible option as (using Mellor's examples) a token S of 'It is now 1980' and a token U of 'S occurs in 1980'

do seem to have the same truth conditions. They are both true if and only if *S* occurs (tenselessly) in 1980. However, if Mellor takes this option for avoiding the contradiction, his theory, Smith claims, collapses into the old tenseless theory of time. This is because, by rejecting tenet (1) Mellor would be giving up what he takes to be his explanation of the untranslatability thesis. The untranslatability thesis is that tenet of the new tenseless theory which states that tensed sentence tokens cannot be translated without loss of meaning by tenseless sentence tokens. This thesis is, as we have seen, the fundamental constituent of the new theory, and that which renders it different from, and immune to the problems of the old theory. Mellor's explanation of the untranslatability thesis is that such translations cannot be effected because tensed and tenseless sentences have different truth conditions. If Mellor relinquishes this claim then, it seems, his theory does indeed collapse into the old tenseless theory, as he will no longer have any grounds for maintaining the untranslatability thesis.

It is my belief that Mellor's theory is guilty of the charge of being self-contradictory that Smith levels at it. There is an aspect of Mellor's theory which renders it susceptible to just such an attack. This is that he tends to conflate talk of the truth conditions of sentence types with talk of the truth conditions of sentence tokens. For example, he writes:

> Now the truth conditions of tokens of.....temporally tensed types vary with their temporal position. So therefore must the truth conditions of tokens of their translations. But what makes sentence types tenseless.....is that the truth conditions of their tokens do *not* vary in this way. (Mellor (1981) p. 77).

According to Mellor, this provides him with grounds for the claim that tensed sentence tokens are not translatable by tenseless sentence tokens. However, the grounds that he appeals to in order to account for this untranslatability is a difference between tensed and tenseless sentence *types*. It is tensed sentence types that have tokens each with different truth conditions, and tenseless sentence types whose tokens all have the same truth conditions. This clearly tells us nothing about whether or not a particular pair of sentence tokens can translate each other. Indeed, elsewhere in his (1981), Mellor seems to be aware of this. When he analyses the truth conditions of tensed and tenseless sentences, he uses sentence tokens as the subjects of this analysis. He asserts that a particular token, *S*, of the tensed sentence

'It is now 1980' is true if and only if it occurs in 1980. However, he goes on to deny that the tenseless sentence that states *S*'s truth conditions, namely, the sentence '*S* occurs in 1980' has the same truth conditions as *S*. Let us examine the tenseless token-reflexive truth conditions of *S* and the truth conditions of a token, *U*, of the tenseless sentence '*S* occurs in 1980'.

Clearly, the tensed token *S* is true if and only if *S* occurs in 1980, according to Mellor's theory. However, *U*, it would seem, is also true if and only if *S* occurs in 1980. The clause that occurs to the right of the biconditional in the statement of the truth conditions of *S* and *U* is the same in both cases. Tokens *S* and *U* are both true if and only if *S* occurs in 1980. *S* and *U* thus have the same truth conditions. Mellor, however, denies this, but in doing so he appeals to differences between the truth conditions of the sentence types of which they are tokens, and not to any differences between the truth conditions of the tokens themselves:

> *S* is true if and only if it occurs in 1980. If a sentence giving another's truth conditions means what it does.....*S* should mean the same as '*S* occurs in 1980'. But these sentences have different truth conditions. In particular.....if *S* occurs in 1980 that is a fact at all times. You need not be in.....1980 to meet true tokens of.....'*S* occurs in 1980'. But you do need to be in 1980 to meet [a true token of] *S*. (Mellor (1981) p. 74).

The difference referred to by Mellor is clearly a difference between tensed and tenseless sentence types, and not between tokens of those types. It is true that the truth-values of tokens of temporally tensed types vary according to when they are produced, whereas the truth-values of tokens of tenseless types do not. However, this is irrelevant to considerations of whether a *particular* tensed token has the same truth conditions as a *particular* tenseless token. Furthermore, as we have seen, a particular tensed token, and a token of the tenseless sentence that states its truth conditions *do* have the same truth conditions.

The conclusion I draw from all this is that Mellor is wrong to deny that tensed and tenseless sentence tokens have different truth conditions, and that therefore he ought to reject tenet (1) as suggested by Smith. However, as I will argue, it does not follow from a rejection of tenet (1) that Mellor would thereby be forced to relinquish the untranslatability thesis. Consequently, it does not follow that, by making this move, his theory collapses into the old tenseless theory of time.

As we have seen in previous discussions, particularly in chapter 1, tensed sentence tokens are untranslatable by tenseless sentence tokens. One of the most compelling arguments for this untranslatability thesis is that, given a tensed sentence token and a token of the tenseless sentence that states its truth conditions, it is possible for someone to take different attitudes to the truth-value of each. For example, a token, *u*, of the tensed sentence 'The elephant has escaped' and a token, *v*, of the tenseless sentence that states *u*'s truth conditions, 'The elephant's escape is earlier than *u*' have the same truth conditions. *u* and *v* are both true if and only if the elephant's escape is earlier than *u*. However, *u* and *v* are not translations of each other, since it is possible for someone who understands both *u* and *v* to assent to the truth of one, but not to assent to the truth of the other. For example, someone may believe that *u* is true while believing that *v* is false, or remaining agnostic about the truth-value of *v*. *u* and *v* clearly do not convey the same information, and thus they are not synonymous with each other and cannot translate each other. The fact that they cannot translate each other, however, is clearly no impediment to their having the same truth conditions. *u* and *v* are both true under the same conditions. The obtaining of the same state of affairs in the world is necessary and sufficient for the truth of both of them, despite the fact that they cannot translate each other.

The same is true of Mellor's own examples of a token *S* of 'It is now 1980' and a token *U* of '*S* occurs in 1980'. As we have seen, they both have the same truth conditions. However, *S* and *U* cannot translate one another. It is possible for someone who understands both *S* and *U* to, say, assent to the truth of *S* while rejecting *U* as false, or remaining agnostic about the truth-value of *U*. Thus, it would appear to be consistent to hold that two such sentence tokens have the same truth conditions but do not provide translations of each other. It follows that Mellor ought to replace tenet (1) of his theory with tenet (1*):

(1*) Tensed sentence tokens can have the same truth conditions as tenseless sentence tokens, but are nevertheless untranslatable by them.

By making this move, Mellor's theory is no longer self-contradictory. The conjunction of tenets (1*) and (5) does not contradict PITC as the conjunction of (1) and (5) did. Furthermore, by opting for this solution to the charge of being self-contradictory, Mellor's theory is able to retain the untranslatability thesis, so his theory does not collapse into the old tenseless theory of time.

With this resolution of the problem facing Mellor's theory, the new tenseless token-reflexive theory of time is safe. One question, however, remains unanswered. According to Davidson (1967, 1990) and others, the truth conditions of a sentence token are supposed, in some sense, to give its meaning. As we have seen, however, it would seem to be possible for two sentence tokens to have the same truth conditions and yet to differ from each other in meaning, since they are unable to translate each other. This suggests that it is possible for there to be an objective difference in meaning between two sentence tokens that is not discernible in their truth conditions. How is this difference in meaning to be accounted for? I will address this question in the remainder of this chapter.

6.2 A Restatement of the Problem at Issue

Thus, an adequate defence of the new tenseless token-reflexive theory of time can be provided against Smith's (1987b, 1993) argument that it reduces, on pain of self-contradiction, to the old tenseless theory. To sum up briefly, Smith argues that the new tenseless token-reflexive theory is committed to two contradictory theses regarding the truth conditions of tensed and tenseless sentences. The two contradictory theses in question are that, in respect of a tensed sentence token and the tenseless sentence that states its truth conditions, two such sentences have both the same truth conditions and different truth conditions. They have the same truth conditions in order to ensure that they state the same fact, and they have different truth conditions in order to preserve the claim that they cannot translate one another. In defence of the new theory I argued that it can consistently maintain that two such sentences have the same truth conditions, and yet remain untranslatable by each other. Hence the new theory does not reduce to the old tenseless theory, and it is not internally inconsistent.

However, this solution to the problem posed by Smith, while preserving the integrity of the new theory, leaves an important question unanswered. Given that two such sentences have the same truth conditions and yet remain untranslatable by each other, it follows that there is an objective difference in meaning between them that cannot be discerned in their truth conditions. In the remainder of this chapter I will consider various possible accounts of this difference in meaning, and their implications. Some of the possible solutions to the problem in hand are put forward by their proponents in terms of a date version of the new tenseless theory of time. We saw in chapter 2 that the date version of this theory faces a number of problems to which the token-reflexive version is immune. It is my contention that the central

insights of these solutions to the problem can be preserved within a token-reflexive version of the tenseless theory of time, and I will endeavour to show this in section 6.10. However, for ease of exposition, I will discuss these solutions in the terms in which they were put forward, that is, in terms of a date version of the tenseless theory of time.

I will enter a further caveat at this stage. My concern in this chapter is with the difference in meaning between tensed and tenseless sentence tokens, and how to account for it. The prominent characteristic of tensed sentence tokens is that they are tokens of types whose truth-value appears to vary according to the time at which their tokens are produced. Tensed sentence types are thus temporally context-dependent. Tenseless sentence types, on the other hand, are not. Tokens of tenseless sentence types have the same truth-value whenever they are produced. Throughout this chapter, therefore, the feature of context-dependence, or context-sensitivity, will be paramount, but my particular concern, of course, is with *temporal* context-dependence. Sometimes the context-dependence of a sentence type will be the result of that type containing an indexical, such as 'now'. Hence, in my discussion I will sometimes refer to indexicals, and sometimes to context-dependence or context-sensitivity. I realize that within the philosophy of language there is a technical distinction between indexicals, tense and context-dependence. However, my concern is with the broad phenomenon of how the truth-value of a sentence token can depend on a feature of the context in which it is produced. Thus, my use of these different terms is intended to refer to this particular phenomenon.

6.3 The Co-reporting Theory

Michelle Beer (1988) puts forward a suggestion as to what might account for the objective difference between a tensed sentence token and the tenseless sentence that states its truth conditions. She argues that two such sentence tokens are 'co-reporting', but that they differ from each other in sense. The co-reporting theory maintains the untranslatability thesis, in that it does not seek an analytic reduction of tensed sentence tokens to tenseless sentence tokens. A sentence token (to use Beer's examples) such as 'Jones is running now' uttered at time t_7, and the tenseless sentence that states its truth conditions 'Jones is running at t_7', where the verb in this sentence is to be taken as tenseless, are insufficient to translate one another. However, these two sentence tokens are, according to Beer, co-reporting. What this means is that both sentence tokens report the existence of the same state of affairs, or the occurrence of the same event. In order to argue that this is the case, Beer proposes

that it is a sufficient condition for an event, e_1, to be numerically identical with an event, e_2, that e_1 and e_2 'involve the same subject instantiating the same property at the same time' (Beer (1988) p. 161). Another important supporting tenet of the co-reporting theory is that temporal indexical terms, as uttered on particular occasions, are referring terms which denote times.[1] Given these two presuppositions, let us now examine the way in which these two sentence tokens can be said to be co-reporting.

The event referred to by the tensed sentence token is the event of Jones' running now. Since that sentence token is uttered at t_7, 'now' refers directly to t_7, so the event referred to by the utterance of the tensed sentence token at t_7 is the event of Jones' running at t_7. The event referred to by the tenseless sentence token is the event of Jones' running at t_7. The event referred to by each of these sentence tokens thus involves the same subject, Jones, instantiating the same property, that of running, at the same time, t_7. Thus, both sentence tokens refer to the same event, and according to Beer, are therefore co-reporting. However, these two sentence tokens are insufficient to translate each other because it is possible for a competent speaker of the language to understand both of them at the same time and yet to take different attitudes to the truth-value of each. They are not substitutable in all contexts salva veritate, and therefore they are not synonymous. Hence, there must be an objective difference in meaning between them. This difference Beer identifies as a difference in sense. Indeed, she argues that co-reporting sentence tokens can differ in informative content. A token of '*t* is now' uttered at *t*, and a token of '*t* is at *t*' are co-reporting, even though the former is informative but the latter is not. The use of 'now' in the first sentence token refers directly to the time of its utterance, which is *t*, so that sentence token asserts an identity between the time referred to by 'now' and the time referred to by '*t*'. The same sort of identity is asserted by such sentence tokens as 'Leeds is here' when uttered in Leeds. This sentence token is informative, since Leeds might not have been here, or the utterance might not have occurred in Leeds, but it asserts an identity by using two different terms to refer to

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[1] In my discussion of the co-reporting theory, and in my discussion of Kaplan's distinction between character and content I will accept, initially, the presupposition that indexical expressions are directly referential. However, in section 6.10 I will argue that the motivation for maintaining the direct reference theory of indexicals is equally a motivation for advocating a token-reflexive account of the mechanism by which indexicals pick out their referents. Furthermore, a token-reflexive account is able to discharge the responsibility of incorporating times in the truth conditions of sentence tokens containing indexicals. Any account that does introduce times into the truth conditions of tensed or indexical sentences will generate a date version of the tenseless theory, and thus will face the problems identified for this theory in chapter 2.

the same place. Similarly, '*t* is now' asserts an identity by using two different terms to refer to the same time. Its co-reporting counterpart '*t* is at *t*' asserts an identity in a more obvious fashion by using the same term twice to refer to the same time. Hence, the latter is not informative, but the former is. The two sentence tokens are co-reporting, but they differ in informative content and, according to Beer, they differ in sense.

The metaphysical implications of the co-reporting theory, according to Beer, are that the co-reporting nature of sentence tokens such as 'Jones is running now' uttered at t_7, and 'Jones is running at t_7' allows an ontological reduction from the *A* series to the *B* series to be effected. An event's possessing an *A* determination, or a tense, is ontologically identical to its standing in a *B* relation, or a tenseless temporal relation, to another event or moment of time. Beer claims that this reduction does not result in the elimination of tense. She compares it to non-eliminative scientific reductions such as that water is nothing but H_2O, and that lightning is nothing more than a flow of ionized particles. It is an ontological reduction such that the possession by an event of a tense is nothing more than, or is identical to its standing in a tenseless temporal relation to another event or a moment of time. She justifies this direction of the reduction, from the *A* series to the *B* series, by appeal to considerations of theoretical advantage. She claims that a better, or more complete and accurate description of the world is obtained by abstracting from features of the world that are peculiar to the observer. Tenses and temporal indexicals are context-sensitive, and thus sentences containing them only hold true at certain times. Statements of scientific law and complete and correct descriptions of the world do not contain context-sensitive terms so that they may express propositions that are true at any place, time, or any other feature of a context of utterance. Thus Beer cites theoretical advantage in order to support her claim that the truth of the co-reporting theory justifies the conclusion that temporal reality is tenseless.

It is my contention that Beer is either confused or mistaken over the nature of the reduction to be achieved by the co-reporting theory. In chapter 1 I argued that any reduction from the *A* series to the *B* series, or vice versa, is not a theoretical or scientific reduction of the same kind as that from water to H_2O. There are two reasons for this. First of all, any such reduction claims that the entities referred to by the reducing statement and the statement to be reduced are contingently identical. Any claim for the contingent identity of the *A* series and the *B* series is false, since they are logically distinct from each other. The second reason is that such reductions are usually based on the results of scientific discoveries of the underlying nature of

the entities involved. There are no such scientific discoveries which might support a scientific reduction from the *A* series to the *B* series. Beer also claims that the co-reporting theory supports a *non-eliminative* reduction of the *A* series to the *B* series. However, the claims of the new tenseless theory in general are that tense has no metaphysical role to play, and hence, is metaphysically eliminable. Thus, Beer is mistaken in her claim that the co-reporting theory supports a non-eliminative scientific reduction from the *A* series to the *B* series.

However, it is possible that Beer is simply confused. The reasons she gives to support her claim of effecting a scientific reduction are more consistent with the claim that the co-reporting theory supports an *ontological* reduction from the *A* series to the *B* series. If such an ontological reduction has been effected, then tense has indeed been eliminated from the ontology of time, but this kind of reduction makes no claims for the elimination of tense from language and thought. It does not claim that tensed sentences can be eliminated in favour of tenseless sentences, but merely that tense constitutes no part of temporal reality. Thus, it is possible that it is in this sense that Beer means to claim that the reduction is 'non-eliminative'. Beer's claim that the co-reporting theory supports a non-eliminative scientific reduction from the *A* series to the *B* series is based on her confusion over two issues. First of all, she confuses the distinction between a scientific and an ontological reduction. Secondly, she is confused over the sense in which tense is eliminable. Tense is ineliminable from thought and language, but eliminable from temporal reality. I would argue that the co-reporting theory supports the conclusion that temporal reality is tenseless. However, the question that concerns me in the light of the claims of the co-reporting theory is: what *is* the difference in sense between a tensed sentence token and the tenseless sentence that states its truth conditions? How can it be articulated, and does it have any implications for whether temporal reality is tensed or tenseless? Beer does not expand, or offer any thoughts on the nature of this difference in sense. I intend to examine some possible explanations of this objective difference in sense between tensed and tenseless co-reporting sentences.

6.4 Can Frege's Distinction Between Sense and Reference Provide the Answer?

The terminology of the co-reporting theory is suggestive of Frege's distinction between sense and reference. Co-reporting utterances refer to the same state of affairs, so they pick out the same referent, and say the same thing about it, while differing from each other in sense. Similarly, Frege argued that two different

expressions could share a common referent while differing from each other in sense.[2] It is possible that this Fregean distinction could shed some light on the supposed difference in sense between tensed and tenseless co-reporting sentence tokens. The tensed sentence token, 'Jones is running now' uttered at t_7, contains the temporal indexical 'now', while the tenseless sentence token, 'Jones is running at t_7', does not. It might be thought that the difference in sense between these two sentence tokens is a result of the former being invested with some kind of indexical sense while the latter is not. In 'The Thought' (1918-19), Frege makes some remarks which support this supposition. He writes:

> If a time indication is needed by the present tense one must know when the sentence was uttered to apprehend the thought correctly. Therefore, the time of utterance is part of the expression of the thought. If someone wants to say the same today as he expressed yesterday using the word 'today', he must replace this word with 'yesterday'. Although the thought is the same its verbal expression must be different so that the sense, which would otherwise be affected by the differing times of utterance, is readjusted. (Frege (1918-19) p. 516).

A temporal indexical thus contributes its peculiar indexical sense to the thought expressed by the sentence of which it is a constituent. Quentin Smith (1990) has argued that implementing a Fregean account of indexical sense and reference is of no use to the co-reporting theory, since Frege's theory of indexicals is logically incompatible with the co-reporting theory. He writes:

> According to Frege, the time of utterance of the temporal indexical, such as the time t_7, in conjunction with the utterance of the indexical itself, expresses the sense. Thus, the utterance of 'now' [in 'It is now t_7'] in conjunction with the fact that this utterance occurs at t_7, expresses the sense *at* t_7. But this is the same sense that is expressed by 'at t_7' in the non-indexical sentence 'It is t_7 at t_7'. This shows why an appeal to Frege cannot save the Co-reporting Theory. The difference between the indexical and non-indexical expression, for

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2 Frege (1892).

> Frege, is not a difference in the sense expressed, but in the means of expressing it. It is expressed solely by words (viz., 'at t_7') in the non-indexical sentence and is expressed by words (viz., 'now') in conjunction with the time of utterance in the indexical sentence. The Fregean theory is inconsistent with the Co-reporting Theory, for the latter states that *there is a difference in sense* between the indexical and non-indexical utterances and the Fregean theory says there is the same sense and merely a difference in the manner of expressing it. (Smith (1990) p. 216).

The essence of Smith's argument is that, according to Frege, the tensed and tenseless co-reporting sentence tokens have the same sense, but express it in different ways. The co-reporting theory, on the other hand, maintains that they express different senses. It is my belief that Smith has misrepresented Frege on this point. For Frege, the sentences 'It is now t_7', uttered at t_7, and 'It is t_7 at t_7' clearly differ in sense because it is possible for a subject to entertain different attitudes towards the thoughts expressed by each of these sentence tokens. It is possible for someone to doubt the truth of the first, but it is difficult to make sense of anyone seriously doubting the truth of the second. For Frege, a necessary condition for two sentences to differ in the sense expressed by each is for it to be possible for a subject to understand both and to take different attitudes to the truth-value of each. This condition is met by any pair of co-reporting tensed and tenseless sentences, and so, as far as Frege is concerned, they express different thoughts. It follows that their constituent expressions differ in sense.

Smith is therefore wrong to argue that the Fregean theory of indexicals and the co-reporting theory are logically incompatible. However, the Fregean theory of indexicals, such as it is, has been widely criticized,[3] and it remains unclear whether the distinction between sense and reference can be of any value in identifying the difference in sense between tensed and tenseless co-reporting sentence tokens. In the next section I will explore one possible avenue of investigation which might suggest that the Fregean distinction succeeds in capturing this difference.

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[3] For example, Kaplan (1989), Perry (1977), Castañeda (1989) and Wettstein (1979).

6.5 Some Analogies Between Senses and Roles

Frege introduced the distinction between the sense and reference of an expression when considering pairs of expressions which uniquely specify the same extra-linguistic entity. For example, the expressions 'The Morning Star' and 'The Evening Star' both identify the same object in the world (viz., Venus), so they have the same reference. However, these two expressions differ from each other in the information they convey about their common referent. In terms of what they refer to in the world, these expressions have the same meaning; they specify the same object. In terms of the information they convey about their subject matter, these expressions differ from each other in meaning. Thus, Frege argued that there are two distinct levels of meaning. An expression refers to something in the world, which is its reference. However, by identifying the extra-linguistic entity to which an expression refers, one has not thereby exhausted its information content. Consider the following two statements of identity:

(1) The Morning Star is the Morning Star
(2) The Morning Star is the Evening Star

Since the expressions 'The Morning Star' and 'The Evening Star' share a common referent, both statements of identity are true. However, (1) is tautological, in an epistemic sense, and thus says nothing very interesting about the Morning Star. (2), on the other hand, is an empirical truth, and conveys the information that the object we identify as the Morning Star is the very same object as the one we identify as the Evening Star. Therefore, (1) and (2) clearly differ in meaning, since (2) is informative but (1) is not. This difference in meaning, however, is not discernible at the level of reference, since each constituent expression of (1) and (2) has the same reference. The difference in meaning between (1) and (2) is to be found at the level of sense. The expression 'The Morning Star' differs in sense from the expression 'The Evening Star' and this difference in sense contributes to the difference in sense between (1) and (2).

It seems to me that this distinction between sense and reference is at least reminiscent of the distinction identified by Beer between tensed and tenseless co-reporting utterances. Recall the co-reporting utterances 'It is now *t*' uttered at *t*, and 'It is *t* at *t*'. Here, the latter is vacuous, but the former is informative. They differ from each other insofar as they use two different expressions to refer to the same time. Is it not reasonable to suggest that, just as (1) and (2) differ from each other in

sense, these two co-reporting utterances differ from each other in virtue of the difference in sense between the two expressions 'now' and 'at *t*'? The expressions 'now' and 'at *t*' appear to have the same reference, in that they both refer to time *t*, but they differ from each other in the information they convey about their common referent.

Another analogy between the sense of an ordinary expression, as identified by Frege, and the 'sense' of the temporal indexical 'now' can be found in the relationship between the sense and the reference of an expression. As has been noted by Perry, Kaplan, Castañeda and others,[4] indexical expressions have roles. The role of the temporal indexical 'now' is that it refers, on any occasion of utterance, to the moment at which it is uttered. Similarly, the role of the indexical expression 'here' is that it refers, on any occasion of utterance to the place at which it is uttered, and 'I' refers to the one who utters it. Is it possible for the role of an indexical to be identified with its sense? Clearly, the role of an indexical determines its referent on any given occasion of use. Thus, the role of an indexical is instrumental in determining the truth-value of a sentence containing it. Similarly, according to Frege, the sense of an expression determines its reference. The sense of an expression is the *mode of presentation* of its referent. An expression picks out the extra-linguistic entity that is its referent, but it picks it out in a particular way. It is this particular way in which an expression picks out its referent that can be identified with its sense. Thus, co-referring terms pick out their common referent in different ways, and so they differ from each other in sense. For Frege it is in virtue of the sense of an expression that that expression has the reference that it does. The sense of an expression is what we grasp when we understand that expression, and it is this, the sense, that determines the reference of an expression. Therefore, just as the role of an indexical determines its reference on a given occasion of use, the sense of a non-indexical expression determines that expression's reference. The role of an indexical is thus instrumental in determining the truth-value of a sentence in which it occurs. Similarly, the sense of a non-indexical expression is instrumental in determining the truth-value of a sentence in which it occurs.

The role of an indexical is an objective part of its meaning. When we learn how to use the words 'I', 'now' and 'here' correctly, we each learn the same thing. We learn that 'I' refers to the one who utters it; 'now' refers to the time of utterance, and so on. The role is an objective and constant part of the meaning of an indexical.

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[4] Perry (1977, 1979), Kaplan (1989) and Castañeda (1989).

Analogously, the sense of an expression, according to Frege, is an objective feature of that expression's meaning. The sense of an expression is common to all speakers of the language. When we grasp the sense of an expression, we each grasp the same thing. Without this stipulation on the notion of sense, Frege believed we would be unable to communicate successfully with one another. Thus we have another analogy between a Fregean sense and the role of an indexical.

One final apparent analogy between senses and roles is as follows. The sense of a declarative sentence is the thought it expresses. The senses of the constituent expressions of such a sentence combine to yield the sense of the sentence as a whole. Thus, the thought expressed by a declarative sentence is a function of the senses of its constituent expressions. A sentence containing an indexical can also be said to express a thought. When I say 'Jones is running now', what I have said expresses the content of a belief, or a complete thought. If that thought is made up of the senses of the constituent expressions of the sentence, then it would seem to follow that there must be at least a minimal way in which we can say that an indexical expression has a sense.

The preceding discussion has revealed a number of points of analogy between the notion of a Fregean sense and the semantic role of an indexical expression. To summarize, the analogies are as follows. Two non-indexical sentences can be identical at the level of reference, while differing in the information they convey about their common referents. Thus there is an objective difference in meaning between two such sentences that is not discernible at the level of reference. Similarly, a pair of co-reporting tensed and tenseless utterances differ from each other in meaning, although this difference is not discernible at the level of truth conditions. They too differ in the information they convey about their common referents, in that one of them employs a context-sensitive expression, and the other reports the existence of the same state of affairs, or the occurrence of the same event, but does so without context-sensitive expressions, resulting in a freely repeatable sentence. The second analogy between senses and roles is that the sense of a non-indexical expression determines its reference, while the role of an indexical is responsible for determining its reference on a particular occasion of use. Thirdly, the role of an indexical is an objective part of its meaning. Every competent speaker of the language learns the same thing when they learn how to use an indexical correctly. Similarly, the sense of an expression is an objective part of that expression's meaning. When we grasp the sense of an expression we each grasp the same thing. Finally, the sense of a complete sentence, or the thought it expresses, is

a function of the senses of its constituent expressions. Since sentences containing indexicals express complete thoughts, it would seem natural to infer that indexicals express senses which contribute to the complete thought expressed by a sentence of which it is a constituent.

However, despite this abundance of analogies between senses and roles, that is not the end of the story. There are also many disanalogies between senses and roles. After examining these disanalogies we *may* conclude, on balance, that the role of an indexical cannot be subsumed under the notion of a Fregean sense.

6.6 Some Disanalogies Between Senses and Roles

Senses serve to identify uniquely the referent of an expression, and thus are themselves expressible by qualitative definite descriptions, according to the traditional interpretation of sense. An expression such as 'The Morning Star' expresses a sense, and that sense serves to pick out the unique object which is the referent of the expression on each occasion of its use. There is thus a stable and permanent relation between the sense and the referent of a non-indexical expression.[5] The role of an indexical, on the other hand, serves to pick out the referent of the expression on a particular occasion of use by appeal to features of the context in which it is uttered. The same indexical, when used on different occasions, can serve to pick out different referents, while retaining the same invariant role. Thus, the relation between the role of an indexical and its referent on different occasions of use is a changing one. Furthermore, the role of an indexical does not determine its referent in the same *way* that the sense of a non-indexical expression determines that expression's referent. Senses, as I have said, determine reference by means of a uniquely identifying definite description of the referent.[6] Roles, on the other hand, determine the reference by picking out a feature of the context of utterance as referent. They do not do this via a mediating definite description of the referent. Indeed it is possible to use an indexical and successfully refer to the appropriate referent without being able to identify that referent by means of any definite

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[5] According to Lewis (1986) definite descriptions are modally indexical in that their reference can vary depending on the world in which they are uttered. My concern here is with expressions whose reference varies according to particular features of the context in which they are uttered where we, as language users, are *aware* of this variability of reference. Hence I acknowledge Lewis' proposal, but I will ignore it for the purposes of this chapter.

[6] Evans (1982) and Dummett (1973) interpret Frege's account of sense and its relation to reference in a slightly different way. However, their notion of a 'mode of presentation' of the referent still differs significantly from the connection between an indexical and its referent.

description. For example, imagine being on the overnight train from London to Edinburgh, and waking up at some point in the night. One could ask oneself 'I wonder what time it is now?'. By using the temporal indexical one is referring to the time of utterance, but one might perfectly well be unable to pick out that time by means of any definite description. One could also, quite reasonably ask oneself where one is, and be able successfully to refer to that place as 'here', but not be able to identify it under any other description. So, senses and roles serve to identify their respective referents in quite different ways. Furthermore, the relation between sense and referent on the one hand, and role and referent on the other, are relations of a quite different nature. The descriptive sense of a non-context-dependent expression is satisfied by the same object no matter what utterance it occurs in. The role of an indexical, however, may be satisfied by different objects as it occurs in different utterances.

The role of an indexical is a rule that carries us from the context of utterance to the referent. The sense of a non-indexical carries us directly to the referent, without appeal to any feature of the context of utterance, uniquely specifying it by means of some definite description. Thus, as we saw earlier, both roles and senses are objective, and can be grasped equally by different speakers of the language. However, the fact that they are both objectively available to speakers of the language is not, after all, a point of analogy between them. Their functions are entirely different, and indeed, can even be mutually exclusive, since one can successfully refer indexically without being able to refer descriptively, and vice versa.

These considerations suggest a further disanalogy between senses and roles. It is possible for a non-context-dependent expression to have a sense, but no reference. For example, the term 'unicorn' has a sense. A token of it is capable of contributing to the thought expressed by a sentence of which it is a constituent. However, it does not refer to anything that exists. Since there are no unicorns, there is nothing in the world to which a token of the expression 'unicorn' refers. A token of an indexical, on the other hand, always has a referent. It is difficult even to make sense of the notion of a particular token of an indexical having a role but no referent. Whenever an indexical is produced it refers to a particular feature of the context in which it is produced. Thus, the very production of a token of an indexical guarantees that that indexical token has a reference.

The most significant point of disanalogy between senses and roles concerns Frege's criteria of difference for senses and thoughts. The sense of a sentence, for Frege, is identified with the thought it expresses. According to Perry (1977) there

are three distinct criteria of difference for determining whether two different expressions have the same sense, or whether two sentences express the same thought. The three criteria are as follows:

(1) If *A* understands *S* and *S'*, and accepts *S* as true while not accepting *S'*, then *S* and *S'* have different senses.

(2) If *S* is true and *S'* is not, *S* and *S'* express different thoughts.

(3) If '*A* believes *S*' is true, and '*A* believes *S*'' is not, then *S* and *S'* do not have the same indirect reference. (Perry (1977) p. 476).

These three criteria of difference are very closely related to each other, since Frege identifies the sense of a sentence with the thought it expresses and with its indirect reference. In order to identify this disanalogy between senses and roles I will take a pair of sentence tokens, only one of which contains a context-dependent expression, and apply the three criteria of difference to them.

***S*:** Saturday is tomorrow (uttered on Friday)

***S'*:** Saturday is the day of the 14th annual egg and spoon race

Suppose both *S* and *S'* are true. That is, *S* correctly identifies Saturday as the day following the day on which *S* is uttered. *S'*, on the other hand, correctly identifies the same day, Saturday, as the day that satisfies the definite description 'being the day of the 14th annual egg and spoon race'. According to the first criterion of difference *S* and *S'* have different senses, since it is clearly possible for someone who understands both sentence tokens to accept one as true while believing the other to be false. The second criterion of difference does not apply in this case, since both sentence tokens are true. However, since we already know that *S* and *S'* have different senses, we are entitled to conclude that they express different thoughts, because Frege identifies the sense of a sentence with the thought it expresses. Finally, the third criterion of difference shows that *S* and *S'* do not have the same indirect reference.

Clearly, *S* and *S'* differ in sense. However, the indexical sentence *S* expresses a complete thought. The sense of the sentence as a whole is made up of the senses of its constituents, so the indexical expression 'tomorrow' must, according to Frege, contribute a sense of some sort to the sense of the whole. There are two possible candidates for the sense of the indexical expression. Firstly, the expression could

contribute the object it specifies to the sense of the sentence. This is unacceptable because the object specified, the day following the day of utterance, is the referent of the expression, and the sense of the whole must be made up of the senses, not the referents, of the parts. The second candidate for the sense of 'tomorrow' is the role of the expression. The role is the rule that identifies, for any context of utterance, the referent of the expression in that context. For 'tomorrow', the role identifies the day following the day of utterance as referent. However, the role of the indexical cannot be identified as the sense that the expression contributes to the sense of a sentence in which it occurs for the following reason. Two tokens of the same sentence type 'Tomorrow is Saturday' can express different thoughts when uttered in different contexts. However, the role of the indexical, which we are supposing to be the sense of the indexical, remains invariant in these two different contexts. This results in the unsatisfactory situation that the same expression, 'tomorrow', contributes the same aspect of meaning, its role, as sense, to two tokens of the same sentence 'Tomorrow is Saturday', but the result is that each token expresses a different thought. A Friday token of 'Tomorrow is Saturday' is true, but a Saturday token of the same sentence type is false. By the second criterion of difference, these two tokens express different thoughts. However, on the supposition that the role of the indexical is its sense, this expression has contributed the same sense to tokens of the same sentence, but the result is that the two tokens express different thoughts.

Clearly, the role of an indexical cannot be subsumed under the notion of a Fregean sense because it results in a violation of the criteria of difference for senses. Furthermore, the role of an indexical and the sense of a non-indexical, as I noted earlier in this section, behave quite differently, and stand in quite different relations to the referents they identify. I conclude that roles cannot be identified with senses.[7] If roles were to be identified with senses, the coherence and integrity of the notion of sense as it stands, would have to be unacceptably compromised.

At this stage in my investigation I find myself in the following situation. There remains an objective difference between the meaning of a tensed sentence token and the meaning of the tenseless sentence that states its truth conditions. This difference in meaning does not exist at the level of truth conditions, since two such

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[7] David Woodruff Smith (1981) acknowledges some of these differences between the roles of indexicals and traditional Fregean senses, but concludes that indexicals *do* have senses. He argues that indexical senses are 'non-standard'. I find this conclusion unhelpful for, while I recognize the analogies between senses and roles, the disanalogies clearly illustrate that senses and roles are two quite different species of meaning. To collect them together under the same heading confuses, rather than clarifies the nature of each.

sentence tokens have the same truth conditions while remaining untranslatable by each other. Michelle Beer identifies this difference as a difference in sense, but does not elaborate on what she means by this. I examined the Fregean distinction between sense and reference in order to determine whether these two levels of meaning in any way mirror the two levels of meaning that exist in tensed sentences. The latter two levels of meaning are the one that exists at the level of truth conditions, and the one that results in the difference in meaning between a tensed sentence token and its tenseless co-reporting counterpart. At first the investigation appeared fruitful, as there were some significant analogies between Frege's notion of sense and the role of an indexical expression. This notion of role is what differentiates a tensed sentence token, or a sentence token containing an indexical, from the tenseless sentence that states its truth conditions, as it is what renders tensed or indexical sentences context-sensitive. However, despite the analogies between senses and roles, the disanalogies between these two notions turned out to be more significant. Senses and roles behave in such different ways that it is neither possible nor illuminating to force them into the same category. Indeed, the notion of Fregean sense cannot remain intact if it is widened to include the roles of indexicals. I therefore conclude, at this stage, that we must look elsewhere for the true nature of what Beer calls the difference in sense between tensed and tenseless co-reporting sentence tokens.

6.7 A Tensed Solution to the Meaning Problem?

Quentin Smith (1990) has a suggestion as to what might account for the difference in meaning between tensed and tenseless co-reporting sentence tokens. He responds to Beer's article by arguing that it does not necessarily support the tenseless theory of time. Speaking of the co-reporting utterances 'It is t_7 now' uttered at t_7, and 'It is t_7 at t_7', he writes:

> [T]he premises, that the tensed and tenseless utterances differ in sense but refer to the same relata and ascribe the same relation, do not entail that the tensed utterance does not ascribe an irreducible *A* property.....The locus of the invalidity is Beer's and Gale's admission that the two utterances *differ in sense*. Neither Beer nor Gale explains the exact nature of this difference in sense, and the premise that the two utterances both refer to t_7 and say of t_7 that it is simultaneous with itself is compatible with the supposition that their

> difference in sense consists in the fact that the tensed utterance alone conveys the information that t_7 has an irreducible *A* property of presentness. (Smith (1990) p. 214).[8]

What are we to make of this suggestion? Smith claims that the premises of the co-reporting theory do not rule out the conclusion that a tensed utterance ascribes an irreducible property of pastness, presentness or futurity to the state of affairs reported by it. In essence then, he argues that he can accept the premises of the co-reporting theory, which are that co-reporting utterances differ in sense, but refer to the same relata and ascribe the same relation, but that he can undermine its conclusion by claiming that the sense of the tensed utterance serves to ascribe a monadic temporal property to the relata.

My initial response to this suggestion is that there is something implausible about agreeing that tensed and tenseless sentence tokens are co-reporting in the way that Beer outlines, but then insisting that only one of these co-reporting utterances ascribes a monadic temporal property. If one of these sentence tokens serves to ascribe such a property to a moment, event, or state of affairs, but the other one does not, then one might reasonably argue that they are not, after all, co-reporting. Indeed a difference in meaning of this kind would surely reveal itself in the truth conditions of the tensed sentence token. One of the conditions for the truth of the tensed sentence token would have to be that the relevant time, event or state of affairs possesses the relevant tensed property. Thus, Smith's claim that his proposal is consistent with the premises of the co-reporting theory seems dubious. However, I shall let this objection pass for the time being in order to analyse his proposal more closely.

According to Smith's position, the tensed sentence

u: Jones is now running

where *u* is uttered at t_7, refers to the same relata and ascribes the same relation between them as its co-reporting counterpart

v: Jones is running at t_7

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[8] The reference to Gale in this quotation is to an article co-authored by Richard Gale and Michelle Beer (1984), in which they provide further support for the co-reporting theory.

That is, they both refer to the event of Jones' running, and to the time t_7. They also both ascribe the temporal relation of simultaneity between this event and this time. However, in addition, the tensed sentence token ascribes the monadic tensed property of presentness to the relata. Thus, formally, the tensed sentence token *u* is responsible for effecting the following three linguistic functions:

(i) It refers to, or denotes the event or state of affairs reported by *u*.

(ii) It ascribes the temporal relation of simultaneity between the event reported, Jones' running, and the time t_7, the time at which *u* is produced.

(iii) It ascribes the irreducible, non-relational property of presentness to the event reported, and to the time t_7.

The co-reporting theory claims that the tensed sentence token effects functions (i) and (ii). Smith's claim is that function (iii) is consistent with the claims of the co-reporting theory. Furthermore, he claims that function (iii) just is the difference in sense between the tensed and tenseless co-reporting utterances *u* and *v*. If Smith is right, then a tensed sentence token such as *u* would have to express both a dyadic relation and a monadic property. It seems to me that there is an inherent difficulty in accepting this position.

A one-place predicate such as '...is red' and a two-place predicate such as '...is smaller than...' perform quite different and wholly incompatible logical functions. The former expresses a monadic property, the latter a dyadic relation. Is it possible for one expression to carry out both of these logical functions? Let us allow that it is and see what follows. For an utterance, *u*, which occurs at time *t* of the sentence '*e* is now' to ascribe both the dyadic relation of simultaneity and the monadic property of presentness, it must be analysable as follows:

w: *e* is simultaneous with *t*, and *e* is present, and *t* is present.

Notice that the second conjunct of *w* is synonymous with *u*, and consequently, must be subject to the same analysis. If Smith's position is to be maintained, the analysis of the second conjunct of *w* must run as follows:

x: *e* is simultaneous with *t'*, and *e* is present, and *t'* is present.

Here, *t'* denotes the moment of production of *w*. A full analysis of the original utterance, *u*, can thus be given as follows:

y: *e* is simultaneous with *t*, and *e* is simultaneous with *t'*, and *e* is present, and *t* is present, and *t'* is present.

It should now be clear that this analysis has embarked on an infinite regress, and one which I believe to be vicious. This is because it is supposed to provide an analysis of the finite sentence token '*e* is now'. Any analysis of this token ought to be finite if it is to be a complete and correct analysis. Thus, if Smith's position is committed to a regress in the way I have outlined, then his contention that a sentence containing the expression '...is now' ascribes both a dyadic relation and a monadic property is not acceptable.

There are two possible rejoinders open to Smith against this line of attack. The first is to deny that the expressions '...is now' and '...is present' are synonymous. The vicious infinite regress would then not ensue because the second conjunct of *w* would not be open to the same analysis as that appropriate for *u*. A complete and finite analysis of *u* would therefore be given by *w* alone. Would this defence be consistent with Smith's overall position? I think not. Smith attributes the following, rather versatile role to the expression '...is present'. He claims in his article (1990) that it can be used merely predicatively (to ascribe the property of presentness) and both referentially *and* predicatively (to pick out a moment of time and ascribe to it the property of presentness). Furthermore, he notes that it can sometimes be taken as being synonymous with '...is now'. On these occasions, he suggests, 'We should interpret this use of 'the present' as being in a relevant sense *both* a referential and predicative use' (Smith (1990) p. 221). Thus, a token *u* of the sentence '*e* is now' uttered at time *t*, refers to *e* and refers to *t*. Since Smith is claiming that his analysis is consistent with the claims of the co-reporting theory, this sentence token, on his analysis must also ascribe the temporal relation of simultaneity between this event and this time, and it also ascribes the property of presentness to both relata of the temporal relation.

We can take it then, that according to Smith it is possible for the expressions 'now' and 'present' to be synonymous, and that when this is so the latter expression is both referential and predicative in nature. So, are they synonymous as used within

the context of my argument, or can Smith safely claim that within that context '...is present' is *merely* predicative, thus avoiding the infinite regress?

In another article Smith (1987b) relies on the mutual entailment of the two sentences '1980 is now' and '1980 is present' while arguing for the tensed theory of time. This is illuminating for my purposes because it means that within a context such as this, Smith is forced to maintain that the expression '...is present' must be taken as being both referential and predicative. If he did not, this mutual entailment would not hold. That is, if the expression '...is present', as employed in the sentence '1980 is present' were merely predicative, that sentence would not entail the sentence '1980 is now', which for Smith *is* both referential and predicative. So, in order to maintain a consistent overall position, Smith must hold that, within the context of my argument, the expression '...is present' is both referential and predicative. Furthermore, since he is also arguing that his position is consistent with the co-reporting theory, the sentence '*e* is present' must also ascribe the temporal relation of simultaneity between event *e* and the time of its utterance. We can conclude from all this that Smith cannot adopt the defence I offered him, and that he is indeed committed to the vicious infinite regress that I have outlined.

In the preceding discussion I noted that Smith holds that the expression '...is now' is both referential and predicative. This suggests a second strategy available to him to counteract the vicious infinite regress. Smith could relinquish the second of the three linguistic functions of a sentence containing the term 'now'. The second function of such a sentence was that it serves to ascribe the dyadic relation of simultaneity between its two referents, namely, the event or state of affairs it is about, and the time at which it is produced. The motivation for making this move would be that by asserting that a token of the sentence '*t* is now', uttered at *t*, ascribes simultaneity between a moment of time (the time *t*) and the same moment of time referred to by the use of a temporal indexical, this function adds nothing of any content to the analysis of the temporal indexical. After all, to assert that *t* is simultaneous with *t* is merely to assert a tautology, as any moment of time is necessarily simultaneous with itself. The analysis of '*t* is now' can be achieved by claiming that its linguistic functions are just that it denotes a time, and that it ascribes the monadic property of presentness to that time. This removes the difficulty of asserting that the expression ascribes both a dyadic relation and a monadic property and, it seems, does so at no cost to the informational content of the temporal expression, as we have simply removed a tautology. This strategy amounts to a rejection of the co-reporting theory.

Smith does not adopt this strategy because his claim is that the co-reporting theory is compatible with the tensed theory. Furthermore, its consequences are unacceptable. To see this, consider a token, *z*, of the sentence '*t* is past' uttered at t_1. (In what follows a parallel argument can be constructed for the sentence '*t* is future'). If we extrapolate from Smith's position with respect to '*t* is now', the three linguistic functions of this tensed sentence are:

(i') It refers to a time, *t*.

(ii') It asserts that *t* stands in the temporal relation of being earlier than t_1.

(iii') It ascribes the irreducible, non-relational property of pastness to *t*.

Note that (ii') and (iii') are incompatible with one another in the same way as are (ii) and (iii). If the sentence '*t* is past' is to fulfil both of these functions then it must be analysable as '*t* is earlier than t_1, and *t* is past'. The second conjunct of the analysans is synonymous with the analysandum, so it is subject to a reapplication of the analysis. Thus, we embark once more on a vicious infinite regress.

If we eliminate (ii') to remove the incompatibility of (ii') and (iii'), the results are unacceptable. By losing this linguistic function, the tensed sentence token no longer reports that the same state of affairs exists as the sentence we previously took to be its co-reporting counterpart: '*t* is earlier than t_1'. This amounts to the denial that the occurrence of an event, or a state of affairs, can be described in tensed terms as well as in terms of its temporal relations to other moments, and in particular, to the moment at which the tensed token is produced. The same consequence applies if we deny that the sentence '*t* is now' fulfils function (ii). That is, it no longer reports that the same state of affairs exists as its co-reporting counterpart '*t* is simultaneous with *t*'. Clearly, Smith does not make this move because he agrees with the fundamental claims of the co-reporting theory, that two such utterances do in fact report that the same state of affairs exists.

The motivation for relinquishing the second function of a tensed sentence appears stronger in the case of a present tensed sentence, since the relevant temporal relation is simultaneity. Thus, the co-reporting counterpart of '*t* is now' uttered at *t* is '*t* is simultaneous with *t*', which is a tautology. However, in the case of past or future tensed sentences, the co-reporting counterparts are not tautologous, and the real implications of denying their co-reporting nature become apparent. To do this is

to subscribe to a pure tensed theory, with all its attendant problems, rather than the hybrid tensed and tenseless theory that Smith wants to maintain. By advocating the position that a tensed utterance fulfils functions (i), (ii), *and* (iii), Smith is effectively asserting that such an utterance has tenseless truth conditions (by maintaining (ii)), but he is further claiming that this provides only part of the full analysis of tensed terms. In other words, he is claiming that a tensed utterance has both tenseless truth conditions *and* tensed truth conditions.[9] The argument that I have put forward shows that this position is untenable.

There is a further difficulty with Smith's characterization of the temporal indexical 'now' that is worth exploring briefly. He maintains that the ascription of the monadic property of presentness to an event, moment, or state of affairs explains the difference in sense between tensed and tenseless co-reporting sentence tokens. There is a corresponding difference in sense between spatially and personally tensed and tenseless co-reporting sentence tokens. For example, consider the spatially tensed sentence token 'Leeds is here', uttered in Leeds, and its spatially tenseless co-reporting counterpart 'Leeds is at the same location as Leeds'. Would Smith wish to maintain that the sense of the spatially tensed token 'Leeds is here' consists in its ascribing to Leeds the monadic property of 'hereness'[10]? I suggest that, at the very least, people who are not located in Leeds would disagree with this claim. If he relies on this argument to insist that *temporally* tensed monadic properties exist, he must be prepared either to accept the existence of spatially and personally tensed monadic properties, or to provide a good reason why it is only the meanings of *temporal* indexicals that are deficient unless such properties exist.

To conclude this section I return to my original objection to Smith's proposal as to what accounts for the difference in sense between tensed and tenseless co-reporting utterances. The problem that I am addressing in this chapter, and the problem that Smith claims to address with his proposal, is how to account for the objective difference in meaning between a tensed sentence token and the tenseless sentence that states its truth conditions. Since two such sentence tokens have the same truth conditions, the difference between them in meaning does not exist at the level of truth conditions. Each sentence picks out the very same extra-linguistic entities and ascribes the very same properties to them and relations between them.

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9 In his (1993) Smith claims explicitly that he believes that tensed sentence tokens have both tensed and tenseless truth conditions.

10 As far as I know, only two philosophers, Swinburne (1990) and Sosa (1979, 1983a) advocate the existence of spatially tensed monadic properties such as 'hereness'.

To argue, as Smith does, that the difference in meaning between them consists in the fact that only one of them ascribes a monadic tensed property to these extra-linguistic entities is thus to deny that the difference between them does not exist at the level of truth conditions. It is, rather, to claim that there *is* a difference between them in the extra-linguistic entities that they each pick out, since one, and only one, of them picks out a monadic tensed property as a constituent of reality. If he was right, then there would be a difference between two such sentence tokens that *does* exist at the level of truth conditions. In other words, Smith's proposal introduces a difference in meaning that exists at the extensional level, but *ex hyposthesi* there is no such difference. His proposal addresses the wrong aspect of meaning. As we saw, however, a close examination of this proposal on its own merits reveals that it is wholly unacceptable.

In the next section I turn to David Kaplan's (1989) distinction between the character and the content of expressions, to see if this can shed any light on the objective difference in meaning between tensed and tenseless co-reporting sentence tokens.

6.8 Kaplan's Distinction Between Character and Content

Kaplan (1989) identifies two different kinds of meaning which can appropriately be ascribed to complete sentences and to meaningful constituents of sentences. The distinction is most noticeable, however, when the sentences or meaningful expressions to which it is applied are context-sensitive. The first kind of meaning identified by Kaplan is the *content*, or 'what is said' (Kaplan (1989) p. 500). The content of a sentence token, as produced in a particular context is the same as that which 'has traditionally been called a proposition' (Ibid.). To illustrate the notion of the content, or what is said by a sentence, suppose I produce an utterance of the sentence type 'I am going to the opera tomorrow' on Friday, and Fred produces an utterance of the same sentence type on Tuesday. Suppose it is the case that I am going to the opera on Saturday, and Fred is going to the opera on Wednesday. Each of our utterances is true. However, it cannot be denied that each utterance says something different from the other. My utterance is about me, and Fred's is about Fred. We are each talking about distinct operatic productions, since mine occurs on Saturday and Fred's occurs on Wednesday. Each utterance has a distinct content. The content of each can be identified by fixing upon the extra-linguistic entities in the world that the sentence tokens refer to in their respective contexts. Furthermore, it is clear that different tokens of this same sentence type, as

uttered in different contexts can have different truth-values. The existence of this possibility shows that such tokens each have distinct contents.

A sentence with no context-sensitive components has the same content in every context in which it is uttered. Context-sensitive sentences can express different contents in different contexts. Furthermore, tokens of distinct sentence types can express the same content as each other in the appropriate contexts. For example, a token uttered on Sunday of the sentence type 'United lost the match yesterday', and a token uttered on Tuesday of 'United lost the match three days ago', can be said to have the same content, according to Kaplan, although they are tokens of distinct sentence types. Each refers to the same event, that of United losing the match on a particular day, but each locates that event at a different temporal distance from the moment of utterance. This is because the time of the context of utterance is different in each case, so the temporal distance between the time of utterance and the event reported is different and needs to be accounted for.

In a similar way, the content of individual constituent expressions of a complete sentence token can vary from context to context. The content of 'I' varies according to who utters it. The content of 'now' varies according to when it is uttered. Other expressions have fixed contents, such as the predicate '...is blue' which refers to the property of being blue on each occasion of its utterance. The content of an expression is that which it refers to; the extra-linguistic entity that it identifies.

The notion of the content of a sentence token in a particular context is thus comparable to Frege's notion of the thought expressed by a sentence. Frege noticed that we have to change indexicals in order to 'say the same thing' in different contexts of utterance. It is also comparable to the notion of the truth-conditional content of a sentence token as uttered in a particular context. The content of a sentence token can be identified as that which is given by the truth conditions of that sentence token in its context of utterance.[11] The truth conditions of tokens of a non-context-sensitive sentence type are the same on each occasion of use, and tokens of such a sentence type have, in Kaplan's terminology, a fixed content. For example, tokens of the sentence type 'Neil Armstrong lands on the moon in 1969' have the same truth conditions whenever they may be uttered. Each token is true if and only

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11 At least, this is the case on a date version of an account of the tenseless truth conditions of tensed sentences, which is the format in which Kaplan discusses the notion of content. In the next section I will illustrate how the central insights of Kaplan's notion of content can be preserved within a token-reflexive version of the tenseless truth conditions of tensed sentences.

if Neil Armstrong lands on the moon in 1969. Since Neil Armstrong did land on the moon in 1969, the truth conditions of each token of this sentence are satisfied, and each token says the same thing.

Tokens of context-sensitive sentences, on the other hand, have different truth conditions for each occasion of utterance. For example, tokens of the sentence type 'Neil Armstrong landed on the moon yesterday' have different truth conditions whenever uttered, because the time of utterance itself enters into the truth conditions. Thus an utterance of this sentence token on 22 July 1969 is true if and only if Neil Armstrong landed on the moon the day before 22 July 1969. Utterances of the same sentence type on different days vary accordingly in their truth conditions. In Kaplan's terminology, distinct utterances of this sentence type have different contents from each other; they each say something different. Thus, we have the notion of the content of a sentence token, or of a meaningful expression, which can best be thought of as what is said by a sentence token or an expression. It is equivalent to the notion of a contextually specific proposition expressed by a sentence token.

The other half of Kaplan's distinction is the notion of the character of a sentence token, or of a meaningful expression. The character is 'that which determines the content is varying contexts' (Kaplan (1989) p. 505). Thus, the character of an expression is a function that takes one from the context of that expression's utterance to its content in that context. Non-context-sensitive expressions, which have the same content in all contexts, have a fixed character. The notion of character is thus most noticeable in expressions and sentence tokens that are context-sensitive. In other words, expressions and sentence tokens that are, or contain indexicals, or are tensed, or in some other way depend on the context of their utterance in order to determine their content, have a character which is a significant component of their meaning.

The notion of character is thus comparable to Perry's notion of the role of an indexical, although Kaplan's notion is more widely applied than Perry's. Kaplan applies the notion of character to sentence tokens and to meaningful expressions, both context-sensitive and non-context-sensitive. The character of an indexical, or otherwise context-sensitive expression, being the function that determines the content in each context, is that which we learn when we learn how to use such expressions correctly. We learn that, in order to discern the content, or what is said by an utterance of 'here' we have to look to a certain feature of the context in which it is uttered, that is, we have to identify the spatial location in which it is uttered.

This rule or function for determining the content of an expression on any given occasion of utterance is the expression's character. The character is thus, in one sense, a constant part of the meaning of a context-sensitive expression. We employ the very same function on each occasion of its utterance to identify the varying content of such an expression. Thus, Kaplan notes 'It is natural to think of it [the character] as *meaning* in the sense of what is known by the competent language user.' (Kaplan (1989) p. 505). The character is a constant function of the expression type which yields a different content for each token utterance of the expression.

We now have at our disposal an exposition of Kaplan's distinction between character and content. In the next section I will employ this distinction in an examination of tensed and tenseless sentences in order to see if it sheds any light on the objective difference between them in meaning that does not reveal itself in their truth conditions. Furthermore, I will consider whether the central features of Kaplan's distinction can be retained within a token-reflexive account of the tenseless truth conditions of tensed sentences.

6.9 The Characters and Contents of Tensed and Tenseless Sentences

Let us examine a token, *p*, of the tensed sentence type 'The volcano is now erupting', uttered on 22 April 1996, and a token, *q*, of the tenseless sentence type 'The volcano erupts on 22 April 1996'. According to one version of the tenseless theory, the date version, *q* states the truth conditions of *p*. Kaplan's discussion of character and content includes the supposition that indexicals are directly referential, that is, indexicals refer directly to their referents, rather than referring through the mediation of a Fregean sense, or 'manner of presentation'. Consequently, in giving an account of the content, or the truth conditions of a tensed sentence token Kaplan's theory will inevitably include a reference to the time at which that token is produced. Hence, his account generates a date version of the tenseless theory. What is Kaplan's motivation for insisting on the direct reference theory of indexicals? In 'Demonstratives' (1989), he writes:

> The semantical feature that *I* wish to highlight in calling an expression *directly referential* is not the *fact* that it designates the same object in every circumstance, but the *way* in which it designates an object in any circumstance. Such an expression is a *device of direct reference*. This does not imply that it has no conventionally fixed semantical rules which determine its referent in each context of use; quite the

> opposite. There are semantical rules which determine the referent in each context of use - but that is all. *The rules do not provide a complex which together with a circumstance of evaluation yields an object. They just provide an object.* (Kaplan (1989) p. 495, all italics are his).

In emphasizing the directly referential nature of indexicals, Kaplan is focusing on the *way in which* a context-sensitive expression picks out its referent. He is arguing that such expressions differ from non-context-sensitive expressions in that they do not pick out their referent via any mediating definite description or sense, but do so *directly*. A context-sensitive expression is associated with a rule, and for any token of that expression the rule identifies a particular feature of the context in which it is produced as the referent of that token in that context. A token-reflexive account of the truth conditions of tensed sentence tokens can preserve all that is valuable in Kaplan's motivation for insisting on the directly referential nature of temporally context-sensitive expressions, while stopping short of incorporating times in the truth conditions of such sentence tokens. This is significant because, as we saw in chapter 2, there are various problems associated with including times as referents in the truth conditions of tensed sentence tokens, problems to which a token-reflexive theory of the truth conditions of tensed sentences is immune. In what follows I will examine how Kaplan's distinction between character and content can provide an account of the difference in meaning between a tensed sentence token and the tenseless sentence that states its truth conditions. I will illustrate how this account yields a date version of the tenseless truth conditions of tensed sentence tokens. I will then show, in the next section, how Kaplan's insights can be preserved while providing a token-reflexive version of the tenseless truth conditions of tensed sentence tokens.

Thus, we have a token of a tensed sentence, p, and a token, q, of the tenseless sentence that states its truth conditions, according to the date version of the tenseless theory. p and q also have the same truth conditions on this account. They are both true if and only if the volcano erupts on 22 April 1996. Thus, we have an instance of the general problem being addressed in this chapter. We have two sentence tokens that clearly differ in meaning, but that difference is not discernible in their truth conditions. In Beer's terminology, we have tensed and tenseless co-reporting sentence tokens that differ from each other in 'sense'. Let us see if the

distinction between character and content can shed any light on what accounts for the difference between them.

The sentence tokens *p* and *q* have the same content. They each say the same thing about the world, by referring to the same extra-linguistic entities, the volcano's eruption and the time of that event, and by ascribing the same properties and relations to these referents. Their respective contents are given by their truth conditions, and since they have the same truth conditions as each other, they have the same content. However, *p* and *q* differ from each other in character. *p* is a token of a sentence type that has a context-sensitive character. The contents of tokens of this type vary according to the contexts in which they are uttered. The character of the sentence type is a function from the context in which a token of it is produced to the content in that context. *q*, on the other hand, is a token of a sentence type with a fixed character. It has the same content in every context in which tokens of it are produced. The sentence type of which *q* is a token always says the same thing, but the sentence type of which *p* is a token can have different contents in different contexts of utterance. We thus have, it seems, the beginnings of an explanation of the problem under discussion in this chapter. However, the application of the distinction between content and character to tensed and tenseless co-reporting sentence tokens needs to be examined more closely before we can conclude that it provides a complete solution to our problem.

The principle of semantic compositionality is the thesis that the meaning of a sentence is a function of the meanings of its smallest meaningful parts. According to Kaplan, the principle of semantic compositionality applies separately to both the character and the content of a sentence. The character of a sentence is a function of the characters of its parts. Sentence token *p* has, as a constituent, the indexical expression 'now' which has a context-sensitive character. Consequently, the character of *p* as a whole is context-sensitive. However, it is not only sentences containing explicitly indexical expressions that have context-sensitive characters. Any tensed sentence implicitly makes reference to the context in which it is uttered, for example, by means of verbal tense, in specifying its content, and thus has a context-sensitive character. The constituents of sentence token *q*, on the other hand, each have a fixed character, and thus *q* as a whole has a fixed character.

The principle of compositionality also applies to the contents of sentences. The content of a sentence token as a whole is a function of the contents of its smallest meaningful parts. The contents of the constituents of *p* are determined by reference to the context in which *p* is uttered and, once identified, contribute to the

content of *p* as a whole. No reference to the context of utterance need be made in order to determine the contents of the constituents of *q*. Each constituent contributes its content, the same content in each context of utterance, to the content of *q* as a whole. With respect to the adherence of his notion of content to the principle of compositionality, Kaplan makes the following remark:

> If two compound, well-formed expressions, each set in (possibly different) contexts differ only with respect to components which *when taken in their respective contexts* have the same content, then the content of the two compounds *each taken in its own context* is the same. (Kaplan (1989) p. 507).

Sentence tokens *p* and *q* differ from each other only with respect to certain of their components. *p* contains the indexical expression 'now' and *q* contains the non indexical expression 'on 22 April 1996'. However, when 'now' in *p* is taken in its appropriate context, the character of this expression determines as content the day which can also be denoted as 22 April 1996. Thus, two sentence tokens such as *p* and *q*, when taken in their respective contexts have the same content. They are not synonymous however, because they differ from each other in one aspect of their meaning, viz., their character.

Another important feature of Kaplan's distinction between character and content is that it provides us with a good reason why indexicals cannot be translated by non-indexicals, and why tensed sentences cannot be translated by their tenseless co-reporting counterparts. An utterance of 'now' at time *t* refers to *t* via its context-sensitive character. That particular utterance of 'now' has the same referent as an utterance of the non-context-sensitive expression 'at *t*'. However, it does not follow from the fact that these two token utterances have the same referent that they are synonymous with each other. The reason they are not synonymous with each other is that they differ from each other in character. The expression type 'now' has a context-sensitive character, while the expression type 'at *t*' has a fixed character. However, these two *particular* tokens of these two expression types have the same referent. Given a particular context, the same time can be picked out indexically, or via a definite description, but this does not establish synonymy between two such expressions, nor between sentences containing such expressions. They are not synonymous because the types of which they are tokens differ from each other in character.

A similar mistake is to suppose that an indexical is synonymous with the rule, explicitly stated, that specifies its reference on any occasion of utterance. In other words, to suppose that 'now' is synonymous with, for example, 'simultaneous with this utterance', or some other expression that states the rule that tells us how to determine the reference of 'now', is to confuse character with content. The character gives us a procedure to follow in order to identify the reference of an indexical on any occasion of utterance, but the statement of that procedure itself is not identical with the content of the indexical. Kaplan notes:

> Meanings tell us how the content of a word or phrase is determined by the context of use. Thus the meaning of a word or phrase is what I have called its *character*. (Words and phrases with no indexical element express the same content in every context; they have a fixed character.) To supply a synonym for a word or phrase is to find another with the same *character*; finding another with the same *content* in a particular context certainly won't do.....For two words or phrases to be synonyms, they must have the same content in every context. (Kaplan (1989) p. 521).

Thus, neither the statement of the rule that an indexical generates to fix its reference in particular contexts, nor a definite description of the referent of an indexical in a particular context, satisfy the conditions for synonymy with the indexical itself. This applies to whole sentences as well as to indexical expressions. The date version of the tenseless statement of *p*'s truth conditions, *q*, 'The volcano erupts on 22 April 1996' is not synonymous with *p*. They may have the same content, but they differ in character.

Kaplan notes some important features to keep in mind about the two kinds of meaning, character and content. One of these important features is as follows:

> Character applies to words and phrases as types, content to occurrences of words and phrases in contexts. (Kaplan (1989) p. 524).

This is illuminating for my purposes, since the distinction between types and tokens has already played a significant part in my articulation of the new tenseless theory. I argued in chapter 2 that we can only talk of the truth conditions of sentence tokens

in particular contexts, since different tokens of the same tensed sentence type can have different truth-values in different contexts. In Kaplan's terminology a tensed sentence type has a context-sensitive character, and thus tokens of that type can express different contents in different contexts. The statement of the tenseless truth conditions of a given tensed token in a particular context cannot have the same meaning as the tensed token even though two such tokens have the same content. This is because the token of the tensed sentence type is a token of a type with a context-sensitive character. The tenseless token is a token of a sentence type with a fixed character. Since they have different characters, there is an objective difference in meaning between them. However, since they have the same content, the difference in meaning between them cannot be discerned in their truth conditions.

One final illuminating aspect of Kaplan's discussion of character and content is as follows:

> The bearers of logical truth and of contingency are different entities. It is the character (or, the sentence, if you prefer) that is logically true, producing a true content in every context. But it is the content (the proposition, if you will) that is contingent or necessary. (Kaplan (1989) p. 539).

Both Beer and Smith discussed co-reporting tensed and tenseless sentence tokens of the form 'It is 1996 now' uttered in 1996, and 'It is 1996 at 1996'. We can tell straight away that the former is contingent and the latter is necessary, but Kaplan's remarks shed some light on the relation between them. A 1996 token of 'It is 1996 now' is true, but the sentence type of which it is a token has a context-sensitive character. Thus, different tokens of this type can express different contents. It is not necessarily true because the content, or what is said by this particular token might not have been true; its content is merely contingent. The sentence 'It is 1996 at 1996' has a fixed character, and the content it expresses is true in all circumstances. Therefore, the sentence type is a logical truth, since each token of it is true. In addition, any given token of this type expresses a necessary truth because necessarily any time is simultaneous with itself.

Another perspicuous example that Kaplan employs is as follows. The sentence type 'I am here now' is a logical truth. Its character is such that it cannot be uttered falsely. Tokens of this type produce a true content in every context. Prefix this sentence with the logical symbol for necessity, however ('□ I am here now') and

we have a false sentence. It is not necessarily true that I am here now. I might now have been somewhere else, or I might have been here at some other time. The sentence may express a true content in every context, but that content, or proposition expressed, on any given occasion, is not a necessary truth.

I find Kaplan's distinction between character and content a most explanatory and theoretically advantageous distinction. It provides a complete and coherent explanation of how a tensed sentence token and the tenseless sentence that states its truth conditions can both have the same truth conditions and yet differ in meaning. They differ in meaning because they are tokens of types that differ in character. They have the same truth conditions because, in the contexts in which they occur, they have the same content. My only qualm is that, as I noted at the beginning of this section, it results in a date version of the new tenseless theory. This is because of the importance to Kaplan of stressing the directly referential nature of indexicals. In the next section I will argue that all of the central insights of Kaplan's distinction between character and content can be preserved within a token-reflexive version of the tenseless theory of time.

6.10 A Token-Reflexive Version of the Distinction Between Character and Content

Kaplan's distinction between character and content yields a date version of the tenseless theory of time. As we have seen, this is because of his insistence on the direct reference theory of indexicals. To insist on the direct reference theory of indexicals is to maintain that, for example, a token of 'now' refers directly to the time at which it is uttered. Consequently, the time, referred to by some name, definite description or date, being the referent of 'now', will occur in the truth conditions of a sentence token containing it. It is in this way that Kaplan's theory yields a date version of the tenseless theory of time. As we saw at the beginning of the previous section, Kaplan's reasons for insisting on the direct reference theory of indexicals are that he wishes to emphasize the distinction between the way an indexical, or other context-sensitive expression, picks out its referent, and the way a non-context-sensitive expression picks out its referent. The character of an indexical expression type is a function from the context in which a token of it is produced to the content of that token in that context. The content of a token of an indexical expression type is thus a particular feature of the context in which that token is produced. The character of a non-indexical expression type is fixed, and thus picks out the same content in all contexts. The content of a token of such a type is thus picked out by a

wholly different mechanism. Such tokens pick out their referents via a mediating definite description, or sense.

The token-reflexive version of the tenseless theory of time recognizes this distinction between the way in which a context-sensitive expression picks out its referent and the way in which a non-context-sensitive expression does so. The only difference between this version and the date version of the tenseless theory is that the former version claims that context-sensitive expressions pick out their referents via a token-reflexive mechanism. The latter, on the other hand, claims that they pick out their referents via a referring mechanism. Thus, Kaplan's reasons for insisting on the direct reference theory of indexicals are equally good reasons for insisting on a token-reflexive account of the way in which context-sensitive expressions pick out their referents. The token-reflexive account maintains the distinction between the way in which context-sensitive and non-context-sensitive expressions pick out their referents. Furthermore, the token-reflexive account illustrates just as well as Kaplan's date version how the reference of a context-sensitive expression depends upon the context in which tokens of it are produced.

I will now examine the tensed sentence token, *p*, and a token, *r*, of the tenseless sentence that states *p*'s tenseless truth conditions, according to the token-reflexive version of the tenseless theory, 'The volcano erupts simultaneously with *p*'. According to the tenseless token-reflexive theory *p* and *r* have the same truth conditions. They are both true if and only if the volcano erupts simultaneously with *p*. Hence, they have the same content. They each say the same thing about the world by referring to the same extra-linguistic entities, the volcano's eruption and the occurrence of *p*, and by ascribing the same relation between them, that of simultaneity. However, *p* and *r* are tokens of types with different characters. *p* is a token of a type with a context-sensitive character, while *r* is a token of a type with a fixed character. The characters of the types of which *p* and *r* are tokens are both functions of the characters of their parts, thus obeying the principle of semantic compositionality. The type of which *p* is a token has a context-sensitive character as a result of containing the indexical expression 'now'. The type of which *r* is a token has a fixed character as a result of containing no context-sensitive expressions.

Similarly, the contents of *p* and *r* are functions of the contents of their parts. In the same way that the content of *q* is a function of the contents of its non-context-sensitive constituents, so the content of *r* is a function of its non-context-sensitive constituents. However, the notion of content on the token-reflexive theory is slightly different to Kaplan's account of it. Since *p* contains the temporal indexical

'now' it is token-reflexive, and thus, its content consists in two events and the obtaining of the temporal relation of simultaneity between them. The content of *p* consists in the event that it is about, the eruption of the volcano, its own occurrence, and the ascription between these two events of simultaneity. Thus, the character of the expression type 'now' consists in the function of making the truth-value of a token in which it occurs depend upon the context in which that token is produced. However, its content on any particular occasion of utterance is not an entity. Rather, its character determines its token-reflexive content. This has implications for Kaplan's claim that two tokens of different sentence types can have the same content.

According to Kaplan, a token on Sunday of 'United lost the match yesterday' and a token on Tuesday of 'United lost the match three days ago' have the same content. They both refer to the same event and the time at which that event occurred. On the token-reflexive version however, they have different contents because each contains as a constituent a reference to itself, the token utterance. However, it is my contention that the token-reflexive version is more perspicuous than Kaplan's on this issue. What these tokens have in common is the extra-linguistic entity that they refer to, the event of United's losing the match. They differ from each other, however, in the temporal separation between that event and the utterance about it, and the token-reflexive version makes this explicit, whereas the date version does not. Two such tokens still 'say the same thing' in the relevant way by referring to the same event in the world, but their token-reflexive content is different, as it should be, because each token is temporally related to that event in a different way. Thus, the token-reflexive version recognizes that we may talk about the same extra-linguistic entities, but from different temporal perspectives, and it adjusts for that different perspective token-reflexively.

The token-reflexive version of Kaplan's distinction between character and content accounts for the objective difference in meaning between tokens such as *p* and *r* just as well as did Kaplan's own version. Recall my solution to Smith's objection to Mellor's theory in section 6.1 of this chapter. I noticed there that the reason Mellor was susceptible to Smith's attack was that he tended to conflate talk of sentence types with talk of sentence tokens. It is perfectly possible for a tensed sentence token and the tenseless sentence that states its token-reflexive truth conditions to have the same truth conditions as each other. They remain untranslatable by each other however, because they are each tokens of sentence types that differ from each other in a significant way. A tensed sentence type has

tokens whose truth-values vary according to when they are produced. The tokens of a tenseless sentence type, however, do not vary in this way. It is now clear that the features of the sentence types which render particular tokens of them untranslatable by each other are their differing characters. *p* is a token of a sentence type with a context-sensitive character, while *r* is a token of a sentence type with a fixed character. The particular tokens, *p* and *r*, however, have the same token-reflexive content as each other, but they remain untranslatable by each other in virtue of their being tokens of sentence types with different characters. As Kaplan noted, a sentence can only translate another sentence if it has the same content in all contexts.

I conclude that Kaplan's distinction between character and content can successfully be combined with a token-reflexive version of the tenseless truth conditions of tensed sentences, and that when it is so combined it yields a satisfactory account of the objective difference in meaning between a tensed sentence token and the tenseless sentence that states its truth conditions. Indeed, I would argue that the conjunction of Kaplan's distinction and the token-reflexive theory is more perspicuous than Kaplan's own date version of it. It is capable of accounting for how the truth-value of a sentence token depends on the temporal relation between what the sentence is about and the occurrence of the token itself.

Two tokens such as *p* and *r* have the same truth conditions, and thus have the same token-reflexive content, but they are tokens of types with different characters, and so they cannot translate each other. This explains why the objective difference in meaning between them is not to be found in their truth conditions. It is a feature of the types of which they are tokens. Differences in character do not reside in the truth conditions of particular sentence tokens.

Clearly, the distinction between character and content serves to enhance my tenseless token-reflexive analysis of the truth conditions of tensed sentences. It provides an additional level of meaning which explains and accounts for the difference in meaning between a tensed sentence token and the tenseless sentence that states its truth conditions. It does this while allowing that two such sentences have the same truth conditions, and thus, say the same thing about the world. It therefore supports the conclusion that temporal reality is tenseless.

With reference to the indexical 'I' Kaplan notes:

> A sloppy thinker might succumb to the temptation to slide from an acknowledgement of the privileged *perspective* we each have on ourselves - only I can refer to me as 'I' - to the conclusions: first that

> this perspective necessarily yields a privileged *picture* of what is seen (referred to), and second, that this picture is what is intended when one makes use of the privileged perspective (by saying 'I')....The character of 'I' provides the acknowledged privileged perspective, whereas the analysis of the content of particular occurrences of 'I' provides for (and needs) no privileged pictures. (Kaplan (1989) p. 533-4).

By analogy, the same is true for occurrences of the temporal indexical 'now', and for uses of all other tensed expressions that implicitly make reference to the time of their context of utterance. We have a privileged perspective on the moment we call 'now' or the 'present'. However, to move from this acknowledgement to the conclusion that this perspective generates a privileged picture of temporal reality is to indulge in sloppy thinking. The character of 'now' and of tensed language provides and accounts for our privileged perspective on temporal reality. The content of particular occurrences of 'now' yields no privileged pictures.

6.11 Conclusion

To conclude, I will summarize briefly the findings of this chapter. I began by considering an objection to Mellor's tenseless token-reflexive theory of time put forward by Quentin Smith. The objection was that the theory collapses, on pain of self-contradiction to the old tenseless theory of time. I defended Mellor's theory by arguing that it is possible for a tensed and a tenseless sentence token to have the same truth conditions as each other, but to remain untranslatable by each other. This raised a question for the tenseless theory of time, namely, that if it is possible for a tensed sentence token and the tenseless sentence that states its truth conditions to have the same truth conditions, and yet differ in meaning, what account can be given of the objective difference between them in meaning? Since they differ in meaning, and the difference is not to be found in their truth conditions, my aim was to identify and account for this difference in meaning.

Michelle Beer (1988) called two such sentence tokens co-reporting, suggesting that they differ from each other in sense. However, she omitted to elaborate on the nature of this difference, so I investigated Frege's distinction between sense and reference to see if it held the answer. Despite the many analogies between the Fregean notion of sense and the role of an indexical, the disanalogies

between these two notions prevented me from identifying the difference between tensed and tenseless co-reporting utterances as a difference in Fregean sense.[12]

I then turned to a possible tensed solution to the problem in hand, the solution suggested by Quentin Smith (1990). His suggestion that, of tensed and tenseless co-reporting utterances, only the tensed one ascribes a monadic tensed property to its referents seemed to me to be intuitively implausible. Examining it closely I found that it led to a vicious infinite regress of analyses. This proposal had to be rejected.

Finally, I turned to Kaplan's distinction between character and content. This distinction yielded the most perspicuous and theoretically advantageous solution to the problem in hand. However, it generated a date version of the tenseless theory, which we have seen to be problematic. Hence, I adjusted Kaplan's account to yield a token-reflexive version, and found that the problem was solved.

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[12] Kaplan (1989) argues that Frege conflated the notions of character and content in his notion of Sinn. This is why his theory falls down when dealing with indexicals.

Summary and Conclusions

I will now sum up briefly the conclusions I have established in this thesis. I began by presenting McTaggart's argument for the unreality of time which, I argued, was responsible for generating the debate between the tensed and the tenseless theories of time. McTaggart's argument is formally valid, so those who oppose his conclusion that time is unreal have sought to prove the falsity of one or more of its premises, thus showing the argument to be unsound. In general McTaggart's conclusion has been rejected, but two very different pictures of the nature of temporal reality have emerged depending on which of his premises have been rejected, and which endorsed. McTaggart's argument can be seen as the conjunction of a positive and a negative thesis. His positive thesis is that the *A* series is essential for time. His negative thesis is that the *A* series is inherently self-contradictory. McTaggart thus concludes that time is unreal. The tensed theory has adopted his positive thesis and rejected his negative thesis. Thus, it argues that the *A* series is an essential feature of time, and since the *A* series is not self-contradictory, time exists and is intrinsically tensed. The tenseless theory, by contrast, rejects his positive thesis and adopts his negative thesis. Thus, it claims that the *A* series is self-contradictory, but since the *A* series is not essential for time, time exists and is intrinsically tenseless.

I showed how each premise of McTaggart's argument was responsible for generating a number of debates in the philosophy of time. For many years these debates centred around the analytic reducibility or otherwise of the *A* series to the *B* series, and of the *B* series to the *A* series. I examined the variety of ways in which such reductions were claimed to be effected, and the problems encountered by those who thought them possible. I then charted the most recent developments in this debate, which were made by Smart and Mellor on behalf of the tenseless theory of time. The new tenseless theory of time concedes that the *A* series is not analytically reducible to the *B* series. However, it rejects the conclusion that tensed theorists claim follows from this concession. That is, it rejects the conclusion that since the *A* series is analytically irreducible, time is intrinsically tensed. Instead, it claims that tense is irreducible from language and thought, but since the truth conditions of all tensed sentence tokens can be given in entirely tenseless terms, the analytic irreducibility of tense does not imply that temporal reality is tensed.

This conclusion does not, by itself, guarantee that time is tenseless, but when taken together with McTaggart's argument for the inherently self-contradictory nature of tensed time, it provides solid grounds for the metaphysical conclusion that temporal reality is tenseless. The new tenseless theory of time can thus be defended on two fronts. In the first place, it must be shown that the truth conditions of all tensed sentences can indeed be stated in entirely tenseless terms. It must then be shown that the supposition that tense is an objectively real feature of temporal reality is inherently self-contradictory, and thus untenable.

In chapter 2 I sought to defend the new tenseless theory on the first of these two fronts. I undertook an examination of the nature of truth conditions, and examined what can legitimately be concluded from the claim that the truth conditions of all tensed sentences can be stated in entirely tenseless terms. I suggested that truth conditions have both a cognitive and an ontological significance, and that these two features of the notion of truth conditions are not independent of each other. I examined a possible tensed account of the truth conditions of tensed sentences, and highlighted a problem for any such account. This is that, under a tensed approach to providing the truth conditions of tensed sentences, particular token sentences appear to change their truth-value over time.

I then examined two distinct versions of the new tenseless theory of time. According to the first version, the truth conditions of tensed sentences involve reference to dates. For example, a particular past tense sentence token is true if and only if the event referred to by the token occurs earlier than the date at which the token itself is produced. I argued that this approach ultimately fails because, logically, it is possible for the sentence token to be true while not occurring at the date specified in the truth conditions. The second version is the token-reflexive version of the new tenseless theory of time. This approach states the truth conditions of tensed sentence tokens in terms of the temporal relation that obtains between what the token is about and the token itself. For example, a particular past tense sentence token is true if and only if the event referred to by the token occurs earlier than the occurrence of the token itself. This approach is motivated by the same considerations that motivate the date version, but avoids the problems that beset the date version. I then defended the token-reflexive version against a barrage of objections levelled at it by Smith (1993). I concluded that the token-reflexive version of the new tenseless theory of time provides the only viable account of the truth conditions of tensed sentences.

In chapter 3 I sought to defend the new tenseless theory of time on the second of the two fronts noted above. That is, I argued that the supposition of real tense does indeed lead to self-contradiction and paradox. I argued that tense is a concept with two essential features. These are that there is an ontological distinction between past, present and future, and that temporal becoming is an objective feature of temporal reality. I examined various interpretations of these two key features of tense, and argued that, under any interpretation, they cannot consistently be maintained together. The two key features of tense are mutually incompatible, so the supposition that tense is an objectively real feature of temporal reality is logically unsustainable. This conclusion, together with the conclusion of chapter 2 provides support for both the semantic and the metaphysical claims of the new tenseless token-reflexive theory of time.

In chapter 4 I examined an alleged analogy between the theory of time that I defend and Lewis' theory of genuine modal realism. The two theories appeared to be analogous at both the semantic and the ontological levels. I examined the analogy in detail and argued that it breaks down wherever it is metaphysically significant. Furthermore, Lewis' theory suffers from a potentially devastating circularity problem, but the new tenseless theory is immune from any temporal analogue of this problem.

Another potential difficulty for the new tenseless theory of time is whether it can account adequately for the notion of the direction of time. It seems, prima facie, that a theory which claims that all times are equally real, and that time does not flow in one direction is at a disadvantage when it comes to providing an explanation of the direction of time. I undertook a conceptual analysis of the key concepts employed in discussions of the direction of time; the concepts of asymmetry, anisotropy and direction itself. During the course of this analysis I examined various ways in which the direction of time might be explained, and systematically rejected those concepts which proved to be incapable of providing such an explanation. At the end of this process I was left with two concepts which were possible contenders for the underlying basis of an explanation of the direction of time. One of these was consistent with a tensed ontology, while the other was consistent with a tenseless ontology. I examined how the tensed and the tenseless theories might seek to account for the direction of time, and concluded that the tensed theory was singularly unable to do so. The tenseless theory, on the other hand, has the conceptual equipment to explain how time has a direction. The logical asymmetry of the temporal relations 'earlier than' and 'later than' is intrinsic to those relations, and thus is intrinsic to the temporal series generated by those relations. This logical feature,

taken together with the empirical feature of our experience of temporal succession, which emphasizes the earlier to later direction, is capable of accounting for the notion of the direction of time.

In chapter 6 I addressed one final potential difficulty for the new tenseless theory of time. The problem is whether the theory can provide a satisfactory account of tensed meaning without appealing to the objective reality of tense. It arose after consideration of a particular objection to the theory put forward by Smith, who argued that Mellor's version reduces, on pain of self-contradiction to the old tenseless theory of time. I defended the new tenseless theory against this objection, arguing that a tensed sentence token and a token of the tenseless sentence that states its truth conditions can have the same truth conditions while remaining untranslatable by each other. There is, thus, an objective difference in meaning between two such sentence tokens that is not discernible in their truth conditions. I then sought to account for this objective difference in meaning. After examining various possible accounts of this difference, I concluded that Kaplan's distinction between character and content provided the best explanation of it. However, Kaplan's account yielded a date version of the tenseless theory. I argued that his central insights could be retained within a token-reflexive account of the truth conditions of tensed sentences, and then put forward a token-reflexive version of the distinction between character and content. This provided the conceptual equipment necessary and sufficient to explain in a perspicuous manner the objective difference in meaning between a tensed and a tenseless sentence token that have the same truth conditions.

In conclusion, I have defended the new tenseless token-reflexive theory of time by arguing that it provides the best account of the truth conditions of tensed sentences. I have provided further support for the metaphysical conclusions of this theory by arguing that the supposition that tense is objectively real is logically unsustainable. I have shown that there is no significant analogy between tenseless time and modal realism. I have argued that the new tenseless theory of time is best placed to provide a satisfactory account of the notion of the direction of time. Finally, I have argued that the new tenseless token-reflexive theory of time, in conjunction with the distinction between character and content provides the best available account of tensed meaning. Thus, I have defended and developed on several fronts the new tenseless token-reflexive theory of time.

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