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# Structure and transition: towards an accretivist theory of time

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*University of Iowa*

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STRUCTURE AND TRANSITION: TOWARDS AN ACCRETIVIST THEORY OF  
TIME

by  
David Preston Taylor III

An Abstract

Of a thesis submitted in partial fulfillment  
of the requirements for the Doctor of  
Philosophy degree in Philosophy  
in the Graduate College of  
The University of Iowa

December 2009

Thesis Supervisor: Professor Gregory Landini

## ABSTRACT

This dissertation is a defense of a particular theory of the metaphysics of time which I call “accretivism”, but which is popularly known in a form usually called the “Growing Block Theory”. The goal of a metaphysics of time is to incorporate the various aspects of our temporal experience into a single, comprehensive whole. To this end I delineate five aspects of our ordinary experience of time: 1) The Tensed Aspect, in virtue of which objects are presented to us as past, present, or future; 2) The Transitory Aspect, in virtue of which time passes or “flows”; 3) The Durational Aspect, in virtue of which entities have a certain temporal extent; 4) The Structural Aspect, in virtue of which entities are given as being in temporal relations to one another, and 5) The Differential-Repetitive Aspect, in virtue of which things are different from one time to another, and yet there is a certain recurrence of aspects of our experience from one time to another.

I contrast the accretivist picture of time, according to which that which is past and that which is present both have ontological status, but nothing which is future has ontological status, and in which temporal passage consists in the coming-into-being of new entities at the temporal edge of reality marked by the present, with the two dominant theories of time in the contemporary literature: 1) presentism, according to which only that which is present has ontological status, and 2) four-dimensionalism, according to which time is to be understood on analogy with spatial dimensions. Accretivism, I argue, is superior to the other two views in virtue of the fact that it gives full status to both the Structural Aspect of Time, for which the presentist has difficulty accounting, and the Transitory Aspect of Time, for which the four-dimensionalist has difficulty accounting. I then defend the accretivist picture against a variety of objections that might be raised to it.

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STRUCTURE AND TRANSITION: TOWARDS AN ACCRETIVIST THEORY OF  
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Thesis Supervisor: Professor Gregory Landini

Graduate College  
The University of Iowa  
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CERTIFICATE OF APPROVAL

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PH.D. THESIS

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This is to certify that the Ph.D. thesis of

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has been approved by the Examining Committee  
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## CHAPTER ONE

### PRELIMINARIES

#### 1.1 Purpose of the Essay

The general aim of this essay is to contribute to the development and defense of a certain theory of the metaphysics of time. By a “theory of the metaphysics of time”, I mean an attempt to give a systematic account of the various temporal features of the world as revealed in our experience and to clarify how these features are related to one another. A significant part of this process of clarification involves the solution to various philosophical puzzles that arise in trying to understand these features. In this work I will primarily be concerned with two basic issues: 1) the passage of time and 2) the distinction between past, present, and future. While these two aspects of time will be the central focus of this essay, a further goal will be to distinguish the various different classes of temporal phenomena that a successful theory of time needs to take into account. While my goal is not to defend a comprehensive metaphysics of time in this essay, I will attempt to gesture at the aspect of the broader theory of which this essay is a contribution towards.

The basic view to be defended herein is one which I shall refer to as “accretivism.”<sup>1</sup> This term applies to a family of theories of which the view of time presented by C. D. Broad in *Scientific Thought* is perhaps the best-known example. Broad describes his theory as follows:

A Specious Present of mine is just the last thin slice that has joined up to my life-history. When it ceases to be present and becomes past this does not mean that it has changed its relations to anything to which it was related when it was present. It will simply mean

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<sup>1</sup> The term “accretivism” has, as far as I know, never appeared in print as a name for the view I am discussing. The source for my use of the term is Ernâni Magalhães, who in turn adopted it from David Schenk. Schenk (2003) refers to the view as “the accretive model”.

that other slices have been tacked on to my life-history, and with their existence, relations have begun to hold which could not hold before these slices existed to be terms to these relations. To put the matter another way: when an event, which was present, becomes past, it does not change or lose any of the relations it had before, because the terms to which it now has these relations were then simply non-entities.

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... The sum total of existence is always increasing, and it is this which gives the time-series a sense as well as an order.<sup>2</sup>

According to the basic model of time presented in this passage, the “sum total of existence” includes those things that are present and those things that are past, and the passage of time consists in the addition of new entities to this sum total of existence. There are thus two basic aspects to the view, which are the two basic theses to be defended in this essay. First, there is the *thesis of afuturism*, which maintains that only that which is past or present exists, and that there exists nothing which is future. Second, there is the *thesis of transience*, which recognizes temporal passage as a genuine, objective feature of the world. Accretivism, as I understand it, is simply the combination of these two distinct and logically independent theses.

In contemporary presentations of alternatives in the philosophy of time, accretivism is most often presented in a form known as the “growing block model of time.”<sup>3</sup> Other names for the view, or views sometimes identified with it, include “the

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<sup>2</sup> Broad (1923), pp. 67-8.

<sup>3</sup> See, for example, Dainton (2001), Chap. 6. This name for the theory has the unfortunate effect of presenting the view as merely a slight modification of the four-dimensionalist theory. The four-dimensionalist view is often referred to as the “block view”, as they think of the world as being a “four-dimensional block,” and the term “growing block” suggests that the accretivist thinks of the world in much the same way, albeit with the additional claim that the “four-dimensional block” is “growing” in the temporal dimension. This tends to suggest that the accretivist, like the pure four-dimensionalist, thinks of the temporal dimension on analogy with the spatial dimensions. On my view, the accretivist need not think of the temporal dimension as a “fourth dimension” in the sense that it should be understood on analogy with spatial dimensions, though an accretivist may very well do so.

open future view,”<sup>4</sup> “the empty view of the future,”<sup>5</sup> “possibilism,”<sup>6</sup> “pastism,”<sup>7</sup> and “no-futurism.”<sup>8</sup> This view is often cited but infrequently defended as an alternative to the two most prominent general approaches to the philosophy of time in the contemporary literature: four-dimensionalism and presentism.

Four-Dimensionalism is generally taken to be the most widely held view of time in contemporary philosophical literature.<sup>9</sup> The view receives its name from the

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<sup>4</sup> See Zimmerman (ed., 2006), Part II, for example. The “open future” terminology seems to originate in literature concerning Aristotle’s famous discussion of “future contingents” in *De Interpretatione*. See Mayo (1962) as an obvious example. I would prefer to reserve the “open future” terminology for view such as Aristotle’s that hold that at least some statements about the future lack truth-value, or are indeterminate, which is something to which the accretivist need not be committed. In other words, it indicates a *semantic* thesis, rather than an *ontological* thesis.

<sup>5</sup> See Dorato (1995). While this term seems to imply the thesis of afuturism, it does not really capture the idea of temporal passage, which is part of the accretivist view as I have defined it.

<sup>6</sup> See Savitt (2002). This term, like “the open future view”, seems to imply something to which the accretivist need not be committed, namely that the future is undetermined and that there are numerous *possible* futures compatible with the world that presently exists. While it is true that most major accretivists have been indeterminists about the future, and there are perhaps strong dialectical reasons why the two views go hand in hand, I want to leave open the possibility that one might combine the accretivist picture with the idea that the future is completely *determined* by past and present states of affairs, combined with the laws of nature.

<sup>7</sup> See Armstrong (2004), Chap. 11. Armstrong makes it clear that he has the accretivist theory in mind: “the World, the whole of being, is on this view an object that is continually being added to along the temporal dimension. The past exists, the present in the strictest, narrowest sense exists, but is no more than the growing temporal edge of the limit of being” (pp. 148-9). The term “pastism”, however, intended as a parallel to “presentism”, seems to indicate that the past but not the present exists, rather than that they both exist. I employ the term for exactly this use in Chapter 2.

<sup>8</sup> See Bourne (2006). The term “no-futurism” is basically the same as “afuturism”, which I am using for one of the theses constitutive of accretivism.

<sup>9</sup> Prominent contemporary four-dimensionalists include D. M. Armstrong (2004), Yuri Balaschov (2000), Adolf Grunbaum (1963), Mark Heller (1990), Hud Hudson (2001, 2005), Robin Le Poidevin (1991), David Lewis (1986), W. V. O. Quine (1960), Ted Sider (2001), and J. J. C. Smart (1964). It is worth noting that one of the major influences on contemporary four-dimensionalism is the “spacetime” interpretation of the Theory of Relativity, originating with Hermann Minkowski (1908), and one finds versions of the view embraced in popular presentations of modern physics, such as Greene (2004, Ch. 5).

contention that time is the “fourth dimension” in addition to the three commonly recognized spatial dimensions.<sup>10</sup> The essence of the view is that there is no intrinsic difference between the “temporal dimension” of reality and the spatial dimensions, and that time is to be understood on analogy with space.<sup>11</sup> According to such a view, any perceived difference between time and space is due to the content of time and space rather than the dimensions themselves. Thus, as the concepts of past, present, and future have no analogues in space, they cannot be objective features of time, and are standardly taken by the four-dimensionalist to refer to human perspectives rather than something objective. Similarly, as there is no “passage of space,” the passage of time is typically maintained by the four-dimensionalist to be some sort of illusion.

In recent years presentism has emerged as the main competitor to four-dimensionalism.<sup>12</sup> The central thesis of presentism is that only that which is present

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<sup>10</sup> The view is somewhat unfortunately named, in light of contemporary physical theories that postulate far more than three spatial dimensions. Presumably, the four-dimensionalist is not committed to there being any specific number of spatial dimensions, but holds that however many spatial dimensions there turn out to be, time is to be understood as being *another thing like those*. It is also worth noting that the term is often used in the contemporary literature to indicate various more specific doctrines that draw analogies between space and time on particular issues. For example, “four-dimensionalism” is sometimes used to indicate the thesis that entities persist through time by having “temporal parts” analogous to spatial parts, or the thesis that a purported entity’s being “temporally distant” has no more bearing on its ontological status than its being spatially distant. Both of these theses, as we shall see, are entailed by the more general doctrine of four-dimensionalism. I would suggest the most natural use of the term “four-dimensionalism” is for the broad view that time is to be understood as analogous to a spatial dimension in every respect.

<sup>11</sup> It is worth noting that as I have characterized their view, four-dimensionalists may have radically different views as to nature of space. For example, one four-dimensionalist may be a relationalist about space while another is an absolutist, or one may hold that space is continuous while another may hold that it is discrete, but what unites them is that whatever they say about space, they must say the same thing with regard to time.

<sup>12</sup> Prominent recent and contemporary presentists include John Bigelow (1996), Roderick Chisholm (1990), William Lane Craig (2001), Mark Hinchliff (1996, 2000), Simon Keller (2004), Ned Markosian (2002, 2004) Trenton Merricks (1994, 1995, 1999, 2007), and Dean Zimmerman (1996, 1998).

exists.<sup>13</sup> The intuitive core of presentism is the thought that while we might say of past things that they “did exist,” or of future things that they “will exist,” it is natural to say that all that does in fact exist exists in the present. Presentism, unlike four-dimensionalism, obviously requires an objective notion of the present.<sup>14</sup> While one might initially think that the presentist would be much more sympathetic to the passage of time as an objective feature of the world than the four-dimensionalist is, in practice one actually finds a variety of opinions on the topic of temporal passage among presentists. Presentism is first and foremost a view about what exists, and a large variety of alternate versions of presentism can be developed by combining the basic thesis that only that which is present exists with other theses about time.<sup>15</sup>

Accretivism, while less prominent in the current literature, was defended by a number of notable philosophers in the early decades of the twentieth century. While Broad is the most often cited proponent of an accretivist view, the use of him as a paradigm of someone who holds the view is somewhat unfortunate. While it is true that Broad suggests an accretivist view in the passage quoted above from *Scientific Thought*, he discusses it for only a few pages in that work and seems to have held it only for a short time before abandoning it.<sup>16</sup> While Broad is clearly committed to defending the reality of

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<sup>13</sup> Or, at least, of those things which exist “in time”, only those that are present exist. One can still be a presentist and

<sup>14</sup> Assuming, that is, that what exists is an objective fact. Since views that deny this seem to be unintelligible, this seems like a reasonable assumption.

<sup>15</sup> Dainton (2001), Chap. 6 catalogues several versions of presentism, some of which include temporal passage as a feature of the view and others of which do not.

<sup>16</sup> In addition to *Scientific Thought*, Broad also briefly discusses the view in *Mind and Its Place in Nature* (1925). By the time of his 1928 contribution to an Aristotelian Society Symposium on “Time and Change”, he is expressing serious doubts about the view as the result of the criticism of J. M. E. McTaggart, and, by Broad (1938), he has completely repudiated it. A detailed account of some of the changes in Broad’s views on time can be found in Mundle (1959).

temporal becoming, or “absolute becoming” as he call it, as an objective feature of the world, the accretivist position was only one attempt during his career to do so.

A more consistent defender of accretivism is Alfred North Whitehead, who is almost certainly the immediate source for Broad’s version of the view. Compare Broad’s passage quoted above with the following passage from *An Enquiry Concerning the Principles of Natural Knowledge*, published four years before *Scientific Thought*:

Events never change. Nature develops, in the sense that an event  $e$  becomes part of an event  $e'$  which includes (i.e. extends over)  $e$  and also extends into the futurity beyond  $e$ . Thus is a sense the event  $e$  does change, namely, in its relations to the events which were not and which become actual in the creative advance of nature. The change of an event  $e$ , in this meaning of the term ‘change’, will be called the ‘passage’ of  $e$ ; and the word ‘change’ will not be used in this sense. Thus we say that events pass but do not change. The passage of an event is its passing into some other event which is not it.<sup>17</sup>

Despite a number of developments in his overall metaphysics, a similar conception of time is maintained in Whitehead’s later work<sup>18</sup>, as the following passage from *Adventures in Ideas* attests:

But the objective existence of the future in the present differs from the objective existence of the past in the present. The various particular occasions of the past are in existence, and are severally functioning as objects for prehension in the present. This individual objective existence of the actual occasions of the past, each functioning in each present occasion constitutes the causal relationship which is efficient causation. But there are no actual occasions in the future, already constituted. Thus there are no actual occasions in the future to exercise efficient causation in the present. What is objective in the present is the necessity of a future of actual occasions, and the necessity that these future occasions

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<sup>17</sup> Whitehead (1919), p. 62.

<sup>18</sup> It is common to divide Whitehead’s career into three periods: The Cambridge Period (1891-1910), in which he was primarily concerned with mathematics, philosophy of mathematics, and logic; The London Period (1910-1924), in which he was primarily interested in the philosophy of science; and the Harvard Period (1924-1945), in which he primarily pursued issues in speculative metaphysics and cosmology.

conform to the conditions inherent in the essence of the present occasion.<sup>19</sup>

What Whitehead is saying in this passage is that while the future and past both exist “objectively” (that is, as objects of thought)<sup>20</sup>, past “occasions” (Whitehead’s term for a concrete entity) actually exist as revealed by the fact that they are causally related to (“prehended by”) present entities, whereas there exist no “already constituted” future entities. All that is the case at present, according to Whitehead, is that there will be future entities and that the nature of those entities will be constrained by the nature of what exists at present.

Tracing lines of influence even further back, one of the major sources for Whitehead’s philosophy was the work of Henri Bergson, who seems to be another defender of an accretivist view. In the following paragraph from *Matter and Memory* from 1896, Bergson answers an objection to his doctrine of the “survival of the past”:

But how can the past, which, by hypothesis, has ceased to be, preserve itself? Have we not here a real contradiction?—We reply that the question is just whether the past has ceased to exist or whether it has simply ceased to be useful. You define the present in an arbitrary manner as *that which is*, whereas the present is simply *what is being made*. Nothing is less than the present moment, if you understand by that the indivisible limit which divides the past from the future. When we think this present as going to be, it exists not yet; and when we think it as existing, it is already past. If, on the other hand, what you are considering is the concrete present such as it is actually lived by consciousness, we may say that this present consists, in large measure, in the immediate past. In the fraction of a second which covers the briefest possible perception of light, billions of vibrations have taken place, of which the first is separated from the last by an interval which is enormously divided. Your perception, however instantaneous, consists then in an incalculable multitude of remembered elements; and in truth every perception is already memory. *Practically we perceive only the past*, the pure present being the invisible progress of the past gnawing into the future.<sup>21</sup>

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<sup>19</sup> Whitehead (1933), pp. 194-5.

<sup>20</sup> Whitehead’s use of the phrase “objective existence” is analogous to Descartes’ “objective reality” in the *Meditations on First Philosophy*.

<sup>21</sup> Bergson (1912), 189-90.

What exactly Bergson has in mind by suggesting that the past has “ceased to be useful” rather than having “ceased to exist” is, at least to me, rather obscure, but he is clearly suggesting an accretivist model according to which the past exists and the present is a point at which entities are “being made.”<sup>22</sup>

Another example of someone who seems to hold an accretivist account of time is Charles Sanders Peirce. In his 1905 essay, “Issues of Pragmaticism”, he presents a “modal” account of time:

That Time is a particular variety of Objective Modality is too obvious for argumentation. The Past consists of the sum of *faits accomplis*, and this Accomplishment is the Existential Mode of Time. For the Past really acts upon us, and *that* it does, not at all in the way in which a Law of Principle influences us, but precisely as an Existent object acts... the mode of the Past is that of Actuality. Nothing of the sort is true of the future... Be it true in theory or not, the unsophisticated conception is that everything in the Future is either *destined*, i.e., necessitated already, or is *undecided*, the contingent future of Aristotle. In other words, it is not Actual, since it does not act except through the idea of it, that is, as a law acts, but is either Necessary or Possible... As for the Present instant... [i]t is plainly that Nascent State between the Determinate and Indeterminate that was noted above.<sup>23</sup>

The basic idea of this passage from Peirce, as I understand it, is the fact that the past exists can be shown, as with Whitehead<sup>24</sup>, by its causal relation on us, while the Future, whether or not one believes it to be determined or undetermined, nonetheless exists only as an abstract conception until it actually happens. The present, as with other accretivists,

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<sup>22</sup> See also Sartre’s discussion of Bergson in Sartre (1956), Part Two, Chapter II. Sartre clearly understands Bergson as holding an accretivist view.

<sup>23</sup> Peirce (1905), pp. 357-8.

<sup>24</sup> Process philosopher and theologian Charles Hartshorne claimed that there was a great deal of affinity between the metaphysics of Whitehead and the metaphysics of Peirce, and that while he is usually thought of as a follower of Whitehead, he had actually arrived at most of his metaphysical views before encountering Whitehead as a result of his activities as editor of the collected works of Peirce. While Whitehead was certainly familiar with Peirce’s logical and mathematical works, it is no clear whether his metaphysical views actually had any influence on Whitehead.

is the point at which things are in a “Nascent State,” that point at which they come into existence.

Peirce’s mention of Aristotle evokes the fact that Aristotle is sometimes cited, incorrectly I believe, as someone who holds an accretivist view. This attribution is largely due to his famous discussion of the sea battle in *De Interpretatione*.<sup>25</sup> In these passages, Aristotle suggests that while there are truths about the past and present, at least some statements about the future, namely those concerned with human actions, lack truth-value. Aristotle’s main concern is to avoid the fatalistic argument that truths about the future would constrain human free will. It is not obvious at all that Aristotle’s discussion commits him to an accretivist view, however. While Aristotle does seem to be committed to the denial of the existence of future events, it is not clear that he accepts the existence of past events, but only that there are *truths* about the past. As we shall see, presentists have developed a variety of proposals for accounting for truths about times other than the present. Aristotle may very well be best interpreted as a presentist rather than accretivist. Indeed, if one looks at Aristotle’s discussion in other works, it becomes increasingly difficult to maintain that he actually held an accretivist theory of time, though it is also very difficult to definitively state how he fits into standard contemporary classifications of views of time at all.<sup>26</sup>

In more recent times, some have suggested that something like the accretivist view falls naturally out of quantum mechanics. Perhaps the most important proponent of this kind of view was Hans Reichenbach.<sup>27</sup> In the Appendix to *The Direction of Time*, Reichenbach says that

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<sup>25</sup> Aristotle, *De Interpretatione*, Chap. 9.

<sup>26</sup> For an interesting recent discussion of the difficulties in relating Aristotle’s discussions of time to contemporary debates, see Coope (2005), pp. 3-5.

<sup>27</sup> A similar kind of argument can be found more recently in Karl Popper (1982). Among scientists, Ilya Prigogine is perhaps the most notable recent proponent of the idea that modern

The distinction between the indeterminism of the future and the determinism of the past is expressed in the last analysis in the laws of physics. This is the important result of the combination of classical statistics with the indeterminacy relation of quantum physics. The consequences for the time of our experience, that is, the time of everyday life, are obvious. The concept of *becoming* acquires a meaning in physics: The present, which separates the future from the past, is the moment when that which was undetermined becomes determined, and “becoming” means the same as “becoming determined.”<sup>28</sup>

While drawing metaphysical conclusions from physical theory is never as straightforward as it might initially seem, and Reichenbach’s attempt is problematic for various reasons<sup>29</sup>, his claim about the connection between quantum mechanics and the accretivist view of time is interesting, if only as a contrast to those who claim that modern physics, especially the theory of relativity, have shown that temporal becoming is an illusion.<sup>30</sup>

Among contemporary philosophers, the most extensive defense of a purportedly accretivist theory is to be found in Michael Tooley’s *Time, Tense, and Causation*.<sup>31</sup> While Tooley expressly sets out to defend the “very natural” view according to which “the past and present are real but the future is not,”<sup>32</sup> it is somewhat questionable whether the view he actually develops should actually be interpreted as accretivist.

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physics, far from banning objective temporal passage from the universe, is actually quite friendly to something like the accretivist picture. See Prigogine (1996) where he defends the view the “time precedes existence”, which, as I understand, is basically to endorse the notion that claims about temporal passage are irreducible to claims about what exists, or, in other words, what I will be calling “the thesis of dynamism” in the next chapter.

<sup>28</sup> Reichenbach (1956), p. 269.

<sup>29</sup> Grunbaum (1963), Chap. 10 criticizes not only Reichenbach, but similar claims made by Arthur Eddington, Hermann Bondi, and G. J. Whitrow.

<sup>30</sup> I will discuss the standard argument against temporal passage on the basis of the Special Theory of Relativity in Chapter 3.

<sup>31</sup> Peter Forrest is another contemporary philosopher who has shown himself sympathetic to the accretivist position, but has not yet published a full-length presentation of the view. He has defended it against objections in Forrest (2004), (2006a), and (2006b).

<sup>32</sup> Tooley (1997), p. 1.

Tooley's theory rests on a rather perplexing distinction between two sorts of actuality. *Actuality simpliciter*, according to Tooley, is the ordinary notion of actuality. To this Tooley adds the notion of *actuality as of a time*. Past, present, and future are all actual simpliciter, but only the past and present are actual as of the present time. Though Tooley speaks of his view as one which embraces the "unreality" of the future, the future on his view is actual in the ordinary, everyday sense of actuality, but fails to be actual "*as of the present time*." While Tooley himself presents his view as one which embraces the reality of temporal becoming, it is questionable whether he has actually succeeded in providing a genuinely dynamic view. Whatever the notion of *actuality as of a time* is supposed to amount to, given that all events that will ever exist are in *actuality simpliciter* already laid out in the future, then it seems as though, in the normal sense of actuality, they eternally have the feature of being actual as of the time they occur at and all previous times. The notion of *actuality as of a time* seems, thus, to be a purely relational notion. Tooley's model, therefore, does not in fact seem to be one in which reality grows by the accretion of new facts, but instead one in which every future event already exists, and that all events have the additional relational feature of being actual *as of* various times. Nonetheless, even if Tooley fails in the end to provide a genuinely accretivist metaphysics, his work is important in providing a number of arguments that motivate accretivist views.

One last citation of a possible instance of an accretivist doctrine deserves at least passing mention, though it is at best a tentative ascription. According to John Mbiti, something very similar to accretivism is part of the standard conceptual scheme of traditional African cultures and religion. Mbiti says

The question of time is of little or no academic concern to African peoples in their traditional life. For them, time is simply a composition of events which have occurred, those which are taking place now and those which are inevitably or immediately to occur. What has not taken place or what has no likelihood of an immediate occurrence falls in the category of 'No-time'. What is certain to

occur, or what falls within the rhythm of natural phenomena, is in the category of inevitable or *potential time*.

The most significant consequence of this is that, according to traditional concepts, time is a two-dimensional phenomenon, with a long *past*, a *present*, and virtually *no future*. The linear conception of time in western thought, with an indefinite past, present, and infinite future, is practically foreign to African thinking. The future is virtually absent because events which lie in it have not taken place, they have not been realized and cannot, therefore, constitute time. If, however, future events are certain to occur, or if they fall within the inevitable rhythm of nature, they at best constitute only *potential time*, not *actual time*. What is taking place now no doubt unfolds the future, but once an event has taken place, it is no longer in the future but in the present and the past. *Actual time* is therefore what is present and what is past.<sup>33</sup>

Mbiti bases his claims about the African conception of time in part upon an analysis of verb tenses in African languages, which he suggests shows that such languages lack the resources to make claims about the long-term future. Mbiti's claims are certainly not uncontroversial<sup>34</sup>, and I am in no position to evaluate his views, but they are nonetheless intriguing.

Accretivism, presentism, and four-dimensionalism will all be discussed in more detail in the next chapter, in which I develop a basic framework for approaching issues in the philosophy of time. The remainder of this introductory chapter will be concerned with a discussion of the basic methodological presuppositions that underlie my investigation into the nature of time, and will conclude with an outline of the rest of the essay.

## 1.2 Methodology of the Essay

In the opening paragraphs of *Appearance and Reality*, F. H. Bradley says of the metaphysician that: "Engaged in a subject which more than others demands peace of spirit, even before he enters on the controversies of his own field, he finds himself

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<sup>33</sup> Mbiti (1989), pp. 16-17.

<sup>34</sup> See, for example, Gyeke (1995) and Hallen (2002) for further discussions of Mbiti's claims.

involved in a sort of warfare.”<sup>35</sup> The reasons for such “warfare” are twofold. First, it is often assumed that the metaphysician must defend the very enterprise of metaphysics against those whose attitude towards it is dismissive. I am in complete agreement with Bradley’s own responses that any attempt to argue against metaphysics must presuppose some metaphysical view, and that *a priori* arguments against metaphysics are best countered by actually engaging in metaphysical inquiry and seeing what progress one makes in it. A second problem, however, is that even among those who recognize the importance and legitimacy of metaphysical inquiry, there is a great deal of controversy about how it should proceed and what its ultimate ends should be. It seems imperative, then, that any essay on a significant topic in metaphysics should begin with at least some discussion about what the author takes the nature and purposes of the inquiry to be. This, of course, runs the risk of alienating those whose basic conception of metaphysics is substantially different. Making one’s metaphilosophical views explicit seems worthwhile, however, in that if they do happen to be the source of one’s disagreement with one’s opponents, it is best to bring this out into the open from the very beginning.

### 1.2.1 Philosophy

Metaphysics is a central branch of philosophy. Philosophy, as I understand it, is that discipline concerned with the acquisition and rational systematization of our knowledge of the most fundamental and general aspects of the world. This characterization captures three important features of philosophical inquiry that distinguishes it from other inquiries: philosophy is *systematic*; philosophy is *synoptic*; and philosophy is *foundational*. Philosophy is “systematic” in the sense that it deals with how various subject-matter fit together. How, for example, does time as understood in physics relate to how time is understood in psychology or history, and how do any of them relate

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<sup>35</sup> Bradley (1893), p. 1.

to time as revealed in our everyday experience? Philosophy is “synoptic” in the sense that it deals with things-in-general rather than very specific matters of fact. Whether this event occurred before or after that event is not usually of philosophical importance, but the general fact that time seems to involve these relations of “before” and “after” is something of importance to the philosophy of time. Philosophy is “foundational” in the sense that it deals with issues that are presupposed by or lie at the core of other disciplines. The notion of time is one that is normally simply assumed in the day to day practice of the physicist. When they ask the question of what time (or what space or matter or other such fundamental things are), they are asking questions which are part of the philosophy of physics rather than something that, while it can be informed by physical inquiry, cannot be answered by the methods of physics proper.

The relationship of philosophy with other knowledge-seeking disciplines is therefore quite complex. On the one hand, the subject-matter of other disciplines must conform to the general features that are the subject-matter of philosophy, and therefore the subject-matter of each of these disciplines can be considered as an instantiation of the correct philosophical system.<sup>36</sup> On the other hand, one should not take this to imply that philosophy is prior to other disciplines in the sense that the work of the philosopher must be completed before other inquiries proceed. Indeed, history shows that much of the most important philosophical work has drawn inspiration from the “special sciences.” In

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<sup>36</sup> This does not, of course, mean that the results other disciplines follow deductively from the correct philosophical system. It may very well turn out that the laws of physics, for example, are metaphysically contingent. These laws must still conform to metaphysical principles, however. If it is, for example, a true metaphysical principle that there can be no action at a distance, then any physical law that seems to require such action is in need of a deeper explanation that eliminates the apparent requirement. This explanation may itself be beyond the scope of empirical physics, however. Furthermore, the very existence of contingent physical laws must itself be amenable to metaphysical explanation. Such a “principle of contingency” may be an ultimate metaphysical fact or may itself be derivable from other, more fundamental metaphysical principles.

practice, what we find is a complex interplay in which philosophy both influences and is influenced by other fields.

This interplay of philosophy and other disciplines reflects the fact that philosophy, as a rational systematization of our knowledge of the world, requires both *a priori* and *a posteriori* elements. As both *rational* and *systematic*, it requires going beyond mere experience. A simple catalogue of facts about the world as we experience it yields little of the “wisdom” of which philosophers claim to be lovers. Only by testing our experience against the tribunal of reason and the use of that speculative insight that allows us to recognize connections among seemingly disparate phenomena can we hope to get beyond William James’s “blooming, buzzing confusion” to something that is genuinely an understanding of the world. The fact that the knowledge we are seeking is knowledge of *the world* accounts for the relevance of empirical considerations to the inquiry. Even if one denies that *all* substantive knowledge of the world is empirical, few would deny that at least a significant part of that knowledge derives at least in part from experience. And even those who would deny the veridicality of the greater part of our experience have a responsibility to account for the fact that we do perceive the world in such and such a way. This need to account for our experience provides one of the greatest checks on the potential excesses of speculative philosophy when divorced from grounding in experience.

Many interesting philosophical puzzles arise out of an apparent conflict between reason and experience. Parmenides and Zeno, having developed arguments that the very notions of plurality and motion were self-contradictory, held that the only genuine reality was the unchanging One, and that the world of our ordinary experience is therefore mere illusion. Heraclitus and Cratylus, impressed with the flux of experience, apparently took the contradictions they believed implicit in this flux to be the key to some great mystical

insight. We should not uncritically follow the approach of either school.<sup>37</sup> Even if we take the arguments of Parmenides and Zeno to be valid, their account is incomplete without some sort of explanation of why we experience the world the way we do, if Reality is in fact so much different from Appearance. And if we assume a Heraclitean account of our experience of the world as being constantly in flux to be correct, one must strive to find an intelligible account of that experience before one accepts it as a genuine representation of reality. When reason and experience seem to be in conflict, or when two different rational principles or two different experiences or types of experiences seem to conflict, there is unfortunately no formulaic way of adjudicating or eliminating these conflicts. Nor, when it is decided that the only solution to the conflict is to either abandon some *a priori* intuition or declare some bit of experience as illusory, is there some easy way of choosing what principle or what bit of experience is at fault. Thus, different choices in response to these conflicts can be made, generating different research programs, which can only be evaluated in terms of their overall success of accounting for the world that we experience in an intelligible fashion.

### 1.2.2 *Metaphysics and Ontology*

Metaphysics is commonly defined as the “theory of ultimate reality.”<sup>38</sup> Among the central concerns of metaphysics is the articulation of first principles, the most basic and fundamental truths that apply to any subject-matter whatsoever, as well as the fundamental *categories* involved in these principles. What is a “category”? I use the word in roughly the Kantian sense of a fundamental concept needed to understand the world,

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<sup>37</sup> Admittedly, these may very well be caricatures of these schools, rather than an accurate portrayal of their doctrines. As my concern is with the methodological point, not the historical facts, such caricatures are useful in illustrating the point, regardless of their accuracy.

<sup>38</sup> See, for example, Van Inwagen (2009), p. 1.

though, unlike Kant, I assume a realist view of the categories.<sup>39</sup> They are not necessary structures of thought imposed upon our experience in the way Kant believed, but, at least in the ideal categorical scheme, pick out actual features of reality. Among the most important of the categories is the category of *being* or *existence*.<sup>40</sup> *Ontology* is that branch of metaphysics that studies the category of being. Much contemporary philosophy, at least in the tradition of analytic philosophy, operates under the assumption that ontology exhausts the subject-matter of metaphysics, or, in other words, that being is the only fundamental category. This is an assumption that I will not make, and will explicitly reject over the course of this essay.

As an example of this tendency, it is useful to consider the treatment of what I would suggest as a prime candidate to be another fundamental category, namely *possibility*. According to contemporary philosophical orthodoxy, truths about what is possible require an “ontological ground” or “truthmaker”, some existent upon which those truths depend. Lacking any obvious truthmakers among the concrete inhabitants of our world, philosophers are then led to postulate the existence of “possible worlds”, conceived either as an infinitude of causally independent concrete universes of which

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<sup>39</sup> The mention of Kant’s conception of categories raises the obvious specter of Kant’s fundamental puzzle of how “synthetic *a priori*” knowledge is possible. Or, in other words, how can we have knowledge of the most fundamental principles that govern all of reality, when doing so seems to require knowledge that goes well beyond what could be justified simply on the basis of experience? I have nothing particularly profound to say in response to this other than to say that I do assume that such knowledge is possible, that I reject the psychologistic assumptions behind Kant’s own suggestion that such knowledge is simply knowledge of the innate filters of our own minds that structure our experience, and that I assume our access to such truths, while genuine, is nonetheless fallible. We should not confuse the necessity of the objects of belief with the infallibility of the beliefs themselves.

<sup>40</sup> These two words and the corresponding noun phrases such as “a being” or “an existent” I will generally use interchangeably. Some philosophers, particularly in the early twentieth century, distinguished between “existence” and “subsistence” as two kinds of being, roughly corresponding to the distinction between those beings that are part of the spatio-temporal causal order and those which are not, or what is generally referred to by the distinction between concrete and abstract entities in more recent literature. Even though the “concrete” and “abstract” language is problematic for a variety of reasons, I will use it for this distinction.

ours is only a single example<sup>41</sup>, or as abstract denizens of our world, something akin or perhaps identical to properties or propositions or mathematical entities.<sup>42</sup> In either case, what is a mere possibility becomes some (one is tempted to say “actually”) existing thing, when it seems intuitively to be the case that the very notion of its being “merely” possible implies it does not in fact exist.<sup>43</sup> This is not to say that possibilities are not objectively real. But it *is* to deny that we should attempt to think of possibilities as a kind of existent. The category of possibility is obviously connected to the category of existence, and it is one of the tasks of metaphysics to understand this connection, but the connection is not such that we can somehow reduce truths about what is possible to truths about what in fact exists.<sup>44</sup>

Part of the motivation for the view that I am rejecting comes from a particular conception of truth. Truth, it is maintained, is a relation between thoughts (or perhaps propositions or sentences) and the world. Relations require relata, and presumably any relata of an ordinary relation are existents. Thus there must be some existent in the world that stands as one of the relata of the truth-relation if claims about possibility are true. The best response to this, I would suggest, is to deny that truth is an “ordinary relation”. It is significant that a similar kind of problem arises on almost any plausible account of

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<sup>41</sup> Lewis (1986) is the classic example of this kind of approach.

<sup>42</sup> Plantinga (1974) is one classic presentation of this approach.

<sup>43</sup> In ordinary language, when we say that a certain possibility “exists”, what this seems to mean is that this possibility is compatible with or made more likely to obtain by various existing conditions. For example, if I said that the possibility existed of my vacationing in France next year that would imply that there exists some circumstance such as my having been invited by friends to visit them in France or having saved up money for a long-planned trip there. It would be unusual to say that the possibility of visiting France existed when no such circumstance obtained, even though it may very well be possible that I do so.

<sup>44</sup> On the contrary, it is perhaps more plausible that we understand the existent as a certain kind of possibility, namely that which actually obtains, but I will not pursue this line of thought in this essay. There are similarities between what I am suggesting and the view that Robert Adams labels “possibilism” in Adams (1974).

another phenomenon that seems closely connected to truth, namely intentionality. One of the central puzzles for the philosophy of mind is the fact that we can think about that which does not exist. So even though this *aboutness* seems to be relational in character, it seems mistaken to understand it as an ordinary relation which requires existing relata. Now there are a variety of responses one can develop to this problem, and I do not wish to endorse any particular solution, but I *would* suggest that the problem with regard to truth is closely connected, such that an adequate solution to the puzzle of intentionality should at least provide guidance in solving the similar problem that arises with regard to truth if one denies that truth is an ordinary relation.<sup>45</sup>

The overall distinction that I am making here is similar to distinctions between different senses of “being” made by Aristotle and his followers.<sup>46</sup> Thomas Aquinas summarizes one of Aristotle’s distinctions as follows:

We must realize (with the Philosopher) that the term ‘a being’ in itself has two meanings. Taken one way it is divided by the ten categories; taken in the other way it signifies the truth of propositions. The difference between the two is that in the second sense anything can be called a being if an affirmative proposition can be formed about it, even if it is nothing positive in reality.<sup>47</sup>

Aquinas goes on to discuss “privations” and “negations” as examples of being “nothing positive in reality”, even though they may be said to be beings in the sense that there are truths about them. Roughly speaking, I am using the word “reality” to indicate the Aristotelian sense of “being” which “indicates the truth of propositions”, while I reserve the term “being” for the other of Aristotle’s senses, in which we can classify different

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<sup>45</sup> The basic point that I am making about truth in this section has also been forcefully argued in much greater detail by Trenton Merricks. See Merricks (2007).

<sup>46</sup> The primary Aristotelian source is the *Metaphysics*, Book V, Chap. 7.

<sup>47</sup> Aquinas (1968), pp. 29-30.

kinds of existent (Aristotelian categories) such as particulars or properties. “Reality” is the subject matter of metaphysics, while “being” is the subject matter of ontology.

A fully articulated metaphysics, then, is an attempt to catalogue the various fundamental categories of reality and their relationship to one another. A fully articulated ontology would contain a catalogue of the various fundamental kinds of existent and their relationship to one another. A “metaphysics of time” is an explication of various temporal phenomena in terms in terms of these fundamental categories. An “ontology of time” is an account of the implications of what we must hold to exist, given these temporal phenomena. If temporal phenomena could be accounted for solely by specifying what sorts of things must exist to explain these phenomena, then the ontology of time would exhaust the metaphysics of time. The position to be defended in this essay is that it does not.

### *1.2.3 Descriptive and Revisionary Metaphysics*

How should we proceed with our metaphysical investigation? I suggested in the last section that metaphysics could be characterized as the inquiry into the fundamental concepts needed to understand reality. One tempting move, then, might be to concentrate our investigation on the concepts that we actually employ in understanding reality. According to one metaphilosophical view, the primary business of the philosopher is “conceptual analysis”, the careful articulation of the “conceptual scheme” used in everyday thought and supposedly presupposed by the sciences and other specialized disciplines. Metaphysics should be, in P. F. Strawson’s terminology, *descriptive* rather than *revisionary*.<sup>48</sup>

Conceptual analysis is, undeniably, an important instrument in the philosopher’s toolbox. It is probably inevitable that the existing conceptual resources that we employ

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<sup>48</sup> Strawson (1959), Introduction.

serve as part of the starting data with which any philosophical account of the world must begin. We cannot begin our investigation with a *tabula rasa*, and somehow wipe away our entire conceptual apparatus and start anew. Even if it were possible, it is not clear that it would be advisable to do so. It seems likely that the most basic categories of the world are such that without concepts that correspond to them, thought would simply be impossible. Even as we move from more fundamental categories to less basic kinds, the fact that a particular way of thinking has proved to be of widespread usefulness provides at least a certain degree of evidential weight in its favor.

It would be a mistake, however, to suggest that conceptual analysis exhausts the task of the metaphysician. The fact is that at least a significant part of our own conceptual apparatus does seem to be contingent, and the metaphysician must confront the possibility of alternative ways of thinking about the world. Consider Eli Hirsch's highly artificial example of the speakers of the "Incar-Outcar Language".<sup>49</sup> In this example, we are supposed to imagine a people who speak a language very much like ours, except that they have no word or concept for "car", but instead refer to "incars", which we would describe as "cars inside garages", and "outcars", which we would describe as "cars outside garages". When a car enters a garage, the speakers of this language think of the situation as the coming-into-existence and growth of an incar, and the shrinking and disappearance of an outcar. There is no concept of a single object that moves from outside to inside the garage, however.

When confronted with this possibility, it seems to me there are four basic responses one might have to it:

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<sup>49</sup> This is first introduced in Hirsch (1982), p. 32. One of the oldest versions of this idea may be found in the Chinese philosopher Zhuangzi, who uses a story of monkeys who become extremely angry if they receive three chestnuts in the morning and four at night, but are satisfied if they receive four in the morning and three at night, to illustrate the importance we place in our arbitrary ways of dividing things up. In both cases, the total number of chestnuts received is the same, and so objectively speaking, there is a little difference in the two cases.

- 1) **Relativism:** The relativist response is to maintain that neither “cars” nor “incars” and “outcars” objectively exist, as there is no “correct” way of dividing up the world. We can only say that cars exist according to our conceptual scheme, whereas incars and outcars exist according to the other conceptual scheme, but there is no fact of the matter as to which scheme is true.
- 2) **Parochialism:** The parochialist response is to say that of course cars are what really exist, and while this other culture may have a strange way of thinking and speaking about cars, as long as we can translate everything they say into our language and our way of thinking about the world, we should not take this possibility as a threat to the correctness of our own conceptual scheme. This response assumes that our particular way of dividing up the world is correct, and other conceptual schemes can only be considered as imperfect variations of ours.
- 3) **Universalism:** The universalist maintains that cars, incars, and outcars all exist. Our culture may find it convenient to have a concept that refers to cars rather than incars and outcars, whereas the other culture finds it more convenient to have concepts that refer to incars and outcars rather than cars, but each of these ways of thinking is picking out things that are actually out there in the world. Both conceptual schemes are correct, but simply limited in the fact that they fail to recognize the objects picked out by the other scheme.
- 4) **Fallibilism:** The fallibilist takes the possibility of other conceptual schemes to show that we should consider our own conceptual apparatus as tentative and potentially mistaken. It may very well turn out that our conceptual scheme is correct, or it may turn out that the Incar-Outcar Language is correct, or it may very well be that neither is correct, but part of the task of metaphysical

investigation is to confront these different possibilities, and to find reasons to choose between them.

My own philosophical inclinations place me firmly in the fallibilist camp. Relativism is open to the well-known objection that it is self-defeating; parochialism relies on the highly questionable assumption that our own culture just happens to have hit upon the correct way of thinking about the world; and universalism seems to massively overpopulate the world in order to achieve the result that nobody is (or could possibly be) wrong.<sup>50</sup>

So while an understanding of our existing conceptual apparatus is an important aspect of metaphysical investigation, it cannot be taken to exhaust the task of the metaphysician. An extremely important part of that task is to propose and consider alternatives to our existing concepts, and to try to justify either our existing conceptual scheme or one of the alternatives. I thus take it that the objection to a particular view that it does not fit well with our ordinary ways of thinking about a particular matter is only of limited evidential weight against that view. In particular, it is important to note that I do not intend the theory of time that I am defending to be an analysis of our ordinary ways of thinking about time. In fact, certain facets of it are quite revisionary.

#### *1.2.4 Ordinary and Ideal Language*

During the twentieth century, much of philosophy was said to have taken a “linguistic turn”, which came to mean that questions about the nature of language occupied a central place in philosophical inquiry. Particularly in philosophical studies of

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<sup>50</sup> What I am calling “universalism” here is closely connected to the mereological doctrine of the same name. John Hawthorne has emphasized that one of the major motivations for the widespread acceptance of what he calls “the principle of plenitude”, which contains mereological universalism as one of its components, is the desire to avoid saying that other possible ways of dividing up the world are mistaken. See Hawthorne (2006), Essay 3.

time, accounts of temporal language are often thought to be of prime importance.<sup>51</sup> Indeed, the central debate in the philosophy of time throughout much of the latter half of the twentieth century, between so-called “A-theorists” and “B-theorists”, largely involved the primacy of “tensed” versus “tenseless” language.<sup>52</sup> According to the “old” B-theory, all tensed language could be analyzed without loss of meaning into tenseless language, which was denied by A-theorists. The old B-theory was eventually abandoned and replaced by the “new” B-theory, which maintained instead that tenseless “truth-conditions” could be given for all tensed language.<sup>53</sup>

There will be very little discussion of “the language of time” in this essay. For one thing, I find the whole truth-conditional approach to meaning that is presupposed in much of the current debate to be highly questionable. More generally, I believe that focus on such questions obfuscates rather than illuminates the metaphysical issues at stake. Certainly questions of how exactly it is that language manages to be meaningful and how it relates to reality are among the most important philosophical questions, and many particularly puzzling questions arise when it comes to the temporal aspects of language and reality.<sup>54</sup> However, I am rather skeptical of the notion that attempts to answer such questions can shed significant light on the core metaphysical questions. If it turned out

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<sup>51</sup> See, for example, the Introduction to Smith and Jokic (2003), which suggests that the philosophy of language and the philosophy of time are “more connected than most” areas of philosophy, and laments the fact that they have not been pursued more closely together, despite the “important implications” they have for one another.

<sup>52</sup> The A-theory/B-theory distinction, and the inadequacies of it for characterizing views of time, will be discussed in detail in the next chapter

<sup>53</sup> See Oaklander and Smith (1994) for discussion of this history.

<sup>54</sup> These puzzles go back at least to Plato, who worries in *Timaeus* b-d about the capacity of language to express the relationship between the eternal and the temporal worlds. The problem can be generated from either side, as one might worry that language is too much subject to change to really represent that which is permanent and timeless, or one might worry that to try to capture changing reality in a linguistic description is to try impose some permanent structure on that which is in flux.

that a particular view of time made meaningful discourse about time impossible, then that would certainly count as a major objection to, and perhaps refutation of, the theory. I am not sure that is actually going to narrow down the field of plausible theories in any significant way, however. At any rate, such questions seem to me largely posterior to the more fundamental metaphysical investigation. Once we have an account of what temporal reality is like, then we can ask how our language is able to represent that reality. Attempting to establish the nature of time based on how we ordinarily talk about time seems to me fundamentally misguided, however.

The phrase “linguistic turn”, of course, originates with Gustav Bergmann, who intended to include under its rubric a wide variety of different views on the ways in which philosophy could focus on language.<sup>55</sup> Bergmann’s own method was not one that was concerned simply with the analysis or semantics or use of ordinary language, or even one that gave particular prominence to what we now think of as the philosophy of language. Bergmann’s version of the linguistic turn involved the idea that a central concern of metaphysics should be the construction of an “ideal language”. I will be making at least some use of the notion of an ideal language, so I will briefly explain how I understand this notion. An ideal language is an artificial language constructed to mirror or “picture” the ontological structure of the world. Natural languages serve a variety of functions. One such function is to indicate certain ways in which the world is. Natural languages tend to perform this function in a vague and imprecise manner. As a result of this vagueness and imprecision, and as a result of the multiplicity of the uses of natural languages for things other than representing the world, these languages are often poorly suited for the ontologist’s task of cataloguing the basic kinds of things and the basic structure of the world. In order to achieve ontological perspicuity, it can often be useful

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<sup>55</sup> Bergmann (1953).

for an ontologist to construct an artificial language in which the world is more accurately represented than it is in ordinary language.

Alfred North Whitehead expresses the point as follows:

Every science must devise its own instruments. The tool required for philosophy is language. Thus philosophy redesigns language in the same way that, in a physical science, pre-existing appliances are redesigned. It is exactly at this point that the appeal to facts is a difficult operation. This appeal is not solely to the expression of the facts in current verbal statement. The adequacy of such sentences is the main question at issue. It is true that the general agreement of mankind as to experienced facts is best expressed in language. But the language of literature breaks down precisely at the task of expressing the large generalities—the very generalities which metaphysics seeks to express.<sup>56</sup>

Whitehead's point is that while almost everyone will agree upon the basic facts of our experience when stated in ordinary language, we should not mistake that superficial agreement for a philosophically adequate description of the world. When engaged in philosophy, we often begin with facts such as "There is a red apple on the table." With this, everyone may very well agree. We might, however, sharply disagree about how to understand that fact. Is the apple a "material object" that exists independently of our minds, or is it a collection of sensations "in our minds"? What is the relationship between the redness and the apple? Is redness something that exists external to the apple, so that apple is red in virtue of a relation to this external thing, or is the redness a constituent of some sort of the apple? Is the table a genuine entity or is it the case that all that really exists are atoms arranged in a certain "tablewise" manner? Is the relation of "on-ness" something that holds directly between the apple and the table, or are we to understand this in terms of both objects being at "places" that are the primary bearers of spatial relations? The purpose of an ideal language is to make one's answers to these questions explicit in a way that is often masked when facts are expressed in ordinary language.

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<sup>56</sup> Whitehead (1978), p. 11.

While ideal languages primarily serve the function of making one's *ontological* commitments explicit, they are also useful in explicating *metaphysical* principles. Consider the Law of Non-Contradiction. One way of elucidating this principle is in terms of the fact that one cannot construct a candidate ideal language in which a genuine contradiction is represented. In English we might state a contradiction as follows: "The apple is red and the apple is not red." Notice, however, that our ability to utter such a sentence requires that we use different tokens of the word "apple" or the word "red" to be referring to the same particulars or properties. In an ideal language, by contrast, every element in a sentence corresponds to an element of reality. Let us suppose "a" stands for the apple, "R" stands for the color red, and use a vertical stroke "|" in between the two to represent the fact that the property is possessed by the particular. We might depict the world as one in which the apple is red as follows: "a|R". Or, we might depict the world as one in which the apple is not red as follows: "a R". However, we cannot depict the world as one in which the apple both possesses and does not possess the property while keeping the requirement that each element of the sentence corresponds to one entity. Doing so would require both putting and not putting the vertical stroke between the "a" and the "R". In an important sense, logical possibility can be understood in terms of representability in an ideal language, though, of course, this should not be understood as an *analysis* of the notion of logical possibility, since the notion of *representability* presupposes the notion of possibility.<sup>57</sup>

### 1.2.5 *The Metaphysics and Physics of Time*

One might be tempted to suppose that it is primarily the business of the natural sciences, particularly physics and cosmology, to explore the nature of time, and the work

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<sup>57</sup> One can also say that what is being explicated here is the traditional thesis that conceivability is possibility.

of the philosopher of time should be a matter of systematically interpreting exactly what the best current scientific theories say about time. On such a view, puzzles in the philosophy of time become simply a subset of puzzles in the philosophy of physics. Indeed, many have been tempted by this line of thought, and the philosophical literature is full of attempts to argue for particular views of time based on developments in recent physics.

I will not proceed in this fashion. It is not because I think that physics is irrelevant to the philosophy of time. On the contrary, I believe that physics provides very important empirical data that needs to be explained by any successful philosophical system. However, the idea that we can simply ground our philosophical account of time solely in scientific theory seems to me fundamentally misguided. For one thing, there is a certain underdetermination of philosophical theory by the data of scientific theories. It is often argued, for example, that the Special Theory of Relativity (STR) makes untenable any view of time that requires the existence of an objective present, and, even more boldly, that the overwhelming evidence in favor of STR can be taken to confirm four-dimensionalism as the correct account of time.<sup>58</sup> Partisans of other views of time, however, have suggested that these arguments rest on the fact that standard formulations of STR have certain implicit and inessential philosophical assumptions, and these philosophers have shown a remarkable ability to provide alternatives to these standard formulations that make it at least compatible with their own preferred views.<sup>59</sup> The evaluation of these various attempts is an important project in its own right, but not one that I have undertaken in this essay. My point is that using scientific theories to provide

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<sup>58</sup> One of the classic sources for this sort of argument is Putnam (1967).

<sup>59</sup> For a variety of different views, see Stein (1991), Smith (1993), Tooley (1997) Craig (2001), and Bourne (2006).

evidence for philosophical views is rarely as straightforward as some more superficial treatments of the subject might lead one to believe.

A further problem with the use of physics to attempt to give a philosophical account of time is that there really is no such thing as “*the* current physical view”. Despite the fondness of many philosophers for STR, we can juxtapose arguments that an accretivist view such as that to be defended in this essay is incompatible with STR with Reichenbach’s aforementioned argument for a version of accretivism on the basis of Quantum Mechanics (QM).<sup>60</sup> In my view, Reichenbach’s derivation suffers from the same basic underdetermination problem as besets the proponents of the philosophical implications of STR. The point I want to make, however, is that there are well-known difficulties with reconciling the theory of relativity with quantum theory.<sup>61</sup> It seems as though they cannot both be true, at least as standardly understood. Interestingly, it seems to be exactly the same elements of STR that drive arguments against an objective present that are responsible for its conflicts with QM. One could perhaps suggest that we move the discussion to those physical theories, such as String Theory and its relatives, which attempt to reconcile modern physics. Such attempts are themselves, however, highly speculative and controversial<sup>62</sup>, so it is not completely clear what their evidential weight in favor of a philosophical view would actually be, even if one could legitimately maintain that they favored one view over another.

Furthermore, the point should be made that while physics is one discipline relevant to the study of time, it can hardly claim sole province over temporal phenomena.

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<sup>60</sup> See Reichenbach (1956).

<sup>61</sup> Maudlin (2002) contains a particularly clear and philosophically enlightening discussion of these problems.

<sup>62</sup> See Smolin (2004) and Woit (2006) for criticisms that question the legitimacy of the entire research program of String Theory.

A complete account of time must take into account the data of fields as diverse as biology, history, and psychology, each of which potentially has some relevance to our understanding of time. Even disciplines such as mathematics or natural theology, which are often taken to study *atemporal* beings, are relevant, in that they bring up questions of the connection of their objects of study to the temporal world. If mathematical objects are “timeless,” then how exactly do they connect to the physical world? Does it even make sense to maintain that there is a conscious being outside of time, as God has traditionally been supposed to be? These are questions that are not going to be answered simply by trying to distill a view of time based on the way time is treated in physical theories.

Lastly, it is often suggested that there is a conflict between time as it is treated in physics and the “human experience” of time. One of the most famous accounts of this conflict can be found in Rudolf Carnap’s account of a conversation he once had with Albert Einstein:

Einstein said that the problem of the now worried him seriously. He explained that the experience of the now means something special for man, something essentially different from the past and the future, but that this important difference does not and cannot occur within physics. That this experience cannot be explained by science seemed to him a matter of painful but inevitable resignation. I remarked that all that all that occurs objectively can be described in science; on the one hand the temporal sequence of events is described in physics; and, on the other hand, the peculiarities of man’s experiences with respect to time, including his different attitude towards past, present, and future, can be described and (in principle) explained in psychology. But Einstein thought that these scientific descriptions cannot possibly satisfy our human needs; that there is something essential about the Now which is just outside the realm of science... I definitely had the impression that Einstein’s thinking on this point involved a lack of distinction between experience and knowledge. Since science in principle can say all that can be said, there is no unanswerable question left. But though there is no theoretical question left, there is still the common human emotional experience, which is sometimes disturbing for special psychological reasons.<sup>63</sup>

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<sup>63</sup> Carnap (1963), pp. 37-8.

Commenting on this passage, Brian Greene asks:

Is science unable to grasp a fundamental quality of time that the human mind embraces as readily as the lungs take in air, or does the human mind impose on time a quality of its own making, one that is artificial and that hence does not show up in the laws of physics? If you were to ask me this question during the working day, I'd side with the latter perspective, but by nightfall, when critical thought eases into the ordinary routines of life, it's hard to maintain full resistance to the former view... Certainly, though, the feeling that time flows is deeply ingrained in our experience and thoroughly pervades our thinking and language... But don't confuse language with reality. Human language is far better at capturing human experience than at expressing deep physical law.<sup>64</sup>

While Greene is right to emphasize the fact that we should not confuse language with reality<sup>65</sup>, it is the contrast between human experience and reality as described in physical theory that appears in both his and Carnap's discussion that I find rather puzzling. Particularly for Carnap, the paradigm example of a Logical Empiricist, to emphasize a distinction between "experience" and "knowledge" seems rather bewildering. For an empiricist, experience is the *basis* of all substantive knowledge. For a *logical* empiricist, scientific theories are meaningful only to the extent that they can be explicated in terms of our experience. To dismiss an aspect of experience because of its incompatibility with a scientific theory seems essentially to abandon the spirit of empiricism. The irony is that, on this issue at least, Carnap seems to take the same side as mystically-inclined philosophers such as F. H. Bradley and J. M. E. McTaggart, whose willingness to dismiss everyday human experience, including our ordinary experience of time, as illusory on the basis of abstract metaphysical argument was the exact sort of excess of metaphysical speculation that the logical empiricists were trying to correct by their insistence that all meaningful claims be rooted in our experience.

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<sup>64</sup> Greene (2004), pp. 141-2.

<sup>65</sup> I would suggest that he seems much too optimistic about the ability of language to adequately capture our experience, however.

To be fair, Carnap seems to suggest, rather oddly, that the only aspect of our experience that Einstein is worried about conflicting with modern science is a certain emotional attitude to “the Now”. What Carnap (or Einstein if his account is accurate) seems to ignore is the fact that it is not just our response to our experience but an element of *what we experience* that seems to generate the apparent conflict with the scientific picture. Paul Davies expresses sentiments somewhat similar to Einstein’s:

As a physicist, I am well aware how much intuition can lead us astray... Yet as a human being, I find it impossible to relinquish the sensation of a flowing time and a moving present moment. It is something so basic to my experience of the world that I am repelled by the claim that it is only an illusion or misperception. It seems to me that there is an aspect of time of great significance that we have so far overlooked in our description of the physical universe.<sup>66</sup>

What Davies makes clear that Einstein as presented by Carnap does not, however, is the fact that it is actually something of which we have a “sensation” that must be dismissed as an “illusion or misperception” according to the physicist’s picture of the world as standardly understood. It is the fact that we seem to sense time passing, and that we seem to perceive that the present is distinct in some way from other times that is the crux of the puzzle, not simply that we have some difference of attitude towards the present than we have towards other times.

Given the general attitude of logical empiricists towards “theoretical entities,” one might expect their natural response to the fact that a scientific theory depicts a world lacking the flow of time that is manifest in our ordinary experience to be to adopt an instrumentalist stance towards that theory. However useful the Theory of Relativity is as a tool for predicting what we will experience, such an empiricist might suggest, it should not be taken as a literal picture of the way the world actually is. As a matter of fact, if the conflict between physics and human experience turns out to be irreconcilable, I myself

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<sup>66</sup> Davies (1995), p. 275.

would be inclined to take this route. I do not believe, however, that such conflicts between physics and human experience will ultimately prove to be irreconcilable. While it may be the case that in some important sense “a flowing time” is not the sort of thing that one can give an account of in physics, this is because the correct physics must presuppose the notion rather than explaining it. And, as the correct physical theory *will* be one that presupposes the flow of time, there cannot be a genuine conflict between physical theory and our experience on this ground.

### *1.2.6 Metaphysics and Experience*

In this essay, then, I will assume that the metaphysics of time must be rooted primarily in our experience, and that the most basic way to proceed is by consideration of the various temporal aspects of our experience. It is important to keep in mind the fallibility of attempts to describe this experience, especially in light of the inadequacy of ordinary language. In many ways “the given” is the most misleadingly named philosophical concept. What is *given* is very rarely *a gift*, and is perhaps more accurately described as “the found”, with the caveat that often a great deal of searching and clearing away of the conceptual and linguistic trappings that are hiding it are needed before it *can* be found. The ultimate goal is, however, not just to describe experience, but to *understand* it, and in particular how its various aspects relate to one another. One of the most significant tools in achieving this understanding are the traditional philosophical puzzles that have been raised that challenge our ordinary ways of thinking about time. Addressing these puzzles plays a significant role in deciding what view of time best explains our actual experience of time.

### **1.3 Outline of the Essay**

In this first chapter I have been concerned with a rough presentation of the basic view to be defended in this essay and some of its historical antecedents, as well as a rough characterization of the basic conception of philosophy to be employed in defense

of this view. In the second chapter, I will be concerned with presenting a basic catalogue of the various temporal phenomena of which a comprehensive theory of time should give some account. I present these temporal phenomena in terms of five basic *aspects* of time: 1) *The Tensed Aspect*; 2) *The Transitory Aspect*; 3) *The Structural Aspect*; 4) *The Extensive Aspect*; and 5) *The Repetitive-Differential Aspect*. The main focus of this essay will be on the first two aspects, but I give at least some indications of my positions in respect to the other aspects. A rough argument in favor of accretivism on the basis of the fact that it provides a theory that gives each of these aspects a fundamental place in our understanding of time will be presented. The third chapter will develop this basic argument for accretivism by maintaining its superiority over other views that recognize the transitory aspect.

## CHAPTER TWO

### ASPECTS OF TIME

#### 2.1 Background of the Essay

The central purpose of this chapter will be the demarcation of temporal phenomena into five distinct classes or “aspects of time”. One central objective will be to distinguish certain issues in the philosophy of time that are often not clearly distinguished. A second goal will be to contrast the account of these phenomena given by the accretivist theory that I wish to defend with the accounts given by the presentist and four-dimensionalist. A third aim will be to begin to motivate the accretivist theory by suggesting that accretivism allows all aspects of time to be integrated into a coherent overall picture of time that gives a significant role to each of these aspects. I will begin with a discussion of some of the recent history of the philosophy of time, which will set the stage for the classification of temporal phenomena that I wish to present.

##### 2.1.1 *The “Discovery of Time”*

Samuel Alexander once remarked that “the discovery of Time”, or the tendency to “take time seriously”, was the most characteristic feature of philosophy during the first quarter of the twentieth century.<sup>67</sup> And while it is true that the philosophical study of time is roughly as old as philosophy itself,<sup>68</sup> a plausible case can be made that the importance of the early twentieth century for the philosophy of time is comparable to the seventeenth century for the philosophy of mind. Just as introductory texts in the philosophy of mind tend to begin with Descartes and the problems bequeathed to us by

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<sup>67</sup> Alexander (1939), p. 349.

<sup>68</sup> More precisely, it dates back at least to Heraclitus and Parmenides.

his legacy, so do texts in the philosophy of time tend to begin with sets of problems articulated near the beginning of the twentieth century.

There are at least five major factors that have contributed to interest in the philosophy of time over the past hundred years or so. The birth of modern psychology as an independent discipline and the related development of the phenomenological tradition in philosophy led to the recognition of the importance of understanding temporality for understanding the nature and structure of consciousness.<sup>69</sup> The growth of hermeneutics as a field of inquiry central to both the philosophy of history and to literary theory, as well as the appearance of major literary works that challenged traditional narrative structure, has brought about recognition of the importance of the ways in which we interpret the temporal structure of events to our capacity to make sense of the world around us.<sup>70</sup> The breakdown of traditional Western theological orthodoxy has led to a number of attempts to revise the classical conception of God as an atemporal being and to explore the nature of time as part of the project of developing a new account of God's relationship to the natural world.<sup>71</sup> The radical revolutions in the scientific conceptions of space and time initiated by Einstein and Minkowski's contributions to physics, followed later by quantum theory and more recently by theories of quantum gravity, has led philosophers of science to concern themselves with developing philosophically adequate interpretations of these new physical theories.<sup>72</sup> And perhaps most importantly

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<sup>69</sup> James (1892), Chap. XVII is one classic source, as is the work of Bergson. Among the phenomenologists, Husserl (1991) and Heidegger (1962) are the most obvious classics.

<sup>70</sup> Ricouer (1984) and Carr (1986) are among the most important works of this tradition.

<sup>71</sup> A great deal of the "process theology" inspired by Whitehead is motivated by these sorts of concerns. Stump and Kretzmann (1981) is a major source for recent debates. Gansslee and Woodruff (2002) is an important recent collection on these issues. William Lane Craig deserves mention as perhaps the most prominent recent philosopher of time strongly motivated by theological concerns. See Craig (2001), among other works.

<sup>72</sup> As Russell (1926, p. 331) noted: "There has been a tendency, not uncommon in the case of a new scientific theory, for every philosopher to interpret the work of Einstein in

for philosophers working within the tradition of analytic philosophy, the rejection of idealism by the tradition's founding fathers such as G. E. Moore and Bertrand Russell precipitated the need to deal with the arguments their idealist predecessors and contemporaries such as F. H. Bradley and J. M. E. McTaggart had offered against the reality of time.<sup>73</sup> Each of these traditions has its own history and own way of approaching issues in the philosophy of time. In terms of categorizing issues in the philosophy of time, I will begin with one particularly influential framework for understanding these issues that comes out of the analytic tradition. This framework relies upon terminology apparently<sup>74</sup> first introduced by Richard Gale in 1967, when he distinguishes the "A-theory of time" from the "B-theory of time".<sup>75</sup> It is this distinction that I discuss in the next section.

### 2.1.2 *The A-Theory and B-Theory*

Gale divided philosophers of time into two basic camps based on their adherence to either the A- or B-theories of time.<sup>76</sup> This terminology of "A-theory" and "B-theory"

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accordance with his own metaphysical system, and to suggest that the outcome is a great accession of strength to the view which the philosopher in question previously held." Among Anglo-American philosophers, the positivist tradition represented by Carnap (1966), Reichenbach (1958), Grunbaum (1963), Sklar (1974), and Friedman (1983) is perhaps most influential. Ryckman (2005) is an important account of the history of philosophical interpretations of relativity that emphasizes transcendental idealist interpretations of modern science as an alternative to the positivist tradition. It is worth noting that Whitehead (1919, 1920, 1923) and Broad (1923), which are significant sources for the view of time that I am defending in this essay, are also primarily concerned with working out the philosophical consequences of the new physics.

<sup>73</sup> Besides the work of Gale discussed in the next section, Dummett (1960) was particularly influential in reviving interest in McTaggart's argument among analytic philosophers

<sup>74</sup> As far as I can discover, Gale is the first to have used this terminology. I contacted Gale himself to confirm this fact, and he reports being uncertain as to whether he was the first person to introduce these terms for distinct theories of time.

<sup>75</sup> Gale (1967), Section II, "Introduction", pp. 65-85.

<sup>76</sup> Gale also listed a third camp, the "Either-Way-Will-Work" theory, according to which the A-theorist and B-theorist's descriptions of the world are intertranslatable, and there is no

was derived from McTaggart's earlier distinction between two ways or "series" in which positions in time seem to be ordered.<sup>77</sup> According to McTaggart, the "A-series" consists of positions in time considered as possessing the ever-changing characteristics of being past, present, or future. His "B-series", by contrast, consists of positions considered as ordered by the permanent relations of "earlier-than" or "later-than".<sup>78</sup> According to Gale, the B-theory consists of the following four "tenets":<sup>79</sup>

- (1) "The A-Series is reducible to the B-Series since A-determinations [the characteristics of being past, present, or future] can be analyzed in terms of B-relations [earlier-than, simultaneous-with, later-than] between events."
- (2) "Temporal becoming is psychological since A-determinations involve a B-relation to a perceiver."
- (3) "The B-Series is objective, all events being equally real."
- (4) "Change is analyzable solely in terms of B-relations between qualitatively different states of a single thing".

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objective fact as to which one "really" represents the world as it is in itself. It is an unfortunate fact that modern variations of this view seem to be gaining currency in the philosophy of time. Savitt (2002), for example, argues that the theories of time of C. D. Broad and D. C. Williams, a paradigmatic A-theorist and a paradigmatic B-theorist respectively, are in fact indistinguishable at a certain level of analysis, and thus there is no genuine disagreement between them.

<sup>77</sup> McTaggart first published his famous argument for time's unreality, of which the distinction between the A-series and B-series is a key component, in his 1908 article, "The Unreality of Time". This article served as the basis of the more developed version of the argument in Chapter XXXIII of Vol. II of *The Nature of Existence*, published in 1928. McTaggart may have had a version of this argument in the early 1890s, when he argued for the unreality of time in the presence of G. E. Moore and Bertrand Russell. See Moore (1942), pp. 13-14, in which Moore describes his first meeting with McTaggart. It is not clear, however, whether the argument offered by McTaggart on this occasion was a version of the argument for which he later became known, or one of the other standard temporal paradoxes extant in the British Idealist tradition. For further discussion of McTaggart's argument, see Chapter Three.

<sup>78</sup> The description of these as two distinct "series" is somewhat misleading, as the ordering generated by one method is exactly the same as the ordering generated by the other. The point is, however, that they are two distinct ways of thinking about the ordering of events in time.

<sup>79</sup> Gale (1967), p. 70.

By contrast, the A-theory consists of the following contrasting tenets:<sup>80</sup>

- (1) “The B-Series is reducible to the A-series since B-relations can be analyzed in terms of A-determinations”.
- (2) “Temporal becoming is intrinsic to all events”.
- (3) “There are important ontological differences between the past and future”.
- (4) “Change requires the A-series”.

Since first introduced, this terminology has become widely disseminated in the literature on the philosophy of time, and is still widely used<sup>81</sup>, even though many have come to reject its adequacy over the past decade.<sup>82</sup> The two dominant theories in the current literature, presentism and four-dimensionalism, are often taken to be the current leading versions of an A-theory and a B-theory, respectively.

There are a number of problems with the A-theory/B-theory framework, however. Gale himself notes that it is difficult to find tenets that are characteristic of all of the people he wants to classify as “A-theorists”<sup>83</sup>, and indeed, it is actually difficult to find anyone who explicitly endorses all four of the listed tenets. The “B-theory” fares somewhat better and, indeed, all four tenets are typically held by four-dimensionalists, for example. It might be better to think that rather than there being one “A-theory”, there are simply a number of different ways of rejecting the B-theory, and that each of the opposing tenets is meant to mark one way of doing so. However, there are other theses

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<sup>80</sup> Gale (1967), p. 77.

<sup>81</sup> Often the terms “tensed theory” and “tenseless theory” are used synonymously with “A-theory” and “B-theory”.

<sup>82</sup> Tooley (1997) contains influential criticisms of the inadequacy of presentations of views in the philosophy of time that divide the landscape neatly into two opposed camps.

<sup>83</sup> After listing examples of prominent “A-theorists”, Gale notes that “These men have far less in common than the defenders of the B-theory, making it more difficult to abstract a set of common tenets from their writings”. Gale (1968), p. 24.

central to four-dimensionalism that are not listed as part of the “B-theory”, such as the thesis that objects persist through time by having temporal parts analogous to spatial parts<sup>84</sup>, or the thesis that time, like space, is isotropic, and thus has no inherent direction.<sup>85</sup> There are examples of prominent “B-theorists” who reject both of these theses.<sup>86</sup> Besides suggesting that “the B-theory” is not the name of a single theory any more than “the A-theory” is, this fact leads one to question why these four tenets are singled out as marking the major division of theories in the philosophy of time, as opposed to some of the other issues that “B-theorists” disagree upon. If we group philosophers by theories of persistence, for example, the categorization of philosophers looks somewhat different from grouping them by theories on the analytic priority of A-determinations versus B-relations, for example.

There are a number of problems with the tenets themselves, at least as stated by Gale. If one considers Tenet 1 of the B-theory alongside Tenet 1 of the A-theory, one notes that, while contraries, these tenets are not contradictories. One might very well hold that both A-determinations and B-relations are primitive and unanalyzable, or perhaps that one or both are analyzable in terms of something other than the other one. Tenet 3 of the B-theory seems to conflate the idea that the B-series ordering is objective (which I believe very few would deny, even if they might not believe it is irreducible) with the idea of the ontological parity between past, present, and future. Tenet 3 of the A-theory mentions an “ontological difference” between past and future, when, for example, the ontological privileging of the present seems much more characteristic of those usually considered “A-theorists”. In fact, it is not clear that one needs to think that there are

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<sup>84</sup> This thesis is discussed in Section 2.7.

<sup>85</sup> This thesis is discussed in Section 2.6.

<sup>86</sup> Hugh Mellor rejects the doctrine of temporal parts, while Nathan Oaklander rejects the isotropy of time.

“important ontological differences between the past and future” at all, though clearly they reject the contrasting Tenet 3 of the B-theory.<sup>87</sup> Tenet 4 of the B-theory seems to mark a contrast with Tenet 4 of the A-theory over different theories of “change”, but, as I shall be arguing later in this chapter, the word “change” is ambiguous between two distinct aspects of time, and what is typically thought of as the “B-theory of change” does not actually conflict with what is usually thought of as the “A-theory of change”, as they are accounts of distinct phenomena.

The overall problem with the A-theory/B-theory classification, or any attempt to categorize theories of time into two broad classes, is that the “tenets” represent positions on issues that, if not completely logically independent, have at least fairly complicated logical relationships to the issues used to define other tenets of the theories, such that one’s position on one of the issues does not commit one to a particular position on the other issues. The terminology of “A-theory” and “B-theory”, thus, tends to obscure the boundaries between these distinct issues. In particular, it is often unclear in disputes between “A-theorists” and “B-theorists” whether the main issue at stake is whether A-determinations are an irreducible feature of the world or the question of whether the passage of time is an objective feature of the world. It is one thing to accept that being present is an irreducible characteristic that certain entities possess, while it is another thing altogether to accept that there is some sort of temporal passage whereby different entities come to possess that characteristic. Similarly, there seems to be no reason to suppose that objective passage requires such characteristics. Michael Tooley is an example of a philosopher of time who at least purports to accept that temporal passage is objective but who offers an analysis of A-determinations.<sup>88</sup> The overarching lesson of

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<sup>87</sup> It is actually not clear to me that the presentist needs to accept *any* of the tenets of the “A-theory” as Gale describes them.

<sup>88</sup> See Tooley (1997), especially Part III.

this is that there are a wide variety of possible theories of time that can be generated by different combinations of responses to fundamental issues in the field, and it is misleading to frame the debates as between two basic and fundamentally opposed theories.

Despite these misgivings, Gale's tenets do capture important distinctions among various theories of time, and can serve as an important starting point for trying to understand various fundamental issues that separate these theories. The starting point for the framework to be developed in this essay will, however, not be Gale's distinction, but the earlier though also influential categorization of temporal phenomena provided by C. D. Broad, another philosopher whose work was heavily inspired by McTaggart.

### *2.1.3 Broad's Three Aspects of Time*

McTaggart published his mature metaphysical views in a massive and complex two-volume work entitled *The Nature of Existence*. It is a rather unfortunate fact that the only chapter of this work that is commonly read today is the chapter in which he presents the revised version of his argument for time's unreality. C. D. Broad, McTaggart's close friend and literary executor, as well as a distinguished philosopher of science, felt McTaggart's work important enough that he wrote a three-book commentary on McTaggart's work, his *Examination of McTaggart's Philosophy*.<sup>89</sup> Unsurprisingly, the only chapter from Broad's commentary that is commonly read today is his response to McTaggart on the unreality of time, entitled "Ostensible Temporality". In it, Broad offers an account of the phenomenology of time which identifies three basic sets into which all temporal features of the world of naïve experience are supposed to fall.<sup>90</sup> The first set of

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<sup>89</sup> Another important account of McTaggart's thought from a somewhat different perspective than Broad's, is provided by Peter Geach's *Truth, Love, and Immortality: An Introduction to McTaggart's Philosophy*.

<sup>90</sup> Broad (1938), Vol. 2, Pt. 1, Chap. XXXV, pp. 261-288.

characteristics comprises those that ground the fact that everything we experience has some duration. Nothing that we experience is given to us as instantaneous. The second set of characteristics comprises those that ground the fact that everything we experience seems to stand in temporal relations to other things that we experience. Of any two things we experience, either one wholly precedes the other by some (perhaps zero) duration or there is some (perhaps complete) temporal overlap between them. Lastly, Broad delineates those characteristics involved in the fact that everything we experience is such that it seems to begin as something not yet experienced in the distant future, and then becomes less and less remote, until it finally occurs, and then proceeds to become something which is increasingly remote in the past. For example, we anticipate attending a friend's birthday party as the date becomes nearer and nearer, until it finally arrives and we enjoy the event while it occurs, and then remember it fondly as the experience fades further and further into the past.

The first two characteristics Broad groups together, labeling them "The Extensive Aspect of Temporal Facts". To the third set of characteristics Broad assigns the name "The Transitory Aspect of Temporal Facts". It is in virtue of the Extensive Aspect, Broad suggests, that time can be considered as analogous to space, while the Transitory Aspect is supposed to mark out those features of time which distinguish it from space. There are several problems with Broad's classification which suggest the need for modification. First, while it is probably reasonable to suggest that there is some sort of similarity between the fact that we experience entities as having duration and the fact that we experience entities as extended in space, to assimilate duration as a kind of extension seems inappropriate at the level of phenomenological classification. Similarly the fact that entities in our experience are connected by temporal relations would only suggest analogy with space if we reject the *prima facie* dissimilarities between temporal relations and spatial relations. Thus it seems to me that we should keep separate the two sets of phenomena that Broad groups together as the "Extensive Aspect". As for the "Transitory

Aspect”, it also seems to me to conflate two distinct sets of phenomena that should be kept separate. On the one hand, we have the *prima facie* distinction between those entities that are past, those that are present, and those that are future. On the other hand, we have the fact of transition whereby what begins as future *becomes* present and then past. While it is true these phenomena seem closely related, they are nonetheless distinct. Lastly, a fifth set of temporal phenomena, not mentioned at all by Broad, concerns the fact that we experience certain entities as recurring from one time to another, while there are nonetheless differences between what occurs at one time and what occurs at another.

Thus, I suggest, we should actually distinguish between five basic sets of temporal phenomena associated with ordinary experience and conception of time, which, in the spirit of Broad’s classification, I will refer to as “Aspects of Time”.<sup>91</sup> These five aspects can be roughly characterized as follows:

- 1) **The Tensed Aspect:** Time as we experience it exhibits a division into past, present, and future.
- 2) **The Transitory Aspect:** Time as we experience it possesses a feature that is commonly referred to as transition, passage, becoming, or flow.
- 3) **The Structural Aspect:** Time as we experience it involves an ordering of entities connected by various sorts of temporal relations.
- 4) **The Durational Aspect:** Time as we experience it involves at least certain entities taking up some amount of time.
- 5) **The Differential-Repetitive Aspect:** Time as we experience it exhibits dissimilarities between what is at one time one time and what is at another, and yet also exhibits a certain recurrence of what is at one time at other times.

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<sup>91</sup> The phrase “Aspects of Time” also invokes the title of an influential book on the philosophy of time by George Schlesinger.

Whereas the main focus of the later chapters of this essay will be on the first two aspects of time, I will discuss each of the five aspects in more detail and present some of the basic issues associated with them in the subsequent sections of this chapter.

## 2.2 The Tensed Aspect of Time

Among the basic temporal features of the world that we should take as data to be taken into account by any successful philosophical theory of time, there is the fact that some things are presented to us as past, others as present and yet others as future. This distinction is what I am calling “the tensed aspect of time”. There are at least two major philosophical issues with regard to understanding the tensed aspect of time. The most fundamental issue concerns what sort of analysis we are to give of this distinction. There are a variety of accounts that one might give of this particular aspect of time, but they can be classified into four basic approaches:

- 1) **Tense Fundamentalism:** Tense fundamentalism holds that pastness, presentness, and futurity are ineliminable features of basic ontological concepts such as existence or exemplification or that there are distinct “tensed properties” such as “having been red” or “being presently red”.
- 2) **Tense Primitivism:** Tense primitivism holds that pastness, presentness, and futurity are simple, indefinable properties possessed by certain entities.
- 3) **Tense Reductionism:** Tense reductionism holds that the distinction between what is past, what is present, and what is future corresponds to an objective distinction, but one that can be analyzed in other terms.
- 4) **Tense Relativism:** Tense relativism holds that the distinction between what is past, what is present, and what is future does not correspond to an objective distinction, but to one that can be analyzed only as a relation to other kinds of entities.

Tense fundamentalism is perhaps best motivated by the fact that it corresponds very naturally to the way in which the distinction between past, present, and future is represented in many natural languages. Proponents of “tensed facts” and “tensed properties”, or those philosophers such as E. J. Lowe who emphasize the importance of “taking tense seriously” to solving problems in the philosophy of time be interpreted as proponents of tense fundamentalism.<sup>92</sup> The most prominent version of tense primitivism is a version of the so-called “moving spotlight” conception of time, which will be discussed in Chapter Three. Tooley explicitly endorses tense reductionism, and some presentists are best interpreted as holding this sort of view.<sup>93</sup> Tense relativism is basically Gale’s Tenet One of the B-theory, and is widely held among contemporary philosophers, particularly among four-dimensionalists.<sup>94</sup>

The second major issue regarding the tensed aspect of time concerns the relevance of the distinction between past, present, and future to our ontological inventory. There exist eight major possibilities as to the bearing of this distinction on ontological status:

- 1) **Omnitemporalism:** That which is past, that which is present, and that which is future all have ontological status.
- 2) **Afuturism:** That which is past and that which is present have ontological status, but that which is future does not.
- 3) **Apresentism:** That which is past and that which is future have ontological status, but that which is present does not.

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<sup>92</sup> See Lowe (1998), Chap. 4 and Lowe (2002), Chap. 17. As Dainton (2001), Chap. 5 notes, it is very difficult to figure out what the ontological import of Lowe’s view actually is.

<sup>93</sup> An example would be presentists who grounds truths about other times in terms of presently existing evidence for claims about other times rather than in tensed entities.

<sup>94</sup> Russell (1915) is the ancestor of most of the temporal relativist views.

- 4) **Pastism:** That which is past has ontological status, that which is present and that which is future do not.
- 5) **Apastism:** That which is present and that which is future has ontological status, but that which is past do not.
- 6) **Presentism:** That which is present has ontological status, but that which is past and that which is future do not.
- 7) **Futurism:** That which is future has ontological status, but that which is present and that which is past do not.
- 8) **Atemporalism:** Nothing that is past, present, or future has ontological status.

Of these options, Apresentism, Pastism, and Futurism have never, to my knowledge, been seriously upheld by any philosophers. Given that they deny existence to anything present, including one's present mental states, they seem to have little to recommend them. Atemporalism is basically the view held by McTaggart and others that the entire temporal world is an illusion. Apastism has received relatively little attention in recent literature, though Michael Dummett attributes the view to C. I. Lewis, A. J. Ayer, and Jan Lukasiewicz, all of whom apparently held versions of the view at one time on epistemological grounds.<sup>95</sup> Presentism, as I have said, is one of the two most prominent contemporary approaches to the nature of time. Omnitemporalism is a thesis entailed by the other most prominent theory, four-dimensionalism, though it is also held by others who are not strict four-dimensionalists. Afuturism is a component thesis of accretivism, the view that I am defending.<sup>96</sup>

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<sup>95</sup> Dummett (2004), pp. 75-77. The basic argument is based on a verificationist principle. The central premise is statements about the past cannot be verified if they are irreducible to statements about the present, whereas statements about the future can be verified by simply waiting long enough to see what happens.

<sup>96</sup> There are countless other views that one might hold on the ontological status of the past, present, and future. One might, for example, hold that only the present plus the past five minutes has ontological status, or that a two second period four million years in the future has ontological status. I will, for the most part, ignore these views, though it worth noting that Barry

The relationship between the issue of the analysis of tense and the issue of the ontological relevance of distinctions of tense is quite complicated, and there are a number of different ways of combining views on each individual issue. There are examples of omnitemporalist views, for example, that embrace tense fundamentalism<sup>97</sup>, tense primitivism<sup>98</sup>, and tense relativism<sup>99</sup>. In the rest of this section, I will discuss the issue of the analysis of tense and the issue of the ontological relevance of distinctions of tense in more detail.

### 2.2.1 *The Analysis of Tense*

In many natural languages, including English, one of the most important ways in which the distinction between past, present, and future is manifested is in the use of temporal markers, or *tenses*, on verbs. This fact is of particular interest for ontology in that one of its primary concerns is the family of concepts expressed in English by the verb ‘to be’. One very natural question for the ontologist to ask, then, is to what difference in the world these differences in tense of ‘to be’ correspond. We say, for example, that there *are* elephants, but that there *were* dinosaurs. What is the significance of this distinction for ontology? One possibility is that these distinct forms of ‘to be’ correspond to distinct forms of *being* that are primitive and unanalyzable. On such a

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Dainton (2001, Chap. 5) argues that a view which he calls “compound presentism”, according to which what has ontological status extends past the present into the immediate past, should be taken as a serious option in the philosophy of time. It is also worth noting in this context Quentin Smith’s “degree presentism”, which accepts that only the present has full ontological status, while other times have lesser degrees of ontological status depending upon their distance from the present. See Smith (2002).

<sup>97</sup> An omnitemporalist tense fundamentalist would hold that past, present, and future all have ontological status, even though past-tensed ontological status is different from present or future-tensed ontological status.

<sup>98</sup> The main version of the moving spotlight view discussed in Chapter Three is an example of this.

<sup>99</sup> This is the standard position of most four-dimensionalists.

view, *being* itself, and not just our linguistic representation of it, is irreducibly tensed. This is the basic idea of the view I am calling “tense fundamentalism”.

The doctrine of tense fundamentalism can be made clearer by consideration of an ideal language. According to tense fundamentalism, the ideal language, like various natural languages, will be a tensed language. In other words, certain symbols will be differentiated from other symbols by a temporal marker that identifies them as being past, present, or future tensed.<sup>100</sup> Assume for the moment that standard predicate logic is an ideal language, and that the version of tense fundamentalism that we are considering is one that holds that existence (and thus the existential quantifier) is irreducibly tensed. Now consider our above statements about dinosaurs and elephants. A tense fundamentalist might hold then that we should represent the difference between elephants and dinosaurs roughly as follows:

1.  $\exists^{\text{Pres}}x[(\text{Elephant}(x))]$
2.  $\exists^{\text{Past}}x[(\text{Dinosaur}(x))]$

In this example, the past-tensed quantifier which applies to dinosaurs is distinguished from the present-tensed quantifier which applies to elephants. The ideal language would then contain quantifiers that correspond to each irreducible tense.

Variations of the view can be developed to coincide with other accounts of existence. For example, if one holds that existence is a property, one might hold that there are different existence-properties that correspond to each tense, and thus would represent this with different existence-predicates for each tense of existence. One might

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<sup>100</sup> One might perhaps maintain the need for tenses beyond the basic three, but I will ignore this possibility.

then suggest that a more perspicuous way of representing the truthmakers for the sample assertions is this<sup>101</sup>:

1.  $B^{\text{Pres}}a$  and  $Ea$
2.  $B^{\text{Past}}b$  and  $Db$

In this case, “B” stands for the property of existence (“being”), and “a” and “b” represent some individual elephant and dinosaur, respectively. In general, what for whatever device one uses to represent existence in an ideal language, a tense fundamentalist would need different forms of this device to represent each of the different tenses of ‘to be’.

Even if we hold, as seems to me correct, that existence is not itself a constituent of the world, and thus that there are no “existence-facts”,<sup>102</sup> it is possible to maintain tense fundamentalism with regard to existence. Properly speaking, on such a theory existence will not be represented in an ideal language at all. Instead, our existential commitments would “show” themselves in our choice of an ideal language rather than being stated in that language. If such a view is combined with tense fundamentalism with regard to existence, then distinctions in tense would have to show themselves in the ideal language as well. Perhaps, for example, one might represent those particulars having present-tensed existence with a different font than those having past-tensed existence, or one could assign all particulars having present-tensed existence a subscript number and all having past-tensed existence a superscript number. The following is an illustration of the latter method as applied to our sample sentences:

1.  $Ea_1$
2.  $Da^1$

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<sup>101</sup> For convenience, I have followed the convention of using multiple tokens of “a” and “b” within sentences to stand for single individuals, which, technically, one should not do in an ideal language as I conceive of it. See Section 2.6.

<sup>102</sup> *Pace* Russell (1918), Lecture V.

The difference between past, present, and future existence would thus be expressed in altering the symbol used, but not in such a way as to constitute a categorical difference among entities on the level of the distinction between particulars and properties.<sup>103</sup> It seems to me that whatever account of existence one holds, one can be a tense fundamentalist with regard to existence.<sup>104</sup>

I have been focusing on the use of ‘to be’ to represent existence, but the case of other basic meanings of ‘to be’, such as exemplification, is similar. We say that I *was* a child, but that I *am* an adult. One might be a tense fundamentalist by holding that it is this distinction between two different modes of exemplification that are irreducibly modified by tense. One might symbolize this by using “–” to represent the nexus of exemplification, so that

1. C<sup>pres</sup>a
2. C<sup>past</sup>a

would represent the difference between *a*’s currently being a child, and *a*’s having been a child, respectively. A slightly different but related form of tense fundamentalism holds that while exemplification may not be tensed, there are “tensed properties”, such as “having-been-a-child” or “being-presently-a-child” or “being such that Caesar once crossed the Rubicon”<sup>105</sup>. On these views, the tense modifiers are pushed into properties

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103 “a<sub>1</sub>” and “a<sup>2</sup>” are not of different categories because they are grammatically interchangeable. “Ea<sub>1</sub>” and “Ea<sup>2</sup>” are both well-formed sentences of the language. One might be tempted to say that, on such a view, the distinction between past, present, and future particulars marks a sub-category of the category of particulars. One might also hold a view, however, in which the distinction between past, present, and future entities cuts across categories.

104 This illustrates what seems to me an important point, namely that the Ideal Language Method should itself be neutral among substantive ontological theses. One’s choice of a particular ideal language should rule out various ontological options; one’s adoption of the method should not. The usefulness of the ideal language method lies in the clarity it brings to ontological theses and arguments, not in the fact that it itself solves ontological problems.

105 This kind of tensed property is suggested as a truth-maker for statements about the past on some presentist views. See **Section 3.3** for discussion of this sort of view.

rather than being a feature of the mode of exemplification. Using our earlier convention of using a subscript to represent the present-tense and superscript to represent the past-tense, we might then symbolize this as follows:

1.  $C_1a$
2.  $C^1a$

Again, the first case represents *a* possessing the tensed property of being-presently-a-child, while the second represents *a* possessing the tensed property of having-been-a-child.

Tense fundamentalism has a certain appeal due to its modeling the treatment of time in ontology on one of the major ways of treating time in natural language. Nonetheless it is rather strange view. While it is perfectly intuitive to say that elephants *exist* and dinosaurs *existed*, or that I *was* a child and I *am* an adult, once we move to the level of ontology it seems extremely odd to take these distinctions as primitive, as though dinosaurs have some strange kind of existence of the past-tensed sort that is different than the kind of existence that elephants have, or as though I exemplify the property of childhood in some past-tensed way that is different from the way in which I exemplify adulthood. While there may be different kinds of *existents*, it is difficult to understand what exactly it would mean for there to be different kinds of *existence*. Similarly, the notion that having-been-a-child is a genuine property distinct from the property of being-presently-a-child seems rather strange as well. If one assumes a moderate realism about properties,<sup>106</sup> in which not every predicate of natural language corresponds to a genuine property, then one should be suspicious of such tensed properties. Such a property as having-been-a-child does not seem to be an empirically detectable characteristic of my current self, nor does it seem to play any explanatory role in my behavior or my effects

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<sup>106</sup> Armstrong (1978) is the *locus classicus* of moderate realist views.

upon other things.<sup>107</sup> This is not to say that there might not be reason to accept such properties, if, for example, positing their existence is the only way to solve various philosophical problems. However, it should at least suggest a presumption against them.

Can anything be said against tense fundamentalism other than an instinctive commitment to the univocity of the basic meanings of ‘to be’ or a suspicion of tensed properties? One thing worth pointing out is that the use of tense seems to be very much an accidental feature of certain languages. There are other languages, Chinese for example, in which verbs are not inflected in the way they are in English. As P. A. D. Forrest describes the situation in *The Chinese Language*:

Chinese words being, as we have said, invariable in form the verb is incapable of change to indicate person, number, tense or mood... The tense and mood, or the temporal relations and shades of affective meaning which in inflected language are marked by verbal tenses and moods, are again either unexpressed and left to be gathered from the surrounding circumstances (including adverbs of time, etc.) or may be brought out by participles subjoined to the verb, many of these being still recognizable as auxiliary verbs with such meaning as ‘finish’, ‘pass’ (of a past time), ‘wish’, ‘need’ (of the future; cf. the development of a periphrastic future in the Germanic languages)...

If this absence of a regular expression of temporal relations seem a deficiency in Chinese, one has only to observe how seldom one is left in doubt whether English verbs as ‘beat’, ‘set’, ‘put’, with no change of form to show past time, refer to the past, present or future.<sup>108</sup>

Whereas in English we would make a distinction between “I *went* to the store”, “I *am going* to the store”, or “I *will go* to the store”, in Chinese one simply says something that can be transliterated roughly as “I *go* store” for each of these situations, with the context or extra words added to the sentence (e.g., “*Tomorrow*, I go store”) used to indicate the time at which the action takes place. While this certainly not a decisive argument against

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<sup>107</sup> Of course, such things as my memories of having been a child, or the effects of various childhood experiences upon my current self might play such an explanatory role.

<sup>108</sup> Forrest (1948), pp. 63-64.

tense fundamentalism (perhaps inflected languages such as English simply represent the structure of reality better than Chinese does), it does somewhat undercut the appeal of tense fundamentalism based on its connection to natural language.

In fact, it is difficult to find philosophers who explicitly embrace tense fundamentalism as I have described it. However, many philosophers seem implicitly committed to it in their discussions of time. Often, it is remarked that puzzles regarding time such as McTaggart's paradox<sup>109</sup> or the problem of temporary intrinsics<sup>110</sup> arise from failing to pay attention to tense, and can simply be solved by the use of tensed expressions. For example, once it is pointed out that a banana *was* green and *is now* non-green, this supposedly solves the problem of temporary intrinsics, i.e., the puzzle of how the banana can be both green and non-green over time. But unless one explains how one understands the ontology of the banana's having been green and now being yellow, then there really is no solution offered, unless we take the philosopher to be making a primitive ontological distinction between two kinds of exemplification, one marked by "is" and another marked by "was".

If one rejects tense fundamentalism, one must hold a view according to which when one renders tensed occurrences of 'to be' or other verbs into an ideal language, we must analyze those occurrences into two components, one of which expresses the nontemporal content and the other of which expresses the temporal content. One effectively separates what is expressed by the tense from the rest of the meaning of the verb. In the case of 'to be', how this manifests itself in practice will again depend upon how its various senses are to be represented in the ideal language. Suppose again that we take standard predicate logic to be an ideal language. One might then suggest the

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<sup>109</sup> McTaggart's Paradox is discussed in more detail in Section 3.4.

<sup>110</sup> The problem of temporary intrinsics is discussed in more detail in Section 2.6.

following as a more ontologically perspicuous representation of the facts about elephants and dinosaurs:

1.  $\exists x[\text{Elephant}(x) \text{ and Present}(x)]$
2.  $\exists x[\text{Dinosaur}(x) \text{ and Past}(x)]$

In this example, the quantifiers represent ontological status, which itself is depicted as a kind of entity, while the temporal content is represented by the predicates of pastness and presentness, which are taken to stand for properties of individuals. This account, thus, is a version of *tense primitivism*, as it holds that there are such properties as “presentness” and “pastness”.<sup>111</sup> There are, again, a number of different accounts one could give of how the temporal content and nontemporal content of “to be” should be represented in an ideal language. The important point for present purposes is that the nontemporal content of tensed forms of ‘to be’ *can* and *should* be separated from the temporal content in an ideal language, and, as so abstracted, what represents the nontemporal content no longer represents the temporal content, and is thus in itself *tenseless*. However one construes the temporal content of tensed assertions, it does not represent different forms or modes of being. Dinosaurs, if they are included in our ontological inventory at all, have ontological status in exactly the same sense as elephants.

What characterizes tense primitivism as opposed to other views that reject tense fundamentalism is the idea that the temporal content, once separated from the rest of the analyzed verb, is taken to represent a property of pastness, presentness, or futurity, which is exemplified by some entity.<sup>112</sup> Thus the ideal language will require predicates that

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<sup>111</sup> Note that “pastness” and “presentness” are not tensed entities. Being-presently-past or Having-been-present would be tensed properties, but pastness and presentness as conceived in this example are not.

<sup>112</sup> It is not necessarily the case that these properties will be taken by the tense primitivist to monadic. J. M. E. McTaggart, for example, believed that if such characteristics applied to anything at all, they would have to be relations between entities in time and some

stand for properties of pastness, presentness, and futurity.<sup>113</sup> Tense Reductionism and Tense Relativism, by contrast, both hold that the notions of pastness, presentness, and futurity do not correspond to unanalyzable properties, but can in fact be analyzed. The basic difference between tense reductionism and tense relativism is whether these distinctions are to be analyzed in terms of something objective or something that varies relative to other entities. According to the tense reductionist, there are objective though analyzable facts about what is present, past, or future, whereas according to the tense relativist, one can only speak about something's being past relative to something else, present relative to other things, and future relative to yet other things.

As an example of a tense reductionist view, consider Broad's claim that "A Specious Present of mine is just the last thin slice that has joined up to my life-history". This suggests an account of something's being present such that for that thing to be present is simply for it to exist but to have nothing that exists later than it, while for something to be past is for that thing to exist but to be earlier than something else. So our statements about elephants and dinosaurs in predicate logic would be roughly as follows:

1.  $\exists x \sim \exists y [\text{Elephant}(x) \text{ and } (x \text{ Precedes } y)]$
2.  $\exists x \{ \text{Dinosaur}(x) \text{ and } \exists y [\text{Elephant}(y) \supset \sim \exists z (y \text{ Precedes } z)] \}$

This account relies upon an assumption of afuturism.<sup>114</sup> Recall that for an afuturist, there does not exist anything that is future, so the analysis of statements about something's

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particular entity outside the time series. Since such a view would have an absolute standard as to what counts as past, present, or future, it would be compatible with afuturism. See McTaggart (1928), p. 19, though his reasons for holding this view are not particularly clear.

<sup>113</sup> More precisely, a tense primitivist will hold that at least one of these predicates must occur in an ideal language. Perhaps there is only the property of presentness, and something's being past could be analyzed in terms of its being prior to something that possesses the property of being present, or one could possibly be a tense primitivist and be a presentist, in which case every temporal thing that existed would possess the property of being present. Such views would still count as versions of tense primitivism.

<sup>114</sup> One may worry about circularity here, in that our attempt to analyze the predicates "past", "present", and "future" are presupposing a doctrine that makes use of these concepts in

being future (e.g. “Martian colonies are in the future”) will be somewhat more complicated.<sup>115</sup> The basic idea, however, is that one can give an account that maintains the objectivity of assertions about what is past, present, or future without either tensed entities or properties of pastness, presentness, or futurity.

The tense relativist, by contrast, understands assertions about what is past, present, or future only relative to some other entity. When I assert that elephants *exist* while dinosaurs *existed*, the difference between those two states of affairs will be understood in terms of the elephants being-present-with-respect-to-*x* and dinosaurs being-past-with-respect-to-*x*, while it might very well be the case that dinosaurs are present-with-respect-to-*y* and elephants are future-with-respect-to-*y*. One cannot assert in absolute terms whether something is present, past, or future, but things bear these characteristics only with respect to something else. The characteristics of pastness, presentness, and futurity are then effectively taken to be reducible to the “B-relations” of “earlier-than”, “simultaneous-with”, and “later-than”. For something to be past with respect to *x* is for it earlier than *x*, for it to be present with respect to *x* is for it to be

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the statement of the doctrine. It is important to realize that while afuturism does state that what exists is either past or present and nothing that is future exists, it is not offering an analysis of what it is to exist. If the doctrine was that “to exist” means “to be past or present”, then there would be a problem of circularity. The most plausible version of afuturism, as I understand it, takes existence as a primitive, and then makes the factual assertion that everything that exists is either past or present.

One might also worry about whether afuturism simply becomes tautologous on this account, since it seems that we have defined “past” and “present” in such a way that they are mutually exclusive and exhaustive categories. The response to this would be that what we are dealing with here are *real definitions* rather than *nominal definitions*. What we are concerned with is what, as a matter of fact, it is to be present or past and not the analysis of our language or our concepts. As a matter of fact, these two categories do exhaust what exists, the afuturist might argue, so it should not be surprising that their real definitions turn out to be exhaustive of what could possibly exist. This response ignores another problem, which is that the account does not allow the possibility that there be *atemporal* entities which are neither past nor present, and effectively classifies such entities as present. One should be able to modify the account to take in this distinction without too much difficulty, however.

<sup>115</sup> I address the issue of statements about the future in Section 3.5.2.

simultaneous with  $x$ , and for it to be future with respect to  $x$  is for it to be later than  $x$ . Different accounts can be given of what exactly plays the role of “ $x$ ”.

A fairly standard tense relativist account would take the  $x$  to be the particular assertion of the statement about what is past, present, or future. Thus if I say that elephants exist while dinosaurs existed, what that means is, roughly speaking, the existence of elephants is simultaneous with my making the statement and the existence of dinosaurs precedes my making the statement. If I spoke the same words tomorrow, that assertion would have a different meaning from today’s assertion, in the sense that it would be saying the elephants exist simultaneously with the later assertion and the existence of dinosaurs precedes *that* assertion. Thus on such a view, words like ‘past’, ‘present’, and ‘future’, as well as future-tensed verbs, are indexical and thus vary in meaning according to the context in which they are used. This makes them similar to spatial words such as ‘here’. If I am in Iowa City, and I say that “It is raining here” I mean that it is raining in Iowa City, whereas if I am in Paris and I say “It is raining here” I mean that it is raining in Paris. Just as something’s being “here” is not an objective feature of the thing in question but can only be understood relative to the location of the speaker, so the tense relativist holds that something’s being present, past, or future is not an objective quality of it but something that can only be understood relative to the temporal location of the speaker. What is present to Julius Caesar is past to me, just as what is here to Joe Biden is somewhere else to me.

This similarity to the spatial case is what makes tense relativism attractive to the four-dimensionalist. Since there does not seem to be any non-relative feature of space on which it would be natural to model the tensed aspect of time, four-dimensionalists have, to my knowledge, all been tense relativists.<sup>116</sup> Presentism and accretivism, by contrast,

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<sup>116</sup> It is not inconceivable that one could be a four-dimensionalist and not be a tense relativist. If one believed, for example, that there was some particular spatial location, some “here”, that was singled out as somehow objectively unique, as the center of the Earth was on

both need to reject tense relativism as they need an objective notion of what is present to make sense of the theories, though are theoretically compatible with any of the other three theories. Presentism does not fit particularly well with tense primitivism, since it has no need to posit properties of pastness, presentness, or futurity to distinguish between things, as everything that exists, according to them, is present. Most presentists, therefore are either tense fundamentalists or tense reductionists. Accretivism fits somewhat awkwardly with tense fundamentalism on ground of ontological parsimony. If one has an actual event of Caesar-crossing-the-Rubicon existing in the past, then there seems to be little motivation to postulate some past-tensed though presently-existing entity along the lines of Caesar's-having-crossed-the-Rubicon. An accretivist, therefore, would most naturally be either a tense primitivist or a tense reductionist, though in practice most seem to go for the latter option, perhaps because of the availability of the kind of afuturist tense reductionist account of the past and present distinction discussed above.

### 2.2.2 *The Ontological Relevance of Distinctions of Tense*

One remarkable feature of natural language is its use of terms where there is no object to which the term corresponds, and, what is perhaps even more remarkable, that we can make true statements using such terms. We can truly say, for example, that the Land of Oz is imaginary, even though there is no Land of Oz.<sup>117</sup> On the surface, the assertion that the Land of Oz is imaginary is of the same form as the assertion that, for example, Joe Biden is bald. It is tempting to say that both, at least *prima facie*, represent the world as containing an object which possesses a certain property. Yet while it seems plausible to maintain that Joe Biden does in fact correspond to a specific entity in the world, the truth of the assertion that the Land of Oz is imaginary seems to presuppose

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Aristotelian cosmology, for example, one might be required by one's four-dimensionalism to think that there is an equivalent objective "present".

<sup>117</sup> For that matter, "being imaginary" is not a genuine property.

that there is no entity that corresponds to “The Land of Oz”. Terms such as “the Land of Oz” which do not in fact stand for anything I will call “non-referring terms”, whereas terms for which there is something for which they stand I will call “referring terms”.<sup>118</sup>

There are at least three distinct questions to be asked regarding non-referring terms:

- 1) How is it possible for us to use non-referring terms?
- 2) How can sentences containing non-referring terms be true?
- 3) Which sentences in ordinary language make use of non-referring terms?

The first question, under which I would include questions about the origin of the ideas expressed by non-referring terms, is primarily a question in the philosophy of mind and language, and I will have little to say about it, other than that I take it as an obvious fact that it is indeed possible for us to use such non-referring terms, and that we do so quite frequently and unproblematically in ordinary language. The second question is one that will be a central concern of this essay, as one of the main objections to various theories of time is that they cannot plausibly account for the truth of certain sentences while maintaining their commitment to the thesis that certain terms within those sentences are non-referring terms. This will turn out to be one of the main issues in evaluating versions of presentism in the next chapter. The third question is closely connected to the second question, and is perhaps the most basic sort of question one doing ontology can ask. I will often express such questions in the form “Does  $x$  have ontological status?”, though this should not be misconstrued as implying that there exist two sorts of things, those with and those without ontological status. To say that  $x$  lacks ontological status is to say that ‘ $x$ ’ is a non-referring term, i.e., that there is no such thing. It is important to note that

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<sup>118</sup> This terminology is somewhat misleading, as there are a variety of views on which the terms in question do in fact make reference. Meinong (1904), for example, held that they refer to non-existent objects, while Russell (1905) held that they made reference to all objects through being disguised quantifications.

to even ask the question of what has ontological status, one must presuppose our ability to use non-referring terms.

In ordinary language we apply the predicates ‘past’, ‘present’, and ‘future’ to a variety of terms. We say of the event of the Japanese attack on Pearl Harbor that it is past, we say of the state of affairs of Barack Obama’s being president that it is present, and we describe our unborn descendants as future generations. The question then arises as to whether the terms to which we apply the predicates ‘past’, ‘present’, and ‘future’ are referring or non-referring. If we reject tense fundamentalism, then if something past such as the attack on Pearl Harbor or something future such as our unborn descendants are to be included among the things which have ontological status, then the sense in which they have ontological status is exactly the same as that of something present, such as Barack Obama’s being President of the United States. Or, more precisely, if there is a difference in the ontological status of these various things, it is not connected to their being past, present, or future.<sup>119</sup> But do past and future things in fact have ontological status? Are there such things as the Japanese attack on Pearl Harbor and our unborn descendants? The thesis of afuturism denies that anything that we would ordinarily describe as future has ontological status, while affirming that those things which we would describe as past or present do have ontological status. More precisely, a complete description<sup>120</sup> of the

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<sup>119</sup> I wish to set aside for the moment the question of whether our ascriptions of temporal characteristics to one or more categories of things is more fundamental than to others, or even whether one category of things is reducible to or eliminable in favor of another category of things. The question at hand is not whether the event of the Japanese attack on Pearl Harbor fails to exist because, fundamentally speaking, there are no events; the relevant question is whether it fails to exist because there are no past things.

<sup>120</sup> The notion of a complete description is itself an idealized notion, in that such a description of the actual world would almost certainly be infinitely complex. It is also important to note, in light of the next section, that the sense in which such a description is complete is somewhat akin to the sense in which one might complete the task of cleaning one’s house. To have completed the task of cleaning one’s house is to have cleaned everything there is to be cleaned, but should not be taken to imply that one’s house will never need cleaning again. Similarly, to completely describe the world is to describe everything that there is to be described. There is an important sense in which this cannot be completed, since what there is to be

world in an ideal language will, according to the afuturist, include a representation of Barack Obama being President and the attack on Pearl Harbor, but will not include anything representing our unborn descendants. Terms, such as “our unborn descendants”, to which we apply the predicate “future” are thus taken to be non-referring terms. It does not follow from this that there are no truths about the future, such that Barack Obama will have a certain number of living descendants in the year 2106, but that, if there are such truths what exists in the future, it cannot be future entities which make true these claims.

Since what exists must be an objective and non-relational matter<sup>121</sup>, according to any view which takes the distinction between past, present, and future to be relevant to one’s ontological inventory<sup>122</sup> there must be an objective and non-perspectival fact as to what can be correctly described as past, present, or future. Thus, all such views must involve the rejection of what I have called Tense Relativism. The other three positions on the analysis of tense seem to be compatible with any of the positions on the ontological significance of tense.

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described, the world, is in a constant state of flux. To have a complete description is not necessarily to have a *permanently* complete description. One should also be careful not to be misled into thinking that because a description is not permanently complete that it is therefore *incomplete*, any more than one should be misled into thinking that because one’s house is not permanently clean that it somehow fails to be clean. One should not think that there is some sort of “God’s eye” view from which there are future entities that the afuturist ontology does not recognize. Even from such a divine vantage point, according to the afuturist, all there is to be described is what is past and present.

<sup>121</sup> Suppose  $x$  exists in relation to  $y$ . Does  $x$ ’s-being-in-relation-to- $y$  exist only in relation to something else? If one answers in the affirmative, then one is launched upon a vicious infinite regress. If one answers in the negative, then it  $x$ ’s-being-in-relation-to- $y$  exists objectively. But if the state of affairs exists objectively, then its constituents, including  $x$ , must exist objectively as well.

<sup>122</sup> This includes any view other than omnitemporalism or atemporalism.

### 2.3 The Transitory Aspect of Time

The distinction between being and becoming<sup>123</sup> is one of the oldest philosophical distinctions, dating back at least to the Pre-Socratics. It received particularly powerful formulation in Plato's philosophy, in which becoming is devalued in favor of being. According to the cosmology of the *Timaeus*, for example, the sensible world is created by the Demiurge from a combination of two primordial factors: the World of Forms, described as "that which is and has no becoming", and a principle of chaos, described as "that which becomes but never is".<sup>124</sup> The sensible world, according to Plato, could only be a proper object of knowledge to the extent that objects in the world "participated" in the Forms, but there was an additional element to the sensible world, an element of becoming, which prevented this world from being an object of genuine philosophical study. Sensible things are, on this view, merely imperfect versions of the eternal, unchanging Forms. Plato's bifurcation of being and becoming into separate "realms" is somewhat comparable to Descartes's bifurcation of mind and matter, and many philosophers have rejected Cartesian dualism, so many have rejected Plato's dualism of being and becoming.<sup>125</sup> Just as the reduction or elimination of mind in favor of matter has been a prominent theme of philosophy for the past century, so has the reduction or elimination of becoming in favor of being.

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<sup>123</sup> I use the words "temporal becoming", "the passage of time", and "the flow of time" interchangeably for the phenomenon that I am calling "The Transitory Aspect of Time". Each of the terms has a slightly different emphasis. For example, "becoming" seems to highlight the transition from future to present, while "passage" seems to highlight the transition from present to past.

<sup>124</sup> See in particular the *Timaeus* 27d-28a.

<sup>125</sup> It is worth noting that even most of Plato's followers rejected the idea that becoming was "really" to be interpreted as something distinct from and independent of being. See Taylor (1926), pp. 442-3 for discussion of this point.

One significant source of this reduction can be found in a certain ambiguity one can find, for example, in Bertrand Russell's *Principles of Mathematics*. After making the claim that Weierstrass had not only rehabilitated Zeno's arguments against change but made them the foundation of modern mathematics, Russell states that

The only point at which Zeno erred was in inferring (if he did infer) that, because there is no change, therefore the world must be in the same state at one time as another.<sup>126</sup>

In a later chapter, Russell asserts that

Change is the difference, in respect to truth or falsehood, between a proposition concerning an entity and a time  $T$  and a proposition containing the same entity and another time  $T'$ , provided the proposition differ only by the fact that  $T$  occurs in one where  $T'$  occurs in the other.<sup>127</sup>

Note that in the first passage the world being in different states at different times is insufficient for the world to be one in which there is change, whereas in the second passage it is definitive of change. How should one resolve this apparent tension in Russell's thought?

One interpretation would be to suggest that in the first passage Russell is rejecting a particular analysis of change (one which he does not explicitly state), and offering a competing analysis in the second passage. Certainly Russell is offering a particular analysis of change in the second passage, one which would be rejected by someone who adopts the perdurantist theory of persistence, for example, as it seems to assume the existence of enduring entities.<sup>128</sup> Such an interpretation would be mistaken, however. In fact, Russell is actually dealing with two distinct phenomena that might be referred to as 'change', one of which is being declared illusory in the first passage and the other of which is being analyzed in the second passage.

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<sup>126</sup> Russell (1903), p. 347.

<sup>127</sup> Russell (1903), p. 469.

<sup>128</sup> See Section 2.6 for this distinction.

These two distinct phenomena are distinguished by Barry Dainton, who begins by describing our ordinary experience of change by appealing to the situation in which are sitting in a deckchair watching the change in position of a bird in flight. He makes the point that we can experience this sort of change in a variety of sensory modalities. Then he draws attention to a distinct phenomenon within our experience:

Return to the deckchair scenario. For some moments you have been staring at an empty region of blue sky and nothing has changed. Your inner monologue has (if only briefly) ground to a halt, you have seen no movement, your visual field is filled with an unvarying expanse of blue. But is your consciousness entirely still or frozen? Have you come to a complete stop? No. Throughout this period you remain conscious, and conscious of the blue presence *continuing on*; you have a (dim, background, passive) awareness of the blue constantly being renewed from moment to moment. This passive awareness is perhaps more vivid in the case of an auditory experience. Imagine hearing a sustained but unwavering note played on a cello: you hear a continuous and continuing flow of sound. This feature—call it “immanent phenomenal flow”—is possessed by all forms of experience (think of the burning sensation on the tongue caused by biting on a chili pepper), and is a dynamic feature of experience that is independent of changes of the ordinary qualitative sort (the chili-induced burning is felt as *continuing on* even when its intensity and qualitative character remains constant).<sup>129</sup>

Dainton’s point is that in most of our ordinary experience of the world we recognize different states of affairs as holding at one time than hold at other times, and such an experience might naturally be called the experience of change. There seems, however, to be another aspect of our temporal experience, what Dainton calls “immanent phenomenal flow”, and the fact that we experience this additional element is highlighted by experiences in which we experience this element without experiencing any variation of states of the world from one moment to the next. It is this “immanent phenomenal flow” that is denied objective reality by Zeno, a denial that Russell believes is vindicated by

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<sup>129</sup> Dainton (2001), p. 94.

Weierstrass. Russell wishes to make the point that denying the reality of this phenomenon does not entail denying the difference in states of the world from one moment to the next.

Dainton's "immanent phenomenal flow" is what I am referring to as the "Transitory Aspect of Time". The second notion of "change" is part of what I am referring to as the "Differential-Repetitive Aspect of Time". A great deal of confusion on this issue is a result of not distinguishing between these two phenomena, or assuming that only one of them deserves to be labeled "change". Thus one who thinks primarily of qualitative difference between times when they think of change will be puzzled by one who describes, as Russell does, a world that has only qualitative difference and no "immanent flow" between times to be an "unchanging" world. Yet it seems perfectly natural to describe it as such. Yet is also perfectly natural to describe the experience that Dainton describes, in which we are aware of immanent flow but not of any qualitative difference from one time to the next as one in which "nothing has changed", as Dainton does. If there is anything that can be described as "our ordinary conception of change", it would seem to include both the "immanent flow" and "qualitative difference" as constituents of it, so that the lack of either of these things would entail the absence of change. It seems, however, that we ordinarily use the word "change" in such a way as to be ambiguous between these two different phenomena, which are typically joined together in our ordinary experience.

The failure to distinguish clearly between the Transitory and Differential-Repetitive aspects often manifests itself in the form of an implicit reduction of the Transitory Aspect to the Differential-Repetitive aspect. This can often be seen in responses to McTaggart's argument against the unreality of time, in which his major objection to the B-series serving as the foundation for time is that the B-series by itself lacks "change". A standard reply to this part of McTaggart's argument by four-

dimensionalists is to claim that the B-series does involve “change”, as there is qualitative variation<sup>130</sup>, whereas McTaggart’s argument is more plausibly interpreted as involving the claim that the B-series by itself is deficient because it fails to incorporate the Transitory aspect.<sup>131</sup>

Those partisans of the notion that the “B-series” is by itself sufficient for time who do make a clear distinction between qualitative difference and temporal passage typically dismiss passage as an illusion or “myth.”<sup>132</sup> A successful account of temporal passage as illusory would require an account of how this illusion is generated. If time does not in fact pass, then why does it seem as though it does? It is surprisingly rare for philosophers who are dismissive of temporal passage to confront this challenge of giving an account of why time seems to pass.<sup>133</sup> It is important to note that giving an account of the “A-determinations” of pastness, presentness, and futurity is not sufficient to give an account of temporal passage, as these are distinct phenomena.

Four-Dimensionalists are typically disposed to reductivist or eliminativist accounts of temporal passage. There is no obvious analogue of temporal passage in the space, so if time is to be understood on analogy with space, then this feature of time must not be a genuine feature of time. One might think that presentists, by contrast, would be partisans of temporal becoming, though as we shall see in the next chapter, there are a variety of versions of presentism that do not require temporal passage. The accretivist

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<sup>130</sup> Sider (2001), pp. 212-6 is a good example of this.

<sup>131</sup> See Chapter 3 for more detailed discussion of McTaggart’s argument.

<sup>132</sup> The phrase “The Myth of Passage” was popularized by D. C. Williams (1951).

<sup>133</sup> Even McTaggart, who spends chapter after chapter of *The Nature of Existence* trying to explain how the illusion of time is generated from an atemporal “C-series”, seems only to confront the challenge of explaining how the origin of the appearance of temporal order, and does not really seem to give an explanation for passage.

view, by contrast, is committed to temporal passage as an objective feature of the world. Together with afuturism, this is constitutive of the view as I have defined it.

To accept temporal passage as an objective feature of the world is not necessarily to embrace Plato's account of how being and becoming are related. An important task for any position which acknowledges the objectivity of passage is to give a coherent account is to give a coherent account of how to understand the notion of passage. Before presenting my own version of how passage is best understood, I will first examine two other recent attempts to characterize the notion.

### 2.3.1 Tooley's Account of the Transitory Aspect

In *Time, Tense, and Causation*, Michael Tooley mounts an impressive defense of a version of the accretivist theory. One of his central goals is to distinguish, as I have done, between the issue of the analysis of tense and the issue of the issue of the "flow of time". Views that recognize the objective reality of the flow of time he labels "dynamic views", while view that deny the objective reality of the flow of time he labels "static views".<sup>134</sup> He defines the issue between the dynamic and static views in terms of "two competing concepts of change"<sup>135</sup>, the concept of change that I have associated with the Differential-Repetitive Aspect of Time and the concept I have associated with the Transitory Aspect of Time, though I have suggested that these are not in fact "competing" concepts, but mark the fact that the word "change" is used to describe two distinct phenomena.

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<sup>134</sup> It is sometimes pointed out that the label "dynamic view" for one which recognizes the objective reality of temporal passage is somewhat misleading, as the idea has very little to do with the term "dynamics" as used in physics. I take it the terminology is not meant to invoke the use of the word in physics, however, but refers more directly to the Greek root *dunamis*, which in Aristotelian philosophy indicates the potentiality for becoming rather than the actuality of being. In recent years the term *dunamis* was used explicitly to refer to a notion similar to Plato's primordial principle of becoming by Paul Weiss. See Weiss (1995).

<sup>135</sup> Tooley (1997), p. 13.

Tooley characterizes dynamic theories as rejecting the notion that change can be understood simply as something's having different properties at different times. He presents the dynamic theory's account of change as follows:

Thus the world as a whole changes, in this second sense, only if the totality of temporal facts, or states of affairs, is different at different times.

But how can the totality of states of affairs be different at different times? The answer is that this will be possible only if, in the case of temporal facts or states of affairs, facts are, fundamentally speaking, *temporally relative*, so that the basic notion is not that of states of affairs being actual *simpliciter*, but that of states of affairs existing, or being actual, *as of* a particular time. And given this temporally relative conception of facts, or states of affairs, there will presumably be nothing problematic about the idea that the totality of facts that are actual as of one time may be different than the totality of facts that are actual as of some other time.<sup>136</sup>

Tooley's particular theory of time is one that utilizes both the notion of *actuality simpliciter* and the notion of *actuality as of a time*. That which is actual as of a certain time is anything that occurs either at that time or prior to that time. Caesar's crossing the Rubicon, for example, is both actual simpliciter and actual as of midnight on January 1, 1900. World War II, however, is not actual as of January 1, 1900, though it is actual simpliciter and actual as of January 1, 2000. According to Tooley, his theory is dynamic because what is actual as of a time changes from one time to another, and since there is an increase in what is actual as of later times from what is actual as of earlier times, his theory is an accretivist theory, i.e., one which recognizes that the past and present have an ontological status that the future lacks. While past, present, and future are all actual simpliciter, only the past and present are actual as of the present time.

Tooley's view is that these notions of "actuality simpliciter" and "actuality as of a time" have to be taken as primitive notions, and he argues that it is legitimate for him to

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<sup>136</sup> Tooley (1997), p. 14.

do so.<sup>137</sup> Even granting this questionable distinction, it is difficult to see that Tooley has really provided an account according to which temporal passage is distinguished from simple difference from one time to another. Tooley rejects the notion that change understood simply as something's having a property at one time that it lacks at another is sufficient to have a genuinely dynamic theory, presumably because it is compatible with propositions such as "x is A at t<sub>1</sub>" and "x is B at t<sub>2</sub>" always being true *sub specie aeternitatis*. However, on his view it seems as though propositions such as "x is not actual as of t<sub>1</sub>" and "x is actual as of t<sub>2</sub>" will always be true *sub specie aeternitatis*. If the first difference from one time to another is not sufficient to have temporal passage rather than mere difference from one time to another, then it is not clear why the second should not be understood as mere difference from one time to another as well.

### 2.3.2 Dainton's Account of the Transitory Aspect

In his discussion of the Transitory Aspect of Time, Barry Dainton adopts Tooley's language of *actuality of a time*, but rejects the notion of *actuality simpliciter*.<sup>138</sup> He argues that utilizing both notions of actuality is problematic for reasons similar to the ones I just gave, but nonetheless thinks that the idea of *actuality as of time* is necessary to make sense of the dynamic theory. The reason for this is that Dainton wants to find a way for the dynamic theorist to avoid what he calls the "overdetermination problem", a problem for dynamic theories that Dainton sees as the ultimate import of McTaggart's argument for the unreality of time. Dainton introduces the overdetermination problem by comparing the sort of change in events as they gain and lose A-determinations with the sort of change in ordinary objects as they gain and lose properties. A persisting object, such as a lump of clay in Dainton's example, may change from being spherical to being

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<sup>137</sup> Tooley (1997), Section 2.2.

<sup>138</sup> Dainton (2001), pp. 70-1.

non-spherical to being spherical again. In order to do so, it must possess the different properties at different times. The lump of clay is spherical at  $t_1$ , not spherical at  $t_2$ , and then spherical at  $t_3$ , for example. We cannot understand the change in A-determinations in this way, however, Dainton suggests, because the entities that intuitively possess A-determinations, such as events, do not persist in the same way as ordinary objects. They exist only at one particular time. So, if, for example, the event of my birth occurs at  $t_2$ , whatever properties it has, it has at  $t_2$ . If it possesses presentness at  $t_2$ , then there is no way to explain how it could come to possess pastness at  $t_3$ , as my birth does not occur at  $t_3$ , but only at  $t_2$ , so in order to come to possess pastness the only time it could possess it would be at  $t_2$ . But it, *ex hypothesi*, it possesses presentness at  $t_2$ , and so would have to possess both presentness and pastness at  $t_2$ , which seems impossible.<sup>139</sup>

Dainton suggests that this problem can also be formulated with the accretivist view in mind. According to the accretivist view, the passage of time consists in the change in “the sum-total of reality”. Dainton says:

Consider the universe at an earlier time  $t_1$  and a later time  $t_2$ . Let us call the sum totals of reality that exist at these times  $S_1$  and  $S_2$ .  $S_1$  includes everything that has happened earlier than  $t_1$ .  $S_2$  includes everything that happens at  $t_2$ , along with everything that has happened earlier, and so includes  $S_1$ . Suppose that  $E$  is an event that happens at  $t_1$ . It seems that we can say the following about  $E$ :

1. The sum total of reality to which  $E$  at  $t_1$  belongs consists of  $S_1$ .
2. The sum total of reality to which  $E$  at  $t_1$  belongs consists of  $S_2$ .

These two claims are inconsistent; they cannot both be true. A rock cannot, at a given time, be in a pond containing two different total volumes of water. How can one and the same event be a part of two different sum total of reality at the time it occurs?<sup>140</sup>

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<sup>139</sup> There are certain ambiguities in the phrases of the form “at  $t_n$ ” which play a role in this argument. I try to disentangle some of these ambiguities in **Section 2.6**.

<sup>140</sup> Dainton (2001), p. 70.

In other words, since  $E$  is a part of whatever sum total of reality it is a part of only at whatever time it occurs, it is difficult to understand how there could be a change in the sum-total of reality to which it belongs.

Dainton suggests that the solution to this problem is to adopt Tooley's talk of "actuality as of a time". Thus, one cannot talk of  $E$  belonging to a sum total of reality *simpliciter*, but can only talk of  $E$ 's belonging to a certain sum total of reality as of a certain time. So,  $E$  belongs to  $S_1$  as of  $t_1$ , but does not belong to  $S_2$  as of  $t_2$ .  $E$ , however, belongs to  $S_2$  as of  $t_2$ . With Tooley's notion of "actuality simpliciter" rejected, there is no notion of "reality" except as of a particular time. However one evaluates the success of this view in solving the overdetermination problem, it cannot be accepted by anyone who rejects the notion that reality or actuality or existence can, at the bottom, be merely relative notions. As I am inclined to reject this<sup>141</sup>, I have to conclude that Dainton's particular characterization of how it is that the sum-total of reality can change is inadequate.

### 2.3.3 *Meta-Time and Meta-Language*

In order to make sense of temporal passage, we must make sense of the idea that what is real, not just "as of a time" but "simpliciter", changes. In order to see how this might be done, it is useful to begin by considering another view of how to solve the overdetermination problem that Dainton rejects. This solution requires an appeal to "meta-time", understood as a second dimension of time through which positions in the first dimension of time endure.<sup>142</sup> Positions in regular time will have the properties of pastness, presentness, and futurity at different points in meta-time. So, for example,  $t_1$  (or events at  $t_1$ ) may be present at meta-time position  $m-t_1$ , but past at meta-time position  $m-$

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<sup>141</sup> See footnote 55, above.

<sup>142</sup> Dainton (2002), pp. 21-3.

$t_2$ . Or, put in accretivist terms, the sum total of reality at  $m-t_1$  may include  $t_1$  but not  $t_2$ , while at  $m-t_2$  the sum total of reality may include both  $t_1$  and  $t_2$ . Dainton considers a couple of possible objections to the idea of meta-time. He considers and dismisses the objection that meta-time is an “ontological extravagance”. Even if we grant that we cannot observe this meta-temporal ordering, Dainton suggests that if it is the only way to necessary to explain passage, Dainton suggests, positing such an “extra dimension” of time would be at least as respectable as any positing of unobservable entities to explain observational data. The main objection he offers to meta-time is as follows:

Although we are supposing that different ordinary times possess presentness at different meta-times, since all meta-times are equally real, doesn't it remain the case that *every* moment of ordinary time possesses presentness? In which case, the uniqueness of the “now” is lost. Moreover, this model of time is not in the least way dynamic: the posited *two-dimensional* system is entirely static. The proposed second temporal dimension fails to explain what it is claimed to explain, and so is entirely without justification.<sup>143</sup>

Dainton considers the possible response that meta-times have properties of meta-presentness, meta-pastness, and meta-futurity, which they gain and lose in meta-meta-time. Rather than solving the problem, Dainton notes, this simply generates an infinite regress in which the problem is not solved at any level.

While I agree with Dainton that meta-time as he has described it fails to solve the problem of overdetermination in a way that provides for a genuinely “dynamic” view, I would suggest that with some modification the basic idea of a meta-temporal ordering can be rehabilitated and used to develop a coherent account of temporal passage. The key is to reject Dainton's assertion that “all meta-times are equally real”. Rather than there being a “sum total of reality” which includes the various meta-temporal positions, meta-times themselves are sum totals of reality. What one needs to be able to say in order to

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<sup>143</sup> Dainton (2001), p. 22.

make sense of temporal passage is that one sum total of reality  $S_1$  precedes another sum total of reality  $S_2$ . It is important to realize that  $S_1$  and  $S_2$  are indeed sum totals of reality, so that there is not some greater totality  $S_1+S_2$  that includes both of these.

How *can* we make sense of this? I would suggest that the ideal language method gives us the resources for making explicating this idea. First, we need the idealized notion of a complete, true description of the world in an ideal language.<sup>144</sup> In such a description, every symbol in the language would correspond to some entity in the world, and every entity in the world would be represented in the language. Such a description would be a perfect picture of the world. If we had an ideal language, we can say various things in ordinary language about that ideal language, such as that a certain formula is well-formed in the language. Furthermore, we could also say things in ordinary language about that the complete, true description, such as that it is a complete and true description of the world. One of the things we could say in ordinary language is that a certain description  $D_1$  was once a complete and true description of the world, but now a different description  $D_2$  is now a complete and true description of the world. We can illustrate this with a few examples using descriptions of simple, model worlds.

The first model world,  $W_1$ , is an omnitemporalist world in which there are five discrete times and that contains an object  $o$  that has temporal parts<sup>145</sup> at each of those times, and no objects that do not overlap with  $o$ . That the distinct temporal parts of  $o$  are parts of a single persistent object I will represent by using an ‘ $o$ ’ with a subscript for each proper part of  $o$ .<sup>146</sup> This single object successively exemplifies properties  $P$ ,  $Q$ ,  $R$ ,  $S$ ,

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<sup>144</sup> See footnote 54 on the reasons why the notion of a complete description is itself merely an ideal.

<sup>145</sup> See the discussion of perdurantism in **Section 2.6** for a discussion of the view that objects have temporal parts.

<sup>146</sup> This device for representing parthood would of course not work in a more complex world in which objects overlap.

and  $T$ . I will assume a relational theory of time,<sup>147</sup> with the temporal relation of precedence being represented by the rightwards arrow “ $\rightarrow$ ”, which holds between states of affairs. Furthermore, I will assume that what exists at one particular time is singled out as having a special ontological status in virtue of being present. This special ontological status will be indicated by boldfaced type. The following might plausibly be taken as an approximation of a complete, true, and ontologically perspicuous description of such a world:

$$P_{O_1} \rightarrow Q_{O_2} \rightarrow \mathbf{R}_{O_3} \rightarrow S_{O_4} \rightarrow T_{O_5}$$

Nothing in this example thus far is sufficient to make this world one in which temporal passage occurs. What is required in order for the world to be dynamic is a change in what the complete, true, and ontologically perspicuous description of the world is. The correct description of the world in this case would change to

$$P_{O_1} \rightarrow Q_{O_2} \rightarrow R_{O_3} \rightarrow \mathbf{S}_{O_4} \rightarrow T_{O_5}$$

In the second description, the states of affairs  $R_{O_3}$  has lost the special ontological status associated with being present, while  $S_{O_4}$  had gained that status. This theory is a tense fundamentalist version of “the moving spotlight” view.

The second model world,  $W_2$ , is an afuturist world, in which there is no distinction between the ontological status that entities at different times possess, and in which there are no truths about the future, but which is otherwise quite similar to the world in the previous example. An approximation of a complete, true, and ontologically perspicuous description of this world might be

$$P_{O_1} \rightarrow Q_{O_2} \rightarrow R_{O_3}$$

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<sup>147</sup> See **Section 2.5.3** for discussion of the Relational theory of time.

In this description,  $Ro_3$  is present in virtue of there not being any states of affairs after it. If the world is dynamic, the following might become the complete description of the world:

$$Po_1 \rightarrow Qo_2 \rightarrow Ro_3 \rightarrow So_4$$

In the second description, a new state of affairs,  $So_4$ , has come into being, and is present.  $Ro_3$  is no longer present, having been succeeded by  $So_4$ . Note also that the object  $o$  has gained a new part,  $o_4$ , which has come into existence.

A third model world,  $W_3$ , is a presentist world. In this world object  $o$  endures through time. In addition to the monadic properties  $P$ ,  $Q$ ,  $R$ ,  $S$ , and  $T$ ,  $o$  also successively possesses tensed properties that ground the truth of claims about what properties  $o$  had at other times. I will use a subscript number to indicate a past-tensed property and how far into the past the exemplification of that property is, so that  $P_2o$  indicates  $o$  exemplifying the property of *having been P two time-units ago*. Superscript numbers will be used in a similar fashion to indicate future-tensed properties, so the  $P^2o$  would indicate that  $o$  exemplifies the property of *going to be P in two time-units*. So a complete, true, and ontologically perspicuous description of this world might be approximated by the following<sup>148</sup>:

$$P_2o \ \& \ Q_{1o} \ \& \ Ro \ \& \ S^1o \ \& \ T^2o$$

Note that all of the properties exemplified by  $o$  are presently exemplified. Again, this world is not yet dynamic, until we add the fact that the correct description changes to

$$P_3o \ \& \ Q_{2o} \ \& \ R_{1o} \ \& \ So \ \& \ T^1o$$

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<sup>148</sup> A truly perspicuous description of this world would not rely upon multiple occurrences of the letter ‘o’ to indicate the same object occurring in different states of affairs, nor would it depict the world as a conjunction of states of affairs. A better picture would be to have a single ‘o’ surrounded by the various predicates ascribed to that token of “o”. I do not think any confusion is engendered by not reaching that level of perspicuity in this example, however.

In this second description, *o* possesses a completely different set of properties, and so every state of affairs in the previous description has ceased to exist, and five new states of affairs have come into being.

The final world that I will present is a particularly interesting specimen, in that it is a world in which there is temporal passage but no objective present within the first-order temporal ordering. This world is one that we might call a “transitory B-series” world. In our first description of it, it is much like  $W_1$ , but without any particular time marked out as present.

$$P_{O_1} \rightarrow Q_{O_2} \rightarrow R_{O_3} \rightarrow S_{O_4} \rightarrow T_{O_5}$$

Any change in what the complete and true description of this world is would count as temporal passage on the account I am offering. One could change the description by adding on or subtracting entities from the world. Another way would be by re-arranging the temporal structure. In this particular world, the complete and true description changes from being the above to being as follows:

$$Q_{O_2} \rightarrow S_{O_4} \rightarrow P_{O_1} \rightarrow T_{O_5} \rightarrow R_{O_3}$$

Such a world is one in which things change their ordering in the B-series. If we could imagine World War I shifting to being after World War II rather than preceding it, this would be a world with a transitory B-series. It is difficult to imagine what such a world would be like, or any reasons for holding that one lived in such a world, but it is at least a conceivable model of a world that is properly dynamic as I understand it.<sup>149</sup>

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<sup>149</sup> This also suggests, I would argue, that the way in which I am presenting the notion of temporal passage fits in well with the concerns that drive McTaggart’s argument. McTaggart’s preference for the A-series as necessary for time while the B-series is insufficient is based on the idea that things shift their position in the A-series but never do so in the B-series. Presumably if things *did* shift their position in the B-series, however, as in the transitory B-series model, this would deflate McTaggart’s objection, as this would count as a world in which “change” of the sort he believes is necessary to time actually occurs.

The important thing to learn from these examples is temporal passage requires that what there is in the world changes, and that this change will be reflected in a change from one description of the world being true and perspicuous to another description being so. One must be careful not to be misled at this point, however. It might be tempting to think that the description of the world as changing in this way is on a par with any other description of the world, and thus is itself something to be included in the complete description of the world. One might thus be tempted to say that the following is a more complete description of the first world:

$$[P_{O_1} \rightarrow Q_{O_2} \rightarrow \mathbf{R}_{O_3} \rightarrow S_{O_4} \rightarrow T_{O_5}] \rightarrow [P_{O_1} \rightarrow Q_{O_2} \rightarrow R_{O_3} \rightarrow \mathbf{S}_{O_4} \rightarrow T_{O_5}]$$

This would be to make a serious mistake, however, and fundamentally to misunderstand the account of the transitory aspect that I am giving. If my account is correct, this latter “description” in fact fails to pick out a genuine state of affairs in the world. While there is a sense in which it is true that it is the case that

$$[P_{O_1} \rightarrow Q_{O_2} \rightarrow \mathbf{R}_{O_3} \rightarrow S_{O_4} \rightarrow T_{O_5}]$$

and *then* it the case that

$$[P_{O_1} \rightarrow Q_{O_2} \rightarrow R_{O_3} \rightarrow \mathbf{S}_{O_4} \rightarrow T_{O_5}]$$

such that one might loosely say the former *precedes* the latter, this “precedence” is not of the same kind as represented by the rightwards arrow. Unlike the rightwards arrow, it should not be taken to represent a relation between entities. One should be careful not to take the change in what has ontological status to be something that has ontological status itself.<sup>150</sup>

This takes us back to one of the central themes of this account of the transitory aspect, namely that one who accepts the objective reality of temporal passage holds that *becoming* is not reducible to *being*. Since an ideal language, by definition, is designed to

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<sup>150</sup> This, I maintain, is ultimately the lesson of McTaggart’s paradox. See **Section 3.6.1** for discussion of this point.

picture only that which has ontological status, it follows that one cannot capture becoming in an ideal language, but only in “meta-linguistic” talk about the ideal language.

## **2.4 The Durational Aspect of Time**

Many entities in our experience take up some quantifiable amount of time. Years, weeks, days, and seconds are all used to measure the duration of entities. World War II, for example, lasted from 1939 until 1945. The average human lifespan is approximately seventy-five years. A number of puzzles in the philosophy of time, the philosophy of physics, and the philosophy of applied mathematics revolve around questions of the measurement of temporal intervals and durations.<sup>151</sup> While extremely important, I will largely be putting these sorts of concerns to one side. In this brief discussion of the durational aspect of time I will focus instead on trying to understand exactly how the notion of duration fits into an overall philosophy of time.

A somewhat tempting position with regard to the durational aspect is to deny that it is distinct aspect of time, and to maintain that it can be reduced to the Structural Aspect. After all, one might suggest, what is it for World War II to last for six years other than for there to be a series of battles and other events that constitute the war arranged in such a way to add up to a span of six years. Every event’s taking up duration, according to this line of thought, can be reduced to a series of events taking up smaller duration, and the ideal limit of this would be a series of instantaneous events (that is, events lacking any duration whatsoever), and World War II, for example is just this kind of series of instantaneous events ordered by temporal relations.

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<sup>151</sup> Issues of conventionalism versus non-conventionalism about measurement probably belong in this context. Why, for example, do we take the pendulum of a clock to be more regular than, for example, the beating of a human heart, or even the change in directions of a fly in the room? Le Poidevin (2003), Ch. 1 contains a nice discussion of these issues, which rejects the conventionalist position of Reichenbach and Grunbaum.

The alternative to this sort of view is the theory which we might call “temporal atomism”, which holds that there exist entities which possess some duration, but the duration of which cannot be reduced to those entities having “temporal parts” of a lesser (including zero) duration. On such a view, certain entities would simply take up a certain amount of time, but not in virtue of having parts that take up smaller amounts of time. The doctrine of temporal atomism has a long a distinguished history<sup>152</sup>, motivated in significant part by responses to Zeno’s paradoxes, which, on many interpretations, rely upon the idea that time and space are infinitely divisible. The view has received at least some renewed attention in recent years with various physical theories that suggest that space and time are discrete, and that Planck Time (roughly  $10^{-43}$  of a second) marks the length of the fundamental atoms of time.<sup>153</sup>

Interestingly, the idea of temporal atoms<sup>154</sup> seems to be difficult for many people to accept conceptually. Surely, one might suggest, if something takes up some amount of time then part of it must be before another part. Nonetheless, the basic idea of temporal atoms seems to be well-grounded in time as we experience it. To see this, consider our experience of space in the visual field. If we focus on some patch of blue within our visual field, this patch of blue will be composed of smaller bits of blue, but, at some point in decomposing the patch of blue into smaller and smaller bits, we reach units which, though they clearly have some extension as they are visible and colored, would nonetheless no longer be visible if they were any smaller.<sup>155</sup> This idea corresponds to

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<sup>152</sup> This history is chronicled in Sorabji (1983), Part V.

<sup>153</sup> See Smolin (2001), p. 62 for a discussion of this.

<sup>154</sup> “Temporal atom” means an entity with a minimal temporal duration, i.e. one that has duration but does not have parts of lesser duration. The doctrine can be formulated in either substantialist or relationalist terms, so that the “temporal atoms” could be either something like events of a minimal temporal duration, or it may be that substantial times have the quality of duration. The relationalist/substantialist debate is briefly discussed in the next section.

<sup>155</sup> The *locus classicus* of this idea is Hume’s *A Treatise on Human Nature*, Part II.

what sense-datum theorists refer to as “minimal sense-data”.<sup>156</sup> We do not experience geometrical points, but everything within our visual field has some degree of extension.

Similarly, time as we experience it seems to possess a kind of quality of minimal duration. We never experience a pure instant, but our experience seems to be presented to us as having some quality of minimal duration, though duration such that we cannot really imagine a smaller duration, any more than we can visualize something smaller than the minimal sense-data in our visual field. Our experience of time does seem to differ significantly from our visual experience in one important way, however. While we experience our visual field as composed out of an extremely large number of minimal sense data, it seems to me, at least, that within a single act of presentation we do not experience an interval of time built out of minimal experienced temporal intervals. In other words, it seems as though we experience only a single minimal duration. The situation is complicated because the fact that we do maintain some awareness of the short-term past and expectation of the short-term future, the way in which these occur in our consciousness is in a somewhat different way from whatever is being presented to us at present.<sup>157</sup> So, for example, suppose we are listening to an arpeggiated C-chord. As we are having an immediate presentation of the E sounding, within our consciousness there is also some awareness of the C that just sounded and anticipation that G will sound next, however the ways in which C and G occur in our consciousness are much different from the way in which E occurs in our consciousness.<sup>158</sup> What is immediately presented seems to be presented as a single, minimal duration of experience.

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<sup>156</sup> I am trying not to presuppose any particular account of perception in describing the phenomena, however.

<sup>157</sup> The classic discussion of this is Husserl (1991).

<sup>158</sup> Husserl describes the modes of awareness of the past and future as “retention” and “protention”, respectively.

It is important to keep straight some distinctions in this discussion. Depending on how one understands the structure of consciousness, there are at least three things that one might assert to have duration when talking about consciousness. First, there is act of consciousness itself. Then, there is the object of consciousness. Then, there is the object of consciousness as presented to consciousness. The claim that I have been making is that the object consciousness as presented is of a singular, minimal temporal duration. This does not in fact mean that the object itself is a temporal atom. Something might be presented to us as temporally atomic and yet, in reality, be composed of smaller things below the threshold of our conscious awareness. If those physicists who identify Planck time with temporal atoms are correct, then we are certainly incapable of experiencing things occurring at  $10^{-43}$  of a second. Nonetheless, the fact that things within our experience are presented to us as temporal atoms seems as though it should deflate the conceptual argument against it.

As for where major theories of time stand on the issue of duration, the four-dimensionalist does not need to be committed to any particular position on the question of whether there are entities with irreducible duration. The four-dimensionalist is committed to the notion that time is analogous to spatial dimensions, so if they accept spatial points, they should accept instants of time, but if they reject spatial points, then they should reject instants as well. In and of itself, the position does not seem to commit them to any position on the matter.<sup>159</sup> Presentists, by contrast, may have particular reason for embracing the idea of irreducible duration. Certain historically influential objections to the presentist theory revolve around the idea that the present is merely an instant, and instants, as something of zero temporal length, are at best a kind of idealized

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<sup>159</sup> In his prominent book called *Four-Dimensionalism*, Theodore Sider seems to assume that the temporal parts of objects are instantaneous. See Sider (2001), Chap. 1. There does not seem to be any reason why a four-dimensionalist *must* be committed to this, however.

abstraction.<sup>160</sup> Presentism combined with temporal atomism creates a view according to which it can be the case that everything that exists is present, and still what exists has duration. Accretivism does not seem to be committed to any particular theory with regard to the nature of duration, though I tend to be sympathetic to the notion of temporal atoms, and the broader metaphysics of time that this essay is building towards will likely be one that incorporates them. Nothing in the basic argument of the rest of this essay depends upon them, however. I will note that in general, I tend to be suspicious of the notion of instants or of points in the spatial case. While formal methods have been developed that take the notion of a point as primitive and construct the notions of a volume of space or duration of time from sets of points<sup>161</sup>, and methods have been developed that begin with the notions of volume and duration and construct the notion of a point from these notions<sup>162</sup>, the latter seem to me much more respectable from an epistemological standpoint.

## 2.5 The Structural Aspect of Time

World War I occurred before World War II. The presidency of Richard Nixon was after the presidency of Lyndon Johnson. The collapse of the Berlin Wall occurred during the presidency of George H. W. Bush. This connection of events in time by relations of temporal precedence or secession and temporal overlap or simultaneity, what McTaggart refers to as the “B-series”, is evidently one of the most natural ways of thinking about time in our everyday lives. Understanding the “B-relations” and the nature

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<sup>160</sup> A version of this line of thinking occurs in Augustine’s puzzles about the nature of time in *Confessions*, Book XI.

<sup>161</sup> This is the standard approach in modern topology.

<sup>162</sup> Whitehead (1919), Part III is the original source of the “method of extensive abstraction”.

of the structure generated by them, then, is one of the most important tasks of a philosophy of time.

Interestingly, the question of the nature of B-relations is much different for the presentist than for other theories of time. For the presentist, strictly speaking to be simultaneous with something else is simply to co-exist, and nothing ever bears a relationship of being-before or being-after something else. There really is no structuring of entities generated by the B-relations, and this sort of ordering exists only as a kind of ideal construction or at it occurs only at the metatemporal level. The problem of giving an account of what grounds the temporal ordering if nothing is really connected by temporal relations is a significant problem for the presentist<sup>163</sup>. Presentists must in some sense or another be reductionists or eliminativists about B-relations and the structural aspect of time more generally. The problems that standardly concern the structural aspect of time are secondary for the present to this central problem. Since I will be focusing in this section on various puzzles regarding the structural aspect as they arise for those who recognize it as a fundamental aspect of time, I will largely leave presentism aside in this section.

The orthodox four-dimensionalist holds that the fundamental temporal relations are to be understood on analogy with spatial relations. As with the durational aspect, how this is manifest in practice will depend on how the particular four-dimensionalist understands the spatial structuring of entities. The accretivist, as I am presenting the view, shares no such obligation to assimilate temporal relations to spatial relations, and thus has more leeway with regard to a variety of different positions with regard to understanding temporal relations. In the rest of this section I will turn to several major

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<sup>163</sup> It is perhaps the most important instance of what is commonly known as the “problem of transtemporal relations” which is sometimes taken as a central objection to the presentist view.

topics that arise in trying to understand the structural aspect of time, and a number of different responses one might offer to this.

### *2.5.1 The Relata of Temporal Relations*

One of the first questions that must be asked in any account of the structure of time is exactly what sorts of entities are actually connected by temporal relations. Part of this debate concerns the classic issue of substantivalism versus relationism with regard to space and time. Substantivalists about space or time hold that places or times exist as entities distinct from the entities “in” space or time. A substantivalist about time will typically believe that times are what primarily linked by temporal relations, and that the description of, for example, events as being temporally ordered is only secondary to the description of the times they are at being temporally ordered. Thus, for World War I to precede World War II is to be understood as World War I being at a time that precedes the time at which World War II is.<sup>164</sup> The relationalist, by contrast, denies that there are such things as times or places understood as anything other than positions in the existing structure formed by temporal or spatial relations. So, for at least one version of the relationalist theory, World Wars I and II are themselves connected by the temporal relation in question. Relationalists can differ over exactly what they hold the relata to be, for example one might hold it to be events or states of affairs or bare particulars or some other ontological category. They agree, however, that there are no times understood as an independently existing ontological category.

Four-dimensionalism as a doctrine is neutral on the question of substantivalism versus relationism, with the standard caveat that whatever it says about space it also says about time. So, if there are places, there will be times, if one is a four-dimensionalist.

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<sup>164</sup> To be more precise, one should probably give a more complicated analysis. One might want to say, for example, that each member of the set of times at which World War I is precedes each member of the set of times at which World War II is.

Many four-dimensionalists, attracted to absolutism and inspired by the “spacetime” view growing out of modern physics, deny that there are places or times *simpliciter*, but instead substantial *spacetime* points or regions. On such a view, there are no times such that two spatially distant events can be said to happen at the same time, nor are there places such that two temporally distant events can be said to happen at the same place. Nonetheless, the spacetime location is what primarily connected by spatio-temporal relations on this sort of view.

Accretivism is also neutral on the question of substantialism versus relationism, though substantialism raises an interesting question for any view that recognizes genuine temporal passage as I have suggested it should be understood. Do times come into existence with the passage of time, or is it only the entities “in time” that come into existence, thus “filling in” the pre-existing temporal structure? On the latter view, future times would exist at the present<sup>165</sup>, though nothing would be yet be happening at those times. Barry Dainton argues that the accretivist view is best understood in the former fashion, but his argument rests largely upon his particular account of temporal passage and his response to the overdetermination problem. As far as my own views, I take no stand in this essay on the issue of relationism versus substantialism, though by temperament I find myself inclined towards the relationist view.<sup>166</sup>

### 2.5.2 Consecutiveness and Density

A further question with regard to the Structural Aspect of Time concerns whether time is consecutive or dense. For time to be dense is for it to be the case that between any two temporal entities A and B, where A is prior to B, there will be a third entity C such

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<sup>165</sup> Technically, if the times are considered *future* entities, then they may be ruled out by the afuturist thesis that *no* future entities exist. One can, however, construct a view very similar to accretivism which has future times but no other future entities.

<sup>166</sup> By contrast, I find myself inclined towards substantialism about space.

that A is prior to C and C is prior to B.<sup>167</sup> If time is consecutive then there will be entities A and B such that A *immediately precedes* B, or, in other words, A precedes B but there is no entity temporally between A and B. The issue of the consecutiveness versus the density of time is closely connected to the Durational Aspect of Time. If there are temporal atoms, and thus every entity has some duration, and time is dense, this seems to imply that there is an infinite amount of time between any two events.<sup>168</sup> Since this seems like an absurd conclusion, one who accepts the notion of irreducible duration would most likely accept the discreteness of time. One who accepts consecutiveness, however, does not necessarily need to accept the idea of irreducible duration. One might believe in instantaneous entities that immediately precede one another.

Four-dimensionalism again does not commit its adherents to any particular view on the consecutiveness/density issue, so long as the four-dimensionalist says the same thing about time that he or she says about space. The accretivist, or any view that accepts the reality of the transitory aspect, would seem to need time to be density.<sup>169</sup> The reason for this is that temporal passage seems to require the notion of a next moment. Given that the world consists of its history up to the present moment on the accretivist view, and that temporal passage consists in something being added to this whole, then it seems as though something specific has to be added next. If for every future entity, some other

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<sup>167</sup> If time is dense, then a further question arises whether or not time is continuous. Density implies that there are an infinite number of times between any two points of time. This leaves open the question of how large the infinity in question is. All that density requires is that the cardinality of the set of times is the same as the cardinality of the rational numbers. One might, however, hold that the cardinality of the set of times is that of the real numbers, and so there would be a non-denumerable infinity of times.

<sup>168</sup> A possible exception to this would be if the temporal atoms between two times formed an infinite Zeno series such that each term in the series was half the duration of the previous term.

<sup>169</sup> Having said this, Bergson is an example of someone who explicitly endorses the idea that time is “continuous” and yet that passage is real. What Bergson has in mind is, however, a notion of “continuity” distinct from the mathematical conception.

entity had to come into being before that entity, then nothing could ever come into being.<sup>170</sup>

### *2.5.3 The Nature and Analysis of Temporal Relations*

How are we to understand the relations that generate temporal structure? Are temporal relations an irreducible and primitive kind of relation, or can we either analyze them in terms of some other relation, or understand them as being of the same kind as some other relation? We have said already that the four-dimensionalist understands temporal relations as being of the same basic kind as spatial relations. For the consistent four-dimensionalist, there is no intrinsic difference between the temporal dimension of reality and the spatial dimensions. One major consequence of this way of understanding temporal relations is that the fundamental temporal relations must be symmetrical, as the fundamental spatial relations are symmetrical. Directions in space exist only relative to some observer, and somewhat similarly direction in time is not an intrinsic feature of time itself according to the four-dimensionalist, but must somehow depend upon the content of what is in time.<sup>171</sup> An object's being five feet to the left of another object will

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<sup>170</sup> This is the lesson of Zeno's Dichotomy Paradox.

<sup>171</sup> This has the consequence that various philosophers, such as D. C. Williams (1951), who hold that time is in many respects analogous to a dimension of space, but differs in that temporal relations, unlike spatial relations, are asymmetrical, do not qualify as "four-dimensionalists" as I am characterizing the view. While there is nothing incoherent about this view, I believe there is a significant amount of dialectical pressure on one who is tempted by four-dimensionalism to deny that the fundamental temporal relations have an intrinsic direction. If we take the four-dimensionalist as having succeeded in showing that many apparent distinctions between space and time are in fact simply a matter of egocentric perspective, then it becomes very tempting to say that the "direction of time" is also an illusion of consciousness. After all, it is tempting to say that the reason we think that there is a significant difference between those events that are earlier than  $t_1$  and those events that are later than  $t_1$  is that, at  $t_1$ , we have different epistemic access to the earlier events than we have to the later events. If we imagine a species that was immobile, but could only see in one particular spatial direction, such a creature would be most likely think that directionality was something intrinsic to the spatial dimension, rather than an effect of its own epistemic situation.

ultimately be analyzable in terms of the spatial relations between the objects, which will simply be the distance of five feet, and then their relation to some third point from which the one is observed to the left of the other. Similarly, an entity's preceding another entity by five years will be analyzable in terms of the temporal relation between them, which is the temporal distance of five years, plus some third factor in the analysis which determines which one is earlier than the other. The question of how to explain the asymmetry of time becomes a central puzzle for the four-dimensionalist. There are a variety of approaches to answering this question. One might think that the causal relationship between the entities determines which one precedes the other. Many have suggested that patterns of entropy play an important role in distinguishing what is earlier from what is later.

The causal theory of the direction of time must be distinguished from another similar theory which we might call the causal theory of the analysis of time. Rather than holding that time itself is asymmetrical, but that the "directionality" of time is the result of causal relationships that exist in addition to the temporal structure, the causal theory of the analysis of time suggests that temporal relations are simply causal relations. On such a view, for  $x$  and  $y$  to be temporally related is for them to be causally connected. Roughly speaking, for  $x$  to precede  $y$  is for  $x$  to be an actual or potential causal contributor to  $y$ . It is worth noting that both causal theories are incompatible with the famous analysis of causation derived from David Hume, according to which the concept of causation is analyzed at least in part in terms of the concept of temporal ordering. The causal theories want to analyze the direction of time in terms of the direction of causation.

While attempts to understand temporal relations in terms of either spatial relations or causal relations are fairly common in the literature, an interesting third approach can be derived from the work of J. M. E. McTaggart. While McTaggart holds that time is an illusion, he nonetheless believes that there is an objective foundation for the illusion of

time. So while the “B-series”, the structuring of entities by temporal relations, does not in fact exist, there must a “C-series” ordering which does exist and which is responsible for the illusion of time. The basic idea of the C-series is proposed in the 1908 article on the unreality of time, and is a central theme of the second volume of *The Nature of Existence*. Between 1908 and his death in 1925, McTaggart explores various different relations that could serve as the foundation of the C-series, and finally settles upon part-whole relations as what we mistake for temporal relations. What we perceive as “x preceding y” is in reality a fact along the lines of “x is a proper part of y”.<sup>172</sup> Even if one rejects McTaggart’s arguments for the unreality of time, the view that temporal relations can be understood as in the same family as part-whole relationships is nonetheless intriguing. Similar sorts of view can be found in Bergson and in Whitehead, both of whom I have identified as accretivists. Bergson offered a now famous analogy according to which an act of perception is like a growing snowball in which the past “survives” in the present.<sup>173</sup> Whitehead’s ontology is one in which the basic atomic units, “actual entities”, are processes of “concrecence” whereby previous existing actualities are joined into new unities, which then become the material from which the next set of actual entities are formed.<sup>174</sup> So both Bergson and Whitehead seems to think that past entities are in some sense constituents of presently existing entities, and while neither explicitly analyzes temporal relations in mereological terms, their basic approaches to time

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<sup>172</sup> As a personal idealist, McTaggart believes that all that ultimately exists are minds, and, according to McTaggart, these minds are bundles of self-perceptions and perceptions of other minds. Each perception within a mind has within it a series of inaccurate partial perceptions of whatever the object of the perception is. This series is nested in such a way that latter terms in this series contain previous terms in the series, somewhat like Russian dolls. These series are identified by McTaggart as the C-series. The C-series in one mind, by perceiving the C-series in other minds and in itself, are supposed to somehow generate the illusion of time, and ultimately all error, on McTaggart’s view.

<sup>173</sup> Bergson (1907), p. 2.

<sup>174</sup> Whitehead also explains causation in terms of this part-whole connection.

arguably suggest this sort of view.<sup>175</sup> While I do not believe that the accretivist, *qua* accretivist, needs to be committed to any particular analysis of temporal relations, the fact that two prominent accretivists accept something approximating the mereological conception of temporal structure is intriguing, and I shall argue later that such view provides a very natural solution to at least one objection that might be raised to the accretivist metaphysics.

#### *2.5.4 Linear and Non-Linear Temporal Structures*

An extremely important question with regard to the Structural Aspect of Time concerns the properties of temporal relations. Intuitively, the relations of precedence and simultaneity define a linear ordering of temporal entities.<sup>176</sup> Simultaneity is reflexive (every  $x$  is simultaneous with itself), while precedence is irreflexive (no  $x$  precedes itself). Simultaneity is symmetric (if  $x$  is simultaneous with  $y$ ,  $y$  is simultaneous with  $x$ ), while precedence is asymmetric (if  $x$  precedes  $y$ ,  $y$  does not precede  $x$ ). Both simultaneity and precedence are transitive (if  $x$  is simultaneous with  $y$  and  $y$  is simultaneous with  $z$ , then  $x$  is simultaneous with  $z$ , and if  $x$  precedes  $y$  and  $y$  precedes  $z$ , then  $x$  precedes  $z$ ). Finally, the disjunction of the two relations is connected (for any  $x$  and  $y$ ,  $x$  is either simultaneous with  $y$  or one of the two precedes the other).

There are a variety of models of temporal structure that can be developed as alternatives to linear temporal ordering. A temporal structure in which some entities precede themselves would be circular rather than linear. It is sometimes claimed that Chinese culture tends to view time in this way. While I am somewhat suspicious of this

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<sup>175</sup> I have endorsed a version of this sort of view in Taylor (2003), though the idea as presented in that paper was in a rather primitive state of development.

<sup>176</sup> A linear ordering is one which is reflexive, antisymmetric, transitive, and complete, which the disjunctive relation “precedes or is simultaneous with” intuitively generates.

claim,<sup>177</sup> there certainly models of time that posit either circular structures within time<sup>178</sup> or a global circular structure to time.<sup>179</sup> Circular models will also typically deny that precedence is asymmetric. There are a variety of reasons why one might deny that simultaneity is transitive.<sup>180</sup> Completeness would be denied by views that allow for multiple time-series, either completely unconnected or branching or converging time-series.<sup>181</sup> Branching models of time in particular have received a fair amount of attention, particularly with regard to the many-worlds interpretation of quantum mechanics. Storrs McCall's "thinning tree" model of time, which will be briefly discussed in the next chapter, is a rather unusual take on the concept of branching time.

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<sup>177</sup> It is important to distinguish between the claim that time is *cyclical* and the claim that time is *circular*. An example of cyclical time would be one in which an event of type A is regularly followed by an event of type B, which is regularly followed by an event of type C, which is regularly followed by an event of type D, which is regularly followed by an event of type A. The seasons are example of this type of structure. Summer follows spring, autumn follows summer, winter follows autumn, spring follows winter, and then summer follows spring again. The difference between this and a circular model is that it is not literally the same summer that follows spring that preceded the previous autumn, so a particular summer does not actually precede itself, though it precedes the summer of the next year. Clearly events in time are cyclical in this sense. Often evidence presented in favor the thesis that time is thought of as circular in various cultures is actually simply emphasizing the cyclical nature of events in time.

<sup>178</sup> Gödel Universes, which were the first models of general relativity that feature "closed timelike curves", would be an example of this. See Gödel (1949). Interestingly, Kurt Gödel took the possibility of models of general relativity that permitted circular structures to demonstrate that time was in fact unreal, as McTaggart and the idealists had claimed.

<sup>179</sup> Nietzsche's doctrine of "eternal recurrence" may be an example of this.

<sup>180</sup> One set of reasons derives from relativity theory. For these issues, see Jammer (2006), Chap. 11. A further set of reasons derives from the notion of temporal atoms. If one holds that the temporally smallest entities have some finite duration, then that allows for the possibility that a certain temporal atom might be simultaneous with two non-simultaneous entities. To use a very simple example,  $E_1$  might overlap with both  $E_2$  and with  $E_3$ , which nonetheless do not overlap with one another. This is particularly possible if one allows that the temporal atoms actually have different durations.

<sup>181</sup> Some of the best discussion of these various possibilities can be found in Newton-Smith (1984), Chap. 4. In particular, Newton-Smith offers a persuasive argument for the logical possibility of their being completely unconnected time-series.

Most, if not all, of these sorts of variations seem compatible with both four-dimensionalism and accretivism.

## **2.6 The Differential-Repetitive Aspect of Time**

The final aspect of time that any comprehensive philosophy of time must take into account is what I call the Differential-Repetitive Aspect of Time. It is a datum of our experience that on the one hand there are differences from one time to another, and yet on the other hand there is a significant amount of repetition from one time to another. *Prima facie*, there are at least two fundamental types of repetition in the world. One is the type provided by the recurrence of characteristics in our experience. The same properties and relations and sorts of properties and relations reappear again and again as we continue to experience the world. I look at the chair in which I am sitting, and then at the shirt I am wearing, and notice that they are both blue. The lowest string of the violin and the third highest string of the guitar produce the same note when plucked. The bank and the grocery store are spatially separated, as are the bookstore and the restaurant, though the precise distances between the buildings may be different in the two cases. The attempt to give an ontological account of this sort of repetition is, of course, an aspect of the classical “problem of universals”.

A second type of repetition is provided by the persistence of objects through time, which is the type of repetition that I will primarily focus on in this section. Not only does the color of the chair recur at different points in my experience, but the chair itself, at least according to our ordinary way of thinking about things, repeatedly occurs at different points in my experience. This encompasses both cases in which I experience an object continuously through a period of time, such as when I sit in the chair for an hour, as well as cases of discontinuous experiences, such as when I leave the room for an hour, and come back to find that the chair is still here. Examples of this sort of phenomena abound in our ordinary experience of the world as well. Perhaps the most fundamental

case, though in many ways the most philosophically puzzling, is the persistence of our selves through time. Suppose I had lunch with Ken Williford yesterday, and I had a salad while Ken had fish. My memory that it was *I* who had the salad rather than the fish seems to presuppose an acquaintance with my own persistence at a very basic level. This is not to deny that I can be mistaken about such facts. Certainly, I can misremember what I had for lunch or even seem to remember events that never occurred, or even that occurred in someone else's experience.<sup>182</sup> Even our ability to misremember things that happened to us, however, seems to demonstrate that judgments regarding our own persistence are extremely fundamental to our basic experience of the world.<sup>183</sup>

A substantial number of our most fundamental assumptions regarding the world with which we interact also seem to presuppose the phenomenon of persistence. The fact that when I meet Ken in the hallway today I can resume a conversation begun with him at lunch yesterday seems to presuppose that Ken also has persisted through time in a similar fashion to me. The fact that I own the apple that I bought at the store earlier today presupposes the persistence not only of me but of the apple. The fact that I expect my favorite chair to be comfortable when I sit down in it seems to presuppose that it is the same chair that I have had experience of in the past. Even if we move from the realm of ordinary objects, the “medium-sized dry goods” that philosophers are fond of as examples, and discuss those objects studied only by physicists, the presupposition still seems to be that such objects persist through time. The use of a cloud chamber to track

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<sup>182</sup> Consider the case of a small child who is repeatedly told by his grandfather a vivid story of something that happened in the grandfather's youth, and as an adult seems to remember it as something that happened to him.

<sup>183</sup> While our own persistence through time may in some sense be the most paradigmatic example of the phenomenon in question, it will not be a major focus of this chapter. A central reason for that is that it ties into a number of issues regarding the nature of minds and consciousness which I wish to avoid. I will, however, be saying a bit about the nature of consciousness in **Section 3.5.4**.

the path of an electron, for example, seems to presuppose a conception of the electron as an entity that continues to exist over time. The search for background radiation leftover from the Big Bang likewise seems to presuppose that there is something that has persisted since the time of the Big Bang until today.

To point to such phenomena as the recurrence of characteristics or the persistence of objects should not in itself be taken to imply any particular stand on the ontology that underlies those phenomena. It does, however, single them out as data of experience that any successful ontology must explain. Such an account may ultimately revise many of our *prima facie* intuitions about the phenomena in question, but it nonetheless must take those intuitions as a starting point. Furthermore, it is difficult to imagine giving up entirely the notion that there is stability in the world of the sort provided by the persistence of objects or the recurrence of characteristics. A world that was genuinely one of constant flux, of radical novelty from each moment to the next without either the recurrence of characteristics or the recurrence of objects, would seem to be one about which one would be incapable of making any general statements.<sup>184</sup> Given that philosophy is motivated by a drive towards generality, some sort of stability in the world through time would seem to be a presupposition of philosophy itself, or at least of any philosophical system that does not dismiss time as altogether illusory.

One might be tempted to believe that one can reduce the phenomenon of the persistence of entities to the phenomenon of the recurrence of qualities. We recognize objects persisting through time because of the recurrence of qualities, it might be suggested. Why do I believe that the chair that was in the room earlier when I left is still here when I return? The answer, according to this suggestion, is that there is an object

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<sup>184</sup> Such a world would be that described by Heraclitus, in which “nothing is permanent except change”. Note how difficult it is even to formulate a description of such a world without falling into paradoxical modes of expression.

that bears many of the same characteristics as the chair did when I left the room. If there were a much different object, for example one with the characteristic properties of a lamp, in the same position when I returned to the room, I would not be tempted to think that it was the chair that had continued to exist while I was not there. While there is a certain amount of plausibility to this view, two facts seem to tell against it. The first is that it seems to be the case that objects can undergo fairly radical changes, and yet we are tempted to still consider the object as having persisted through time. Perhaps the most famous example of this is Descartes's ball of wax.<sup>185</sup> Secondly, there is the fact that we can ask the question as to whether an object qualitatively identical to the one we encountered previously is in fact the same. John Perry's example of two qualitatively identical tissue boxes can be used to illustrate this.<sup>186</sup> While these considerations may not be decisive, they at least seem to cast doubt on the notion that the phenomena we are picking out when we talk about the persistence of objects is straightforwardly reducible to the phenomena of the recurrence of characteristics.

The contemporary philosophical literature offers three basic accounts of persistence: endurantism, perdurantism, and exdurantism.<sup>187</sup> In the remainder of this

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<sup>185</sup> "...I put the wax by the fire, and look: the residual taste is eliminated, the smell goes away, the colour changes, the shape is lost, the size increases; it become liquid and hot; you can hardly touch it, and if you strike it, it no longer makes a sound. But does the same wax remain? It must be admitted that it does; no one denies it, no one thinks otherwise." *Second Meditation*, p. 20.

<sup>186</sup> "Suppose I took this box of Kleenex and lit fire to it. It is reduced to ashes and I smash the ashes and flush them down the john. Then I say to you, go home and on the shelf will be *that very box of Kleenex*. Wouldn't that be absurd?... The could be an *exactly similar* box of Kleenex on my shelf. We sometimes use 'identical' to mean 'exactly similar,' as when we speak of 'identical twins'. But I am using 'identical' in a way in which *identity* is the condition of memory and anticipation. If I am told that tomorrow, though I will be dead, someone else that looks and sound and thinks just like me will be alive—would that be comforting?" Perry (1978), p. 6.

<sup>187</sup> The terms "perdurantism" and "endurantism" and their cognates originate with Mark Johnston, and were popularized by David Lewis in Lewis (1986). "Exdurantism" derives from Sally Haslanger (2003).

section, I will discuss each of these accounts and a fourth account, which I call intradurantism.<sup>188</sup> For the convenience of an example, let us discuss these accounts in terms of a fairly ordinary, everyday object, such as an apple.<sup>189</sup> Intuitively, I can buy an apple at the grocery store at time  $t_1$ , and arrive home with that apple at time  $t_2$ . The fundamental task of the ontology of persistence is explain the continuance through time of objects such as the apple, and to provide an account of what the ontological ground of this continuance is, as well as solving certain puzzles that arise through reflection on the fact that objects, as they persist through time, change.

The starting data of any theory of persistence is that the same apple exists at  $t_1$  that exists at  $t_2$ , and thus that the apple persists from  $t_1$  to  $t_2$ . Each of the four theories of persistence acknowledges that data, but each gives a different interpretation to that data, in particular to the key notions of “sameness” and “existence at a time”, and therefore in the notion of what it is to “persist” through time. According to endurantism, the sameness in question is strict identity. It is quite literally the exact same entity which exists at  $t_1$  which exists at  $t_2$ . There are at least two ambiguities in saying that something exists at a time, however.<sup>190</sup> To see this, it is useful -to invoke an analogy with spatial location. We might say that the Eiffel Tower exists in Paris. There is a perfectly natural sense according to which the Eiffel Tower also exists *in* Iowa City. If one travels from

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<sup>188</sup> The term “intradurantism” was coined by Annemarie Peil.

<sup>189</sup> I present the problem in terms of the commonsense conception of the world primarily for convenience and familiarity of the examples. One should not think that the problem depends upon the assumption that such ordinary objects as apples are to be included in one’s ontology. As far as I can tell, the same sorts of problems could be generated from consideration of the “scientific image” of the world. Electrons persist as well as apples.

<sup>190</sup> A third ambiguity can be generated by distinguishing between those entities that can be said to exist at a time in a primitive sense and those which do so only derivatively. For example, Ernâni Magalhães holds that it is states of affairs that, properly speaking, exist in time, but that universals and particulars can be said to exist at times in virtue of occurring in states of affairs that do so primitively. See Magalhães (2004), Chapter 2, and (2006), where he notes that the view is adumbrated in the work of David Armstrong.

Paris to Iowa City, it is not as though the Eiffel Tower has ceased to exist; it is still back there in Paris. Yet there is another very natural sense in which we might say that the Eiffel Tower does not exist in Iowa City. One can search all around Iowa City and the Eiffel Tower is nowhere to be found. The sense of existence at a time which we will be concerned with when discussing the ontology of persistence is analogous to the sense in which the Eiffel Tower exists in Paris but not in Iowa City.<sup>191</sup>

The second sort of ambiguity might be best illustrated by consideration of the old adage that something cannot be in two places at once. Suppose I am sitting in my chair with my feet on my desk. One might try to object to the adage by claiming that I am both on the chair and on the desk, and thus in two distinct places. This objection, however, misinterprets the sense of being in a place that is relevant to the adage. The sense in which I am in a place in virtue of part of me being in that place is not what is at issue. In the relevant sense, the only place I am *in* is a certain spatial region that includes both an area above the desk and an area above the seat of the chair. In this sense, what can properly be said to be on the chair is my torso, while what are on the desk are my feet. The endurantist's "existence at a time" is analogous, then, to the sense of "being at a place" which is relevant to the adage, and is such that a part of an entity existing at a certain time does not entail the whole entity existing at that time. An entity can only be said to exist only at a time that the whole entity exists.<sup>192</sup> Thus, according to the

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<sup>191</sup> What is curious about sorts of expressions such as "exists at time *t*" or "exists in place *p*" is that they seem to involve substituting "to exist" for a non-existential use of "is". This does seem a very natural sort of expression, however. My experience is that when one presents a view such as afuturism or omnitemporalism to those unfamiliar with the issues, one of the first objections that commonly arises is that it has the absurd consequences such as the fact that "dinosaurs exist *now*". This objection, of course, trades on the ambiguity in these sorts of expressions. Taken in the way in which the afuturist or omnitemporalist would agree to it, it is quite innocuous. Taken in another way, it is indeed absurd.

<sup>192</sup> This account of endurantism is, I believe, in the same spirit as the most common way of defining the view, which is in terms of an object being "wholly present" at any time at which it exists. One caveat should be noted, however. There may be very good reasons to reject the possibility, either physical or logical, of instantaneous entities. The very existence of an entity

endurantist, the apple's persistence through time consists in literally the same thing being entirely at  $t_1$  and also entirely at  $t_2$ , in a similar fashion to how the old adage would be false if the entire me were in Iowa City and in Paris at the same time.

The perdurantist, while agreeing with the endurantist that in our initial datum that the same apple exists at  $t_1$  and  $t_2$  the notion of sameness is to be interpreted as strict identity, disagrees about how to interpret the notion of existence at particular times in that datum. According to the perdurantist analysis, the apple's existing at those two distinct times is analogous to my being both on the chair and on the desk. That is, the apple is at the two distinct times in virtue of being a whole that has parts that are entirely at those times. On this view, objects such as the apple are extended in time in much the same way in which they are extended in space, and thus have temporal parts in virtue of which they persist through a certain stretch of time as well as spatial parts in virtue of which they extend over a certain expanse of space. It should be obvious that this theory of persistence, understanding the relationship of objects to time on the model of their relationship to space, is one to which a pure four-dimensionalist would be committed.

Exdurantism, by contrast, interprets the notion of existence at a time in much the same manner as the endurantist, but disagrees on the notion of sameness that is relevant. While the endurantist held that the sameness in question was strict identity, the exdurantist holds that it is only identity in the "loose and popular sense", as Joseph Butler termed it. Loose identity is, properly speaking, not identity at all, but a matter of certain relations holding between two distinct entities in virtue of which we find it convenient to

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may require a certain minimal amount of time, and thus it might be said that every entity thus has a certain temporal extent. To this extent, it might be said that no entity entirely exists in an instant, and if  $t_1$  and  $t_2$  are taken to refer to instants, there may be nothing which entirely exists at those times. The solution to this is to understand the notion of times in such a way as to include temporal intervals as well as instants. Thus, when the endurantist says that the same apple entirely exists at  $t_1$  and  $t_2$ , " $t_1$ " and " $t_2$ " might be taken to refer to temporal intervals rather than instants.

conceptualize them as being the same. In other words, it is not literally the same entity that exists at  $t_1$  that exists at  $t_2$  at all, according to the exdurantist analysis, but the two entities are related in a particular manner. Theodore Sider, who is perhaps the most prominent contemporary defender of an exdurantist theory as a general theory of persistence,<sup>193</sup> compares the view to counterpart theory in the ontology of modality. Just as, according to counterpart theory, claims about things that might have happened to the apple are made true by there being an entity in another possible world that does those things and bears certain relations to the apple, so it can be said that an entity which exists at  $t_1$  persists through time by there being entities at other times that bear the right relations to it. Exdurantist accounts may differ over what they hold the relevant relation to be, but they all follow this same basic pattern.<sup>194</sup>

The perdurantist agrees with the endurantist as to how the notion of “sameness” is to be interpreted in our basic datum, but offers a different interpretation of “existence at a time”. The exdurantist shares the endurantist’s interpretation of “existence at a time”, but offers a different account of “sameness”. To this extent, perdurantism and exdurantism have more in common with endurantism than they do with one another. Yet there is another important way in which the two views are very closely related to one another. To see this let us use the interpretation of “existence at a time” given by the endurantist. According to the perdurantist, what exists at  $t_1$  and  $t_2$  in this sense are temporal parts of a temporally extended whole. These temporal parts are strictly distinct from one another.

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<sup>193</sup> Exdurantist theories of persistence have traditionally been quite common in discussions of “personal identity”, but Sider’s “stage theory” is probably the most prominent attempt to generalize an exdurantist view to all objects. See Sider (2001) for the fullest development of the view.

<sup>194</sup> It is characteristic of exdurantism, however, that the relation in question holds between two distinct entities. One cannot be exdurantist and claim that identity, for example, is the relation that unites the phases of the apple, even if one holds that identity is a genuine relation.

According to the exdurantist, what exists at  $t_1$  and  $t_2$  are apples, which are loosely identical to one another but strictly distinct. So, for both of these views, what exists at  $t_1$  is strictly distinct from what exists at  $t_2$ , whereas for the endurantist there is strict identity between what exists at  $t_1$  and what exists at  $t_2$ . Though their accounts of persistence differ significantly, the underlying ontologies of perdurantist and exdurantist are very similar, with the main difference being that the perdurantist account requires the existence of a temporal whole of which those entities which exist at  $t_1$  and  $t_2$ , in the endurantist's sense of existence at a time, are both parts. The exdurantist may or may not accept the existence of this temporal whole, but, if the exdurantist does, it plays no role in his or her ontology of persistence.

The view that what exists at  $t_1$  is strictly identical to what exists at  $t_2$  and the view that what exists at  $t_1$  is strictly distinct from what exists at  $t_2$  do not exhaust the realm of possibilities, however. Between strict identity and strict distinctness, there is a third option, which is partial identity. This possibility forms the basis of the intradurantist account of persistence. Like the exdurantist, the intradurantist accepts the endurantist's account of existence at a time, but offers a different notion of sameness. Rather than replacing strict identity with loose identity, the intradurantist replaces it with partial identity. More specifically, the intradurantist holds that the sense in which the apple that exists at  $t_1$  and the apple that exists at  $t_2$  are the same is a matter of the entity that exists at  $t_1$  being a proper part or constituent of the later entity at  $t_2$ .<sup>195</sup> The intradurantist conceives of the relationship between what exists at  $t_1$  and what exists at  $t_2$  as being similar in kind to the relationship between the stem of the apple at a certain point in time and the whole apple at that time. This contrasts to both the endurantist, according to

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<sup>195</sup> Proper parthood is not the only form of partial identity on which one might consider basing a theory of persistence. There is also proper overlap. While I have my doubts as to whether such a theory would be particularly successful, I will not explore its prospects in this essay.

whom these are one and the same entity, and the perdurantist and exdurantist, both of whom hold what exists at  $t_1$  and what exists at  $t_2$ , in the endurantist's sense of entirely existing at those times, are no more identical than two apples sitting at home on my counter at the same time would be.

Four-Dimensionalists have traditionally opted for the perdurantist conception of persistence, as it analyzes the notion of persistence through time on analogy with how an object takes up space, namely by having parts that occupy distinct points in space. The exdurantist account has recently been gaining favor among self-identified four-dimensionalists who argue for a version of the view that is ontologically indistinguishable from standard four-dimensionalism, but which understands the difference between perdurantism and exdurantism primarily in terms of the referents of terms for ordinary objects.<sup>196</sup> Both the endurance theory and the intradurance theory seem to require ontological differences between space and time that would be incompatible with four-dimensionalism<sup>197</sup>, though they are at least *prima facie* compatible with other standard theses of four-dimensionalism, such as omnitemporalism and tense relativism, so that it seems that one could deviate from four-dimensionalism solely by embracing one of these other theories of persistence.<sup>198</sup> Presentists, it seems, are most likely to opt for either an

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<sup>196</sup> On Sider's version of the view, for example, exactly the same things exist which exist on what he calls the "orthodox four-dimensionalist" view. The central difference between his view and that of standard four-dimensionalism is that terms such as "the apple" refer to temporal parts rather than to temporal wholes as they do on traditional four-dimensionalist accounts. Thus the difference between the two views is primarily at the level of semantics rather than ontology.

<sup>197</sup> At least intuitively, literally the same thing cannot occupy multiple spatial locations, which would be the spatial equivalent of the endurantist theory of persistence, nor do things contain constituents located at distinct points in space from themselves, which would be the spatial equivalent of intradurantism.

<sup>198</sup> As previously mentioned, Hugh Mellor is an example of someone who embraces all of the standard theses of the "B-theory", but who holds an endurantist theory of persistence. Bertrand Russell at the time of *The Principles of Mathematics* would seem to be another example, based on the quotations considered in **Section 2.3**.

endurantist theory or an exdurantist theory, but have more difficulty embracing either a perdurantist or intradurantist theory.<sup>199</sup> Accretivists, it seems, can, *prima facie*, adopt any of the theories of persistence. Intradurantism seems to fit very naturally with the mereological analysis of temporal relations mentioned in **Section 2.5.3**, and indeed something like it seems to be held by Whitehead and his followers.

## **2.7 Four-Dimensionalism, Presentism, and Accretivism**

The four-dimensionalist, as we have seen, is committed to the thesis that time is to be understood as a “fourth dimension”, analogous to one of the spatial dimensions. This leads the four-dimensionalist to downplay both the importance of both the Tensed and Transitory Aspects of Time. Four-dimensionalists tends towards tense relativism, which denies that there is any objective notion of past, present, or future, and towards omnitemporalism, which asserts that the distinction between that which is past, that which is present, and that which is future has no significance for ontology. Furthermore, the view seems committed to the denial of the objective reality of temporal passage, as it seems to have no equivalent in spatial terms. As far as the Durational Aspect goes, the four-dimensionalist does not seem to be committed one way or another on the subject of temporal atomism, so long as he or she says the same thing about time that he or she says about space. The Structural Aspect of Time, the “B-series” of McTaggart, is perhaps the most central aspect of time for the four-dimensionalist, though it is possible to hold

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<sup>199</sup> The presentist holding a perdurance theory would have to hold that the presently existing temporal part is part of a temporal whole of which the other parts do not exist. The presentist holding an intradurantist theory would have to hold that the present contains constituents which do not exist. Either of these theories might perhaps be maintained in a modified form, given that the presentist has to give some sort of account of talk about other times, and so might be able to translate talk about temporal wholes or constituents of the present object which exist in the past into talk about whatever grounds those truths, and thus give something which is in some sense a perdurantist or intradurantist account, but at the very least the presentist cannot offer either of these accounts of persistence in their most straightforward forms.

widely different views on specific issues with regard to the Structural Aspect and still be a four-dimensionalist. This is because one might hold very different views on the structure of space, and, so long as one thinks of time as analogous to one's view of spatial dimensions, one qualifies as a four-dimensionalist. With regard to the Differential-Repetitive Aspect, most four-dimensionalists understand persistence through time as analogous to extension through space, and so adopt a perdurance theory of persistence, though a few have argued that exdurantism is also compatible with four-dimensionalism, so long as the difference between the two theories is at a semantic level rather than an ontological level.

Presentism as a doctrine contains much less substantive commitments than does four-dimensionalism. The central thesis of presentism is that only that which is present exists. This commits the presentist to there being an objective notion of the present, which means that the view is incompatible with tense relativism, but the presentist is otherwise neutral on how this objective notion of tense is to be analyzed. It is probably the case that most presentists accept the objective reality of temporal passage, but they are often silent on the issue, and nothing in the presentist view *per se* commits one to any particular account of the Transitory Aspect of Time.<sup>200</sup> With regard to the Durational Aspect, I suggested that the presentist would be well-advised to accept the doctrine of temporal atomism, though it is not necessarily entailed by the theory. Just as the Tensed and Transitory Aspects are necessarily downgraded in importance by the four-dimensionalist, the presentist holds that the Structural Aspect is much less fundamental to

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<sup>200</sup> Markosian (2004) is an example of a presentist who explicitly suggests a reductive account of temporal passage. Mark Hinchliff (1998) is explicit in stating that the presentist is not committed to the objective reality of temporal passage. Barry Dainton (2001), pp. 84-5, suggests that the "timeless" universe suggested by Julian Barbour's particular interpretation of how relativity and quantum mechanics might be reconciled by the Wheeler-DeWitt equation (Barbour 1999) is ultimately a non-transitory version of presentism which he refers to as "many-worlds presentism".

time, because in very important sense, temporal relations between events at one time and another do not exist for the presentist, or, to the extent that they do, only in virtue of being reduced to things which exist in the present. In the case of the Differential-Repetitive Aspect, I have suggested that the presentist is most likely to embrace either an endurantist or exdurantist theory of persistence, though, notably, one of the main advantages of presentism for some philosophers is that it seems to very naturally fit with the endurantist theory of persistence.

The accretivist view is defined as being committed to the objective reality of temporal passage and an afuturist view according to which the “sum total of reality” includes the past and present, but not the future. As with the presentist, this requires that there be an objective notion of the past and present and so tense relativism must be rejected. With regard to the Durational Aspect, accretivism does not seem to require any particular account, though I noted that my own sympathies lie with temporal atomism. Like the four-dimensionalist, it seems that the accretivist can hold a variety of views with regard to the Structure Aspect of Time, though unlike the four-dimensionalist they are not committed to the idea that time must be understood on analogy with spatial dimensions.<sup>201</sup> I mentioned that the mereological account of temporal relations has been held by at least a couple of prominent four-dimensionalists, and it is one that I have sympathy towards, though it is not properly speaking a part of the accretivist view. Lastly, with regard to the Differential-Repetitive Aspect, the accretivist seems to be neutral with regards to particular accounts of persistence, though the mereological theory of temporal relations fits in nicely with the intradurantist account of persistence.

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<sup>201</sup> It is worth noting that the most common way of presenting the accretivist view, the so-called “Growing Block Theory”, tends to understand the accretivist as having the same kind of commitment to the analogy between space and time with regard to the Structural Aspect. On most presentations, the world of the growing block theorist is exactly like that of the four-dimensionalist, with the exception of the fact that there exists nothing in the future and that the universe is “growing” in the direction of the future.

One of the advantages of accretivism over its two leading competitors is that it at least allows for the possibility of all five aspects of our ordinary experience and conception time to be treated in a realistic manner as fundamental elements of temporal reality. Unlike the four-dimensionalist, who must downplay the importance of both the Tensed and Transitory Aspects, and unlike the presentist who must downplay the importance of the Structural Aspect, the accretivist can accept each of these as genuine, objective phenomena. Given that these aspects of time are well-rooted in our experience of the world as temporal, a theory that can give a significant place to each of the aspects has at least a *prima facie* advantage over other views. In effect, the argument for accretivism in the next chapter builds upon this basic point that the accretivist gives the best account that can combine the various aspects of our temporal experience.

## CHAPTER THREE

### A SURVEY OF TRANSITORY THEORIES

#### 3.1 Introductory Remarks

Given that the five aspects of time discussed in the last chapter are well-rooted in our ordinary experience and conception of the world as temporal, I take it that any metaphysics of time that understands these aspects as genuine features of temporal reality and not as mere illusions of our experience is to be *prima facie* preferred. Thus the basic contention of this chapter is that a theory of time should recognize the objective reality of each of these aspects. In particular, I will be maintaining that what we should be seeking is a theory that holds the Transitory Aspect of Time as objectively real, and that such a theory is to be preferred unless we are presented with legitimate reasons to think that the Transitory Aspect is a mere illusion. Before discussing various transitory theories, however, I will first discuss non-transitory theories and their various attempts to explain how the “illusion” of transience is generated. Towards the end of the chapter, when defending accretivism against various objections, I will deal with several arguments to the effect that the passage of time is an illusion.

The central goal of this chapter, however, will be to survey various theories that incorporate the Transitory Aspect, and argue for the superiority of accretivism over other transitory theories. A significant part of the chapter will be focused on varieties of presentism, primarily as a result of the fact that, of the two major contemporary theories of time, presentism is the one that is at least compatible with recognizing the objectivity of the Transitory Aspect. As indicated at the end of the last chapter, the central problem for presentism will revolve around its lack of recognition of the Structural Aspect of Time. By contrast, the *prima facie* case in favor of the theories that recognize the Transitory Aspect, combined with the refutation of arguments against the objective

reality of this aspect in the next chapter, will constitute the case against Four-Dimensionalism.

Given that a presentism that incorporates the Transitory Aspect is to be taken as the major foil to accretivism in this chapter, and that the main difference between these two views is on their position on the issue of the ontological significance of tense, it will be useful to classify transitory theories by their position on this issue. Thus, after the discussion of non-transitory theories in the next section, I will move on to critique the major varieties of transitory presentism in the current literature. Then I will move to discussion of several versions of transitory omnitemporalism. I will then briefly discuss the combination of apastism with realism about the Transitory Aspect, a view which I refer to as “erosionism”. Lastly, I move on to accretivism, arguing for its superiority over other transitory views.

### **3.2 The Illusion of Transience?**

A methodological presupposition of this essay is that any bit of our experience of the world should be taken as veridical unless there is extremely good reason to reject it, and ultimately only if an explanation as to why, if the world is much different than it appears to us to be, our appearances deceive us. Given that the Transitory Aspect of Time is a central aspect of the temporal world as we experience it, I take it that we should accept its reality, unless given decisive reason to reject it. Any theory, such as four-dimensionalism, that declares that temporal passage is unreal owes us some explanation of how it is that the illusion of temporal passage is generated.<sup>202</sup>

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<sup>202</sup> Perhaps it is worth noting that there are a number of extraordinary experiences which are sometimes described as “experiences of timelessness”. In particular, mystical experiences are often said to have this character. I actually suspect that historically experiences of this sort have been a much more widespread motivation for views that deny the reality of temporal passage than most “scientifically-minded” four-dimensionalists would typically admit. McTaggart, for example, apparently had such experiences at various points in his life. Presumably, the realist about temporal passage owes us an explanation of what is going on in these sorts of experiences as well.

Interestingly, despite the dominance of four-dimensionalist views in the literature, and despite their open dismissal of any objective notion of temporal becoming, attempts to explain the illusion of temporal passage are surprisingly thin. Four-dimensionalists spend quite a bit of time arguing that they can avoid commitment to objective tense, and often when confronted with the question of our experience of temporal passage, they will provide an account of the experience of tense instead, perhaps because of the widespread tendency to conflate these two aspects. However, if even one can give an account of why it certain things seem to be past, others to be present, and still others to be future, this does not seem to be sufficient to explain the immanent phenomenal flow whereby there seems to be a shift with regard to these “A-determinations”. In this section I will briefly look at least a couple of accounts that are offered as explanations of the illusion of temporal passage.<sup>203</sup>

Bertrand Russell was one philosopher who denied the objective reality of temporal passage, but who took seriously the problem of providing for an account of how the illusion was generated. In his discussion of “The Theory of Continuity” in *Our Knowledge of the External World*, Russell sought to give a brief account of why philosophers such as Bergson might believe that there was more to motion than simply an object being at one point at one time and another point at another:

What is this something we see, and that we call visible motion? Whatever it is, it is *not* the successive occupation of successive positions: something beyond the mathematical theory of motion is required to account for it. Opponents of the mathematical theory emphasize this fact. “Your theory, they say, “may be very logical, and might apply admirably to some other world; but in this actual world, actual motions are quite different from what your theory

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<sup>203</sup> There is actually a huge literature on the “phenomenology of time”, much of which assumes that there is such a thing as awareness of the flow of time and which tries to understand how exactly this awareness works. While the actual character of our awareness of temporal passage requires a great deal of elucidation even on a realist account, I am only focused in this section on attempts to explain away or reduce the experience of temporal passage to something else.

would declare them to be, and require, therefore, some different philosophy from yours for their adequate explanation.”

The objection thus raised is not one which I have no wish to underrate, but I believe it can be fully answered without departing from the methods and the outlook which have led to the mathematical theory of motion. Let us, however, first try to state the objection more fully.

If the mathematical theory is adequate, nothing happens when a body moves except that it is in different places at different times. But in this sense the hour-hand and the second-hand are equally in motion, yet in the second-hand there is something perceptible to our senses which is absent in the hour-hand. We can see, at each moment, that the second-hand is moving, which is different from seeing it first in one place and then in another. This seems to involve our seeing it simultaneously in a number of places, although it must also involve our seeing that it is in some of these places earlier than others.<sup>204</sup>

It is not entirely clear what point Russell is making about our perception of motion here. Surely he does not mean that we literally see the same thing being in multiple places. It is not clear what exactly what it would be like to perceive that. The more plausible point is that when we perceive a moving object, we do not perceive it as having its normal spatial characteristics. For example, when we perceive a fly race across our visual field, it is the case that we do not actually experience a fly-shaped object. Russell expands this sort of point by discussing the “physiological” aspects of our experience of motion, emphasizing the fact that the slowness of reactions in our body cause us to see temporal characteristics of objects different than they actually are. His example is that a flash of lightning is much shorter than the physiological processes associated with perceiving the flash of lightning, and thus the flash appears to us longer than it actually is. Similarly, because the rate at which the fly occupies various positions is faster than the rate at which we can process the visual image of the fly, we perceive it as a kind of streak across the visual field.

While all of this is perhaps true, it is not clear that it explains what it sets out to explain, namely the perception of motion. It is probably true that the smallest unit of

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<sup>204</sup> Russell (1914), pp. 144-45.

awareness of a fly going across our visual field is not something fly-shaped, but something like a streak, that does not however seem to account for why we perceive that streak as moving from one place to another. For example, there is an optical illusion known as “flying rods” created by insects flying quickly in front of a camera, so that the camera captures them as an elongated creature with multiple sets of wings, which were thought to be a mysterious undiscovered creature when they were first observed. If all there was to observing the motion of the fly was observing it as a distorted shape, then there would be no difference between observing a “moving” insect and observing a static flying rod”.

Another popular attempt to account for our awareness of the passage of time is to invoke the notion of episodic memory.<sup>205</sup> It is because we are aware of certain events of being in our “immediate past”, and also aware of the sort of A-series ordering, so that we remember that other events were remembered as past and so forth, that is somehow supposed to generate the illusion of temporal passage. It is not clear how this is supposed to work, however. Even if we were aware of certain events having this character of pastness, and even if we were aware of a sort of containment relationship of the sort suggested, it is not clear how this would generate the perception of events changing their characteristics in the way that seems required by our awareness of the passage of time. It seems that on the memory account all we get is a static A-series ordering of events, but there no real sense of things changing their place in this ordering.

### **3.3 Varieties of Presentism**

Presentism is the thesis that only that which is present exists. It is often held by its proponents to be the theory of time that best captures our pre-theoretical intuitions about

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<sup>205</sup> Mellor (1998) is perhaps the most prominent example.

ontology. Ask the average person in the street to list things that exist, and one would almost certainly get a response that lists only present things. If asked about dinosaurs, the average non-philosopher will respond that while they *did exist*, they no longer do, barring speculation about the Loch Ness Monster, *Journey to the Centre of the Earth*-style underground worlds, or other such fantastic scenarios. Prominent presentist John Bigelow goes so far as to claim that

I say that this was believed by everyone, both the philosophers and the folk, until at least the nineteenth century; it is written into the grammar of every natural language; and it is still assumed in everyday life even by philosophers who officially deny it... Presentism was assumed by everyone everywhere, until a new conception of time began to trickle out of the high Newtonianism of the nineteenth century. The Christians' Holy Bible says that there is no new thing under the sun but this is not true, at least not in the sense which first comes to mind out of context. The so-called fourdimensionalist theory of time was something genuinely new, when it gradually came into being last century.<sup>206</sup>

Bigelow's assertion that everyone was a presentist before the nineteenth century seems to me clearly false. While it perhaps true that four-dimensionalism, with its analogy between space and time, is a doctrine of relatively recent vintage, the denial of presentism seems characteristic of a whole tradition, beginning at least with neo-Platonism and continuing through the various medieval theological traditions, which held that from God's point of view past, present, and future "co-exist" *sub specie aeternitatis*.<sup>207</sup> Boethius, to take one prominent example of a philosopher in this tradition, says that

Since, therefore, all judgement comprehends those things that are subject to it according to its own nature, and since the state of God is ever that of eternal presence, His knowledge, too, transcends all temporal change and abides in the immediacy of His presence. It embraces all the infinite recesses of past and future and views them in the immediacy of its knowing as though they are happening in

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<sup>206</sup> Bigelow (1996), p. 35.

<sup>207</sup> Iamblichus, who is sometimes said to anticipate McTaggart's distinction between the A- and B-series, deserves particular mention for his importance to this tradition. See Sorabji (1983), Chap. 3.

the present. If you wish to consider, then the foreknowledge or prevision by which He discovers all things, it will be more correct to think of it not as a kind of foreknowledge of the future, but as the knowledge of a never ending presence. So that it is better called providence of “looking forth” than prevision or “seeing beforehand”. For it is far removed from matters below and looks forth at all things as though from a lofty peak above them.<sup>208</sup>

Boethius’s doctrine is that God’s vantage point, presumably more objective than that of mere human beings “in time”, is one that sees past, present, and future “all at once” much like seeing things on the ground from up above.<sup>209</sup> Similar ideas can be found in numerous writers of late antiquity and the medieval period in particular. Arguably, the basic notion can also be found in at least the Taoist tradition in Chinese philosophy.<sup>210</sup>

Bigelow is fond of arguing for his contention that presentism was commonly assumed prior to the nineteenth by pointing out the absence of time-travel fiction prior to this period.<sup>211</sup> Presumably, what Bigelow is suggesting is that to conceive of time-travel as a possibility requires conceptualizing other times as though they were other “places” that one could potentially visit. Even if one granted the validity of this point, this would at best prove that the analogy between time and space was a nineteenth-century invention and not that non-presentist views were something new. However, I am not sure that we should even grant Bigelow’s point that much weight. Numerous other genres of literature are rarely if ever seen prior to the nineteenth century. The murder mystery, for example, is also largely a nineteenth-century invention.<sup>212</sup> It is not clear what conclusion one

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<sup>208</sup> Boethius (1969), p. 165.

<sup>209</sup> One might see in this spatial analogy the roots of four-dimensionalism.

<sup>210</sup> Fung (1948), p. 112, compares the point of view of the Tao as presented in the *Chuang-Tzu* to that of a man standing at the center of the “circle of changes”, understanding all that is going on in the circle but not himself subject to the movement of the circle.

<sup>211</sup> In addition to Bigelow (1996), he develops this point further in Bigelow (2001).

<sup>212</sup> Notably, Edgar Allen Poe was an important figure in the development of both genres. See “The Murders in the Rue Morgue” for one of the first murder mysteries and “A Tale of the Ragged Mountains” for an early example of time travel fiction. Notably, Poe’s story is much more influenced by mesmerism and the occult than by developments in physics.

should draw about the pre-nineteenth century conceptual scheme on the basis of this fact, however. A more basic explanation for both of these absences would probably involve the overall growth of literacy and expansion of the publishing industry leading to literary experimentation during the nineteenth century rather than some fundamental conceptual change.

Overall, I would suggest that the appeal to presentism as the view of “common-sense” is problematic in much the same way as the appeal to four-dimensionalism as the “scientific” view.<sup>213</sup> Just as there are certain elements of modern science that might suggest four-dimensionalism, there are certain ordinary intuitions that might suggest presentism. Just as, however, there are other elements of modern science that are difficult to square with the four-dimensionalist view, there are other ordinary intuitions that are difficult to square with the doctrine of presentism. Among these are intuitions about the Structural Aspect of Time. To the difficulty of accounting for these intuitions, I turn in the next section.

### *3.3.1 Presentism, the Structural Aspect, and the Past*

According to the presentist, only that which is present exists. Barack Obama has ontological status; Julius Caesar does not. The state of affairs of Barack Obama being president has ontological status; the state of affairs of Barack Obama being a senator does not. This is usually taken to generate at least two major puzzles for the presentist. The first is in accounting for truths about other times. Intuitively, its being true that that Barack Obama is president has some sort of connection to the state of affairs of Obama’s being president. There is, however, no state of affairs of Obama’s being a senator, so the connection between truths about his senate career and actual states of affairs is lost. So, the puzzle arises as to how the presentist can account for such truths. The second

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<sup>213</sup> See **Section 1.2.5**.

difficulty for the presentist involves relations between things at different times. For example, Obama is taller than Caesar. This problem runs even deeper than the problem of accounting for truths about other times, in that not only does the state of affairs of Obama's being taller than Caesar not exist now, but it never seems to exist, as Obama and Caesar never co-exist on the view of the presentist.

There are a variety of responses that the presentist might offer to these difficulties. One might be to simply deny that there are any truths about other times. While I will suggest in the next chapter that this is in fact a reasonable response to propositions about the future, at least in the case of claims about the past, it seems to be part of our pre-theoretical data that propositions such as "Obama was a senator" or "Obama is taller than Caesar" are indeed true, and to simply deny that any such propositions were true would be to undercut the presentist's claim to be defending the "common-sense" view. Perhaps a more promising sort of response would be say that while these propositions are true, unlike propositions about the present these propositions are not made true by existing states of affairs. I have already suggested that the doctrine that every truth must be made true by some *being* is something that should be questioned by anyone who asserts the irreducibility of becoming to being, and so if the transitory presentist is already endorsing this view as a result of the "transitory" half of their theory, perhaps using it to defend the "presentist" aspect might be appealing. Indeed, Trenton Merricks, who is perhaps the most prominent defender of the idea that the need for "truthmakers" applies only to certain truths but not others explicitly uses this idea to defend presentism.<sup>214</sup>

One might be tempted to suggest that as temporal passage is best understood in terms of a change in the sum total of reality and in terms of a change in a complete and true description of the world, and so that what makes it true that there is temporal passage

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<sup>214</sup> Merricks (2007), Chap. 6.

is the occurrence of these changes rather than some existing thing, so one might suggest that the truth about Obama's being senator is not something which is made true by some existing thing, but by the states of affairs of Obama's being a senator having been part of the world which has now ceased to include that state of affairs. Thus, as I have used the appeal to "meta-time" to understand the notion of temporal passage, perhaps it would be useful in understanding the notion of truth about the past as well. Something like this position seems to be endorsed by William Lane Craig:

What makes the tensed proposition true? One could say that the fact that Hegel used to be alive makes the proposition true, in the sense that the tensed fact is expressed as the truth conditions of the relevant proposition on a view of truth as correspondence. But one could also say that the past-tense proposition is true because the relevant present-tense proposition once was true, a view that Freddosso has called 'the primacy of the pure present'. What made the present-tense proposition true was the living, breathing, concrete object Hegel. So ultimately the truth of the past-tense proposition derives from the things/events referred to plus the lapse of time. What makes the tensed state of affairs *Hegel's having been alive* obtain? Again the answer seems to be a combination of Hegel's being alive plus temporal becoming.<sup>215</sup>

Thus, while Hegel's being alive was once part of the sum-total of reality, it has ceased to be so, but while there is now nothing in the complete and true description of reality that grounds the truth that Hegel once lived, we can nonetheless say when talking about our ideal language descriptions of the world that the complete and true description of reality once contained a description of Hegel living.

Simon Keller, while at least sympathetic to the notion that certain truths lack a truthmaker, nonetheless suggests that we should resist this move with regard to truths about the past or future:

Start with a present-tense truth: *The Tower of London is on the Thames*. This is a truth about the Tower of London and the Thames, two things that exist and are next to each other. If either the Tower of the Thames did not exist, or if they were not next to

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<sup>215</sup> Craig (2003), pp. 400-1.

each other, then *The Tower is on the Thames* would be false. So there's one proposition whose truth depends upon certain things' existing and exhibiting certain characteristics. Now consider a past-tense truth about those same things: *The Tower of London was on the Thames*. That too is a truth about the existing tower and the existing Thames, and it's true because those very things *were* next to each other; if either the Tower or the Thames had never existed, or if they had never been next to each other, then *The Tower was on the Thames* would be false.

Next *Anne Boleyn spent time at the Tower*. Here we have another truth about the existing Tower, and another truth that seems to report a relation that holds between the Tower and something else—not an existing Anne, perhaps, but definitely *something*. And if the Tower had never existed, and if the Anne-like thing was not such to make it the case that Anne spent time at the Tower, then *Anne Boleyn spent time at the Tower* would not be true. But now we have an Anne-like thing, and surely that is the very thing about which *Anne Boleyn was executed* is a truth. If the Anne-like thing were different in certain respects, then it would not be true that Anne was executed. So the truth of *Anne Boleyn was executed* does, after all, depend on a certain thing's being a certain way.<sup>216</sup>

The thrust of Keller's argument seems to be that while the denial of the need for a truthmaker might be plausible in the case of possibilities or fictions or other abstract matters, when it comes to truths about concrete things, these seem to require reference to some actually existing thing in order to ground them. Perhaps this concrete thing is not what it initially seems to be, for if one is a presentist it cannot be an existing Anne, but nonetheless it seems as though there must be some existing entity that one is talking about when one makes this kind of assertion, according to Keller. Merricks, in response to Keller, argues that he makes the illegitimate assumption that "truths, differing merely in tense, ought to be treated alike when it comes to truthmaking".<sup>217</sup> According to Merricks, "The Tower *was* on the Thames" differs from "The Tower *is* on the Thames" in much the same way that "The Tower *might be* on the Thames", and just as the latter claim is not made true by an actually existing states of affairs on Merricks view, neither is the past-tensed claim.

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<sup>216</sup> Keller (2004), p. 93.

<sup>217</sup> Merricks (2007), p. 143.

The question of how to distinguish claims that require truthmakers from those that do not is obviously very important, but also very difficult. My own inclination is to agree with Keller that tense is very different than modality in that while changing the modal aspect of a claim seems to affect whether we are talking about some actually existing state of affairs whereas change in tense does not seem to affect this, but this may simply be begging the question against Merrick's version of presentism. Fortunately, it seems to me that we can sidestep this issue by pointing out that even if we allow this sort of solution for accounting for truths about the past, it does not seem to help in accounting for cross-time relations. Even on Craig's account the state of affairs of Hegel's being alive plays a role in the story about what ground the truth of the proposition that Hegel was alive, even though this state of affair no longer exists. This state of affairs nonetheless occurs somewhere in the metatemporal ordering; it was once part of the sum total of reality, even if it is not any longer. When it comes to a proposition involving a relation between entities at different times, the state of affairs in question seems never to obtain. The relational state of affairs of Obama-being-taller-than-Caesar includes both Obama and Caesar as constituents, but since Obama and Caesar never co-exist, it is difficult to see how this state of affairs could ever exist, at least granted what seems like a reasonable assumption, namely that for a state of affairs to exist requires that all of its constituents exist.

Perhaps one might reject this assumption by claiming that existing things can bear relations to non-existent things. One might hold that there is a state of affairs of Obama's-being-taller-than-Frodo-Baggins, even though Frodo is a fictional character and, let us suppose, not an existing thing. Even if one accepted this line of reasoning<sup>218</sup>, it seems

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<sup>218</sup> Perhaps it is worth noting that I would *not* be inclined to accept it myself. The situation in question would probably be best assayed as really being a relation between two properties, the height actually possessed by Obama and the height ascribed to Frodo in fictional depictions. Notably, the presentist could possibly also adopt some version of this strategy to deal with the relation between Obama's height and Caesar's height.

fairly clear that there are certain relational states of affairs in which both relata must exist.<sup>219</sup> Fictional things cannot be causes of actually existent things, for example. Given that causation involves a relation that links together things at different times, and given that both relata of the causal relation must be existing things, it seems as though this presents a difficulty for the presentist, given that the relata of the causal relation never co-exist.<sup>220</sup> Let us suppose that Event A is the cause of Event B. On the presentist view, Event A exists, then ceases to exist and Event B exists. There can be no state of affairs linking together Event A and Event B causally, as neither co-exists with the other one. It seems that the only way a strict presentist can solve this problem is by arguing that what seem to be cross-time relations are in actuality relations between things that do in fact co-exist on the presentist view. This is a central problem for the presentist, and we will look at a number of different ways in which presentists have attempted to solve this problem in subsequent sections.

### 3.3.2 *Evidentialist Presentism*

When confronted with the doctrine of presentism and the problems of accounting for truths about other times and for cross-time relations, perhaps the first thought that

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<sup>219</sup> Temporal relations themselves might also seem to be an example of this. Even though we might truly say, for example, that the death of Sydney Carton is later than the storming of the Bastille, it seems fairly clear that there is no actual state of affairs of the-storming-of-the-Bastille-preceding-the-death-of-Carton as it seems there is an actual state of affairs of the-storming-of-the-Bastille-preceding-the-death-of-Louis-XVI. The transitory presentist, however, could respond that these are not in fact existing states of affairs, but ways of referring to the meta-temporal ordering. While there never exists a state of affairs of the storming-of-the-Bastille-preceding-the-death-of-Louis-XVI, one might say that the sum total of reality once included the event of the storming of the Bastille and then later included the death of Louis XVI.

<sup>220</sup> One view that may solve this problem is the view that Dainton refers to as “compound presentism”. This view holds that not only the present exists, but at least a short amount of time into the past or the future exists as well, and so is not, strictly speaking, a presentist view. Compound presentism would help with the problem if one assumes that all problematic cross-time relations are between entities that close together in time (as seems to be the case in causation), but would fail if there were problematic relations between things further apart in time.

strikes many is to try to analyze claims about other times in terms of presently available evidence that would justify making claims about those other times. So, for example, the claim that “Dinosaurs existed” might be grounded by things such as dinosaur fossils. The claim that dinosaurs existed prior to woolly mammoths would include such things as techniques for dating the relative age of fossils. The claim that birds evolved from dinosaurs would be grounded in similarity of bone structure between certain dinosaurs and birds and whatever other evidence is used to make that conclusion. This view we might call “evidentialist presentism”.

While this might seem initially promising, it would only work if every truth about the past were such that there were sufficient evidence for it in the present. There are no doubt many truths about things in the past for which this is not so. Take the claim that there were exactly 781,748 slaves employed in the construction of a particular Egyptian pyramid. While it is not inconceivable that we might discover records that would confirm or deny this particular claim, there may very well be no evidence one way or another that has survived as to the particular number of persons involved in the building of the pyramid in question. Yet, it seems obvious that for some particular claim about the number of slaves used in building the pyramids, that claim will be true, though there is no presently existing evidence to ground it.

One might construct a more complicated version of evidentialist presentism according to which one with sufficient knowledge of the present state of the universe and the laws of nature could calculate exactly what the universe was like at various points in the past, somewhat like Laplace’s demon was supposed to be able to do with regard to future states of the universe. This would only be viable on the assumption that the laws of nature do uniquely determine one particular past of the universe, which is fairly large assumption about the laws of nature to make. One would hope that the viability of presentism as a theory would not hang upon such a speculative hypothesis. A further difficulty for this sort of move, however, involves Bertrand Russell’s famous scenario

according to which the universe actually came into existence five-minutes ago, with everything in the states it was in at that time.<sup>221</sup> So, even though I seem to remember things happening more than five minutes ago, I actually came into existence with those pseudo-memories. The universe came into existence with dinosaur fossils, and with light that seems to have come from distant and long-dead stars that never actually existed. The whole point of Russell's scenario seems to be any present evidence I might have for what the world was like more than five minutes ago can never be enough to guarantee that the world even existed more than five minutes ago, and thus it seems insufficient to ground truths about the past. If an evil demon could have created the world in the state it was in five minutes ago, with the laws of nature that exist in our universe, then, even if we grant the assumption that laws of nature can be used to determine previous states of the universe, this seems insufficient to ground truths about what actually happened in the past.

### *3.3.3 Lucretian Presentism*

One of the first recent presentists to seriously confront the twin problems of accounting for truths about non-present times and cross-time relations was John Bigelow, whose particular version of presentism is heavily inspired by Hellenistic philosophy. In his influential "Presentism and Properties", he advocates a version of presentism inspired by the Epicurean philosopher Lucretius. On the Epicurean ontology, what fundamentally exist are atoms and the void, and the properties of these two things. The atoms endure through time but constantly change in their relation to one another, thus generating the changing world that we perceive. This creates a problem of accounting for truths about the past, since, at least as Bigelow understand them, the Epicureans hold that only the present arrangement of atoms actually obtains. Thus the problem of what grounds the

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<sup>221</sup> Russell (1921), pp. 159-160.

truth of, for example, the claim that “Helen of Troy was ravished” arises, given that the atoms that once made up Helen are now scattered throughout the universe and are constituents of different objects. Bigelow gives the following quote from Lucretius:

Again, when men say it is a fact that Helen was ravished or the Trojans were conquered, do not let anyone drive you to the admission that any such event is independent of any object, on the ground that the generations of men of whom these events were accidents have been swept away by the irrevocable lapse of time. For we could put it that whatever has taken place is an accident of a particular tract of earth or of the space it occupied.<sup>222</sup>

Lucretius’s solution is basically that places acquire properties based on what happens at them. So the particular place at which Helen of Troy was ravished acquires the property of *being-the-place-where-Helen-of-Troy-was-ravished* which it permanently possesses from that point forward. Thus, the possession of this property by this place is what ground the fact that Helen of Troy was ravished. At other points, Lucretius seems to suggest that rather than taking the property to be possessed by a space (which would seem to require belief in substantial space if one wanted to adopt it), one could take the appropriate property to be possessed by the atoms in question. So various atoms have a property along the lines of *having-constituted-Helen-when-she-was-being-ravished*, and though Helen herself no longer exists, the atoms that once made her up still have these properties of having been a part of her.

Bigelow suggests the following modified variant of the Lucretian view:

One of the things that exists is the whole world, the totality of things that exist. The world can have properties and accidents, just as its parts may have. It is a present property of the world, that it is a world in which Helen was abducted and the Trojans were conquered.<sup>223</sup>

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<sup>222</sup> Bigelow (1996), p. 45. The Helen example is perhaps unfortunate as it is not clear whether there was in fact an historical person or an actual event of her being ravished, but let us suppose these are actual facts for the sake of keeping Lucretius’s example.

<sup>223</sup> Bigelow (1996), p. 46.

So, on Bigelow's version of Lucretian presentism, Helen is ravished, at which point the universe then acquires the property of *being-a-world-in-which-Helen-was-ravished*, and, though Helen herself, as well as the event of the ravishing, ceases to exist, the universe continues to possess this property, and it thus grounds truths about what happened to Helen.<sup>224</sup>

What about cross-time relations? Bigelow's solution to this problem is to hold that supposed facts about things at different times being related are in actuality relations between these properties that ground truths about the past. So, what grounds the truth that the ravishing of Helen caused the Trojan War is a particular relation that holds between the world's property of *being-such-that-Helen-was-ravished* and its property of *being-such-that-the-Greeks-invaded-Troy*. In general, the Structural Aspect of Time is reduced on Bigelow's account to sets of relations holding between presently existing things, namely these world-properties that serve to ground truths about other times on Bigelow's account.

Perhaps if one is prepared to admit into one's ontology the sort of properties that Bigelow's account requires, then his account might be attractive. I would, however, suggest that one should be skeptical of the existence of such entities. Note that such properties would be tensed entities, and thus Bigelow is committed to a version of the position that I have referred to as tense fundamentalism. I have already given general reasons for being somewhat skeptical of tense fundamentalism as a position, in that it seems to ontologize what are accidental features of certain languages and that tensed properties of the sort that Bigelow's account requires are not empirically detectable and

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<sup>224</sup> Bigelow also seems to hold that there are properties that ground truths about the future as well. So, in more detail, before the ravishing of Helen, the world possesses the property of *being-a-world-in-which-Helen-will-be-ravished*, and then presumably acquires the property of *being-a-world-in-which-Helen-is-being-ravished* as she is ravished, and then once the ravishing is over acquires the property of *being-a-world-in-which-Helen-was-ravished*.

thus have no grounding in our experience.<sup>225</sup> There are additional reasons to be weary of these properties, however. For one, it is difficult to understand what the property of *being-such-that-Helen-was-ravished* is supposed to be if it is not a complex entity which contains Helen as a constituent, and Helen cannot be a constituent of the property given that she does not exist. Another sort of problem is that if such properties were in fact sufficient to ground truths about what happened in the past, then it seems as though such properties could in principle be exemplified by the world even though the actual events of the past never happened. One might wonder whether there might be some possible worlds in which the world could acquire the property of *being-such-that-Helen-was-ravished* without Helen ever having to go through the actual concrete event of being ravished or perhaps even existing at all. The only way to rule this out seems to be to postulate some sort of necessary connection between the actual event of Helen's ravishing and the acquisition of the tensed property by the world. This connection, however, seems itself to be some kind of cross-time relation. On Bigelow's account, this cross-time relation will be analyzed as a relation between two tensed properties, the property of *being-a-world-such-that-Helen-was-ravished* and *being-a-world-that-has-acquired-the-property-of-being-such-that-Helen-was-ravished*<sup>226</sup>, but then this just leads one to wonder again why the universe could not have these properties with these relations without the actual concrete event of the ravishing ever occurring.<sup>227</sup>

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<sup>225</sup> See **Section 2.2.1**.

<sup>226</sup> Alan Rhoda (forthcoming) objects that Bigelow's view seems to generate an infinite number of acquisition properties of this sort, as the universe must not only acquire the property of *being-such-that-Helen-was-ravished*, but must acquire a property that grounds the truth that it acquired that property, and the property that grounds the truth that it acquired the property that grounds the truth that it acquired the property, etc.

<sup>227</sup> Another way of putting this objection is to once again consider the Russell hypothesis that the universe originated five minutes ago, but with all these properties about *Helen's-having-been-ravished*.

### 3.3.4 Haecceitist Presentism

One way of understanding the objections raised to Lucretian presentism is that it seems to disconnect what grounds various truths about past events from the individual involved in the events. So, what grounds the truth that “Helen was ravished” is this property of *being-a-world-such-that-Helen-was-ravished*, but exactly how that property is connected to the concrete individual Helen is not clear. Simon Keller offer an alternative version of presentism which is intended to solve exactly that problem. Keller’s basic alternative is to postulate the existence of *haecceities*, or thisnesses. As Keller explains it:

An individual’s *thisness* is its property of being just that individual. Your thisness is a property of you, and of nothing else. The nature of thisnesses is controversial, but one view is that thisnesses are primitive—that they are elements of reality that cannot be reduced to anything more fundamental. Can an individual’s thisness exist without the existence of the individual itself? To put it another way, are there uninstantiated thisnesses? If there are, then thisnesses are *haecceities*.

If there are haecceities, then the presentist can suppose that, although there exist no nonpresent individuals, there exist the haecceities of non-present individuals. And if thisnesses are primitive—if they are not constructed out of qualitative properties or “suchnesses”—then the presentist can use them to give the right sort of structure to past- and future-tensed properties. Here’s how a haecceitist presentist might try to account for the truth of *Anne Boleyn was executed in 1536*.

Among the haecceities that presently exist, the presentist can say, are the thisnesses of Anne Boleyn, of the sword with which Anne was executed, and of the swordsman who was specially brought over from France. These properties themselves, says the presentist, instantiate a relation that somehow mirrors the relation that the four-dimensionalist claims to be instantiated by Anne, the sword, and the swordsman. When it comes to making sure the execution occurred in 1536, rather than at some other time, the presentist might treat times as individuals that themselves have haecceities and say that the pertinent relation actually holds between the haecceities of Anne, the sword, the swordsman, *and* the property of being a time at a around midday on the 19<sup>th</sup> of May, 1536.<sup>228</sup>

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<sup>228</sup> Keller (2004), pp. 96-97.

Thus, to summarize Keller's account: one of Anne Boleyn's properties is the property of *being-Anne-Boleyn*, and as she acquires various properties and relations to other things, this property of *being-Anne-Boleyn* also acquires relationships to these various properties and to the properties that individuate the things to which Anne is related. After Anne herself is gone, the property of *being-Anne-Boleyn* continues to exist as a uninstantiated property, and continues to bear these various relations that it has acquired during Anne's lifetime.

One concern that might be raised to this sort of account involves the fact that if haecceities are understood as Platonic universals, that is, necessarily existing entities that are independent of the spatio-temporal world, which seems to be what is required by the account<sup>229</sup>, then it is difficult to understand how these entities can change their relations to other entities of the same kind. For the most part, properties bear whatever relations they bear to other properties necessarily and internally. If a particular color is darker than another, then it cannot alter its relation to that other color. Whatever contingent relations that might hold between properties seem to hold only in virtue of their being exemplified. Dark redness may be exemplified to the left of light redness, and this may be thought to generate a contingent relation between the two, but, if neither is exemplified, then it seems that the only relations they can bear to one another are the ones they bear in virtue of their own nature. Keller's account seems to require that properties be changed by their being exemplified, in such a way that they continue to bear certain relations to one another even after they have ceased being exemplified.

While this certainly seems like an odd consequence of Keller's view, I am not sure at the end of the day how serious an objection it is. Haecceities, if there are such

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<sup>229</sup> If one tries to understand them as Aristotelian universals, then one has the problem that Aristotelian universals, at least as standardly conceived do not exist independently of their being exemplified, and thus *being-Anne-Boleyn* would not survive the death of Anne Boleyn as required by Keller's view.

things, are going to have to be significantly different than Platonic universals anyway. Unlike redness, which can be exemplified by many things, *being-Anne-Boleyn* necessarily is only exemplified by one thing. Perhaps their ability to change relations to one another is another way in which haecceities differ from standard Platonic universals. A more fundamental objection is that the notion of haecceities, especially as conceived on this view, is itself rather bizarre. The idea that there is a property of *being-Anne-Boleyn* which is in any way separable from Anne Boleyn herself strikes me as absurd. If haecceities are supposed to be what makes an individual the individual that they are, then what could possibly Anne Boleyn something distinct from the property of *being-Anne-Boleyn*? The idea that there is any sort of real distinction between an entity and its individuality strikes me as leading to hopeless confusion metaphysically<sup>230</sup>, in much the same way as thinking that the existence of something is a property distinct from the thing itself.

### 3.3.5 *Ersatzer Presentism*

An alternative version of presentism has been developed by Craig Bourne.<sup>231</sup> On Bourne's view, while only present concrete things exist, there also exist propositions conceived of as abstract entities. Maximally consistent sets of propositions specify the way the world might be at a particular time, and thus there is some maximally consistent set of propositions that corresponds to the way the world actually is at the present time. Bourne then suggests that the maximally consistent sets of propositions are ordered in such a way to correspond to what we ordinarily think of as the time-series. So, there exists a certain relation that holds between the maximally consistent set of propositions

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<sup>230</sup> It is worth mentioning that even John Duns Scotus, from whom the term "haecceity" ultimately derives, thought there was only a formal distinction between a thing and its *thisness*.

<sup>231</sup> The view has been developed most extensively in Bourne (2006).

that corresponds to the present time and the maximally consistent sets of propositions that correspond to what happened in the past. While other times do not exist, these sets of propositions serve as ersatz times. While Caesar does not exist, true propositions about what Caesar did do exist, and these are contained in ersatz times which are related to the propositions that correspond to what is going on at the present time by a relation which is not a temporal relation, but defines a structure between these abstract entities that allows one to trace what happened in the past by following this relation back to “previous” ersatz times. Bourne refers to this relation defining this structure as the “*E*-relation”. He says that

The *E*-relation is not the genuine *earlier than* relation since it does not relate spatio-temporal objects, but it does *represent* the *earlier than* relation in the way it relates times. The properties of the *E*-relation match whatever we take to be the properties of the genuine *earlier than* relation. This allows presentists to have a time series related by ‘earlier than’ without being committed to the existence of real, or rather concretely realized, *relata*, something anathema to the presentism. Ersatz presentism thus bypasses the problems that other presentists get into when they do not take such relations as basic, and try to define them in terms of tenses...<sup>232</sup>

Basically, what Bourne does is to replicate the structure that on a non-presentist view holds between various times but makes this structure hold between these abstract ersatz times instead. The *E*-relation that is what links together this structure, and basically takes the place of temporal relations, which, technically speaking, do not exist on Bourne’s view. Other cross-time relations also hold true of entities in this structure rather than entities in the concrete world.

While Bourne suggests in the above quotation that we can take the *E*-relation to have whatever properties we think the basic temporal relations should have, in fact he argues that we should best conceive of the time series as having a linear structure towards the “past” and a branching structure towards the future. Let  $P_1$  be the ersatz time

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<sup>232</sup> Bourne (2006), pp. 54-55.

that corresponds to the actually existing present world. Bourne holds that the *E*-relation is an asymmetrical relation that will define a linear series in one direction from  $P_1$  and a branching series in the other direction. Bourne uses this to maintain that there is a unique past but multiple possible futures. As time passes in the actual world, one of the branches corresponding to the “future” of  $P_1$  will be singled out as the new present, and will again have a linear series in one direction and a branching series in the other direction.

Assuming one grants the existence of propositions and the idea that maximally consistent sets of propositions can be used to define things that can represent times, the biggest difficulty for the plausibility of Bourne’s view is the plausibility of the existence of this *E*-relation which is supposed to hold between ersatz times. While it makes for a clever account, the *E*-relation seems to be an ad hoc postulate, with no other roots in our actual experience of temporal ordering. One also wonders about the relationship between the ersatz temporal ordering and the actual ordering of events in the world. Why do events in the concrete world always conform to one of the ersatz times linked to the present ersatz time by the *E*-relation? It seems as though this relation between abstract entities must somehow constrain what happens in the concrete world, which violates the generally accepted notion that abstract entities such as propositions are causally inert.

### 3.3.6 Theistic Presentism

A recent alternative to the versions of presentism discussed thus far has been offered by Alan Rhoda.<sup>233</sup> Rhoda offers an account of truths about the past inspired by Charles Hartshorne.<sup>234</sup> The basic idea is that while past events have ceased to exist, God forever remembers everything that has happened in the history of the universe. Rhoda therefore suggests that God’s memories can serve as truthmakers for all propositions

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<sup>233</sup> Rhoda (forthcoming).

<sup>234</sup> Hartshorne (1984), pp. 33-34.

concerning the past.<sup>235</sup> Rhoda argues that, given the weaknesses of all of the other proposed versions of presentism, anyone who wants to defend presentism would be well-advised to accept the existence of God.

One might be tempted to suggest at this point that presentists have genuinely reached a point of desperation when they need to invoke God to solve a central problem for their theory. Appeals to God to fill in the gaps in one's view certainly have a long history in philosophy, though it might be argued that this history is less than venerable. Regardless of this, the central problem that I have with this account is that it seems to me clear that the proposition that Caesar crossed the Rubicon is a proposition about *Caesar crossing the Rubicon*, not a proposition about the memories of God. One is reminded of Quine's criticism of attempts to account for the meaning of non-referring terms by making them refer to ideas:

We may for the sake of argument concede that there is an entity... which is the mental Pegasus-idea; but this mental entity is not what people are talking about when they deny Pegasus.

McX never confuses the Parthenon with the Parthenon-idea. The Parthenon is physical; the Parthenon-idea is mental... we cannot easily imagine two things more unlike, and less liable to confusion, than the Parthenon and the Parthenon-idea.<sup>236</sup>

Quine's point is that when we say something about the Parthenon, we are talking about the physical entity, and not about the idea of the Parthenon, so it would seem strange if when we talk about a non-existence thing such as Pegasus we would be talking about an idea rather than what it seems like we are talking about, namely a physical horse.

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<sup>235</sup> Rhoda's attribution of this view to Hartshorne is somewhat misleading. Hartshorne, inspired by Whitehead, is actually an accretivist, and so has no problem with accounting for truths about the past. Hartshorne's concern is with developing an alternative to traditional theistic accounts of immortality, which he replaces with the notion of "objective immortality". Basically Hartshorne's view is that while, strictly speaking, our lives cease with our death, nonetheless we obtain a certain kind of immortality as permanent memories in the mind of God.

<sup>236</sup> Quine (1953), p. 2.

Similarly, it seems obvious if we say something about Barack Obama's being president, what makes that true is the actual state of affairs of Obama being president. It seems strange to suppose that once we switch to statements about Caesar, which seem to be statements about a concrete person much like Obama, these statements would actually be made true by God's memories rather than what they seem to be statements about, namely a concrete state of affairs involving Caesar.

### **3.4 Transitory Omnitemporalism**

The central objection that I have raised for the four-dimensionalist is the inability to give an account of the Transitory Aspect of Time. The central objection I have raised for the presentist is the inability to give an account of the Structural Aspect of Time. If we are seeking a view which gives a role to both of these aspects, perhaps the most intuitive move to make would be to combine the thesis of transience with an omnitemporalist account of the ontological significance of tense. The omnitemporalist can easily give an account of the Structural Aspect as they include past, present, and future things and the relations between them in their ontology. So one might think that the most natural way of constructing a view that gives due account to both the Transitory and Structural Aspects is to combine omnitemporalism with realism about temporal passage. In this section, I will look at three different versions of transitory omnitemporalism.

#### *3.4.1 The "Moving Spotlight" View*

Perhaps the most commonly discussed version of transitory omnitemporalism is what is known as the "moving spotlight" view.<sup>237</sup> This is actually the name for several distinct yet similar theories that share in common the commitment to omnitemporalism

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<sup>237</sup> Unfortunately, the clearest articulations of this view tend to be by philosophers who reject it. McTaggart's discussion of the "A-series" is one classic example.

and the idea of an objective present that moves along the temporal series, somewhat like a spotlight moving across a fence row, lighting up this post and then that one.<sup>238</sup> Different versions of the moving spotlight view can be developed according to what account they give of this objective present. The two most basic versions would seem to be one which embraces a tense fundamentalist account of the present, where present entities possess a unique ontological status that distinguishes them from non-present entities,<sup>239</sup> and a tense primitivist version which takes “presentness” to be a primitive property possessed by certain entities, and the passage of time to be the shift in which entities possess this property.

It is sometimes suggested that this sort of view is especially vulnerable to McTaggart’s argument for the unreality of time.<sup>240</sup> Broad contrasts this sort of view with one that holds a notion of “absolute becoming”, that is, the coming-into-existence of new entities, and suggests that it is only by accepting a notion of absolute becoming that McTaggart’s argument can be answered. What this misses, however, is the fact that the moving spotlight view also accepts a notion of absolute becoming. While it is true that past, present, and future events all have ontological status, and the colonization of Mars does not “come into existence” but already exists in the future, nonetheless the states of affairs of the colonization of Mars being present, whether interpreted as the possession of a particular property or as the possession of a distinct ontological status, is something which comes into being on the view. Both the moving spotlight and the accretivist picture

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<sup>238</sup> The “moving spotlight” metaphor seems to originate with C. D. Broad, who describes the view in terms of a policeman’s bull’s eye lighting up various houses on a street. See Broad (1923), p. 59.

<sup>239</sup> Quentin Smith’s “degree presentism” is really of version of this kind of view. See Smith (2002).

<sup>240</sup> See, for example, Dainton (2001), pp. 25-26. See the discussion of McTaggart’s argument below in **Section 3.6.1**.

that Broad defends, if they are to be made intelligible, require a notion of meta-temporal shifts in the sum total of what exists, only in the case of the moving spotlight view what cease to exist and come into existence are these various states of affairs that determine which entities are present, whereas for the accretivist picture it is the entities themselves that come into existence.

The upshot of this is that the moving spotlight view, in my opinion, is actually more plausible than it is often taken to be. The central weakness of the theory is that it seems committed to either tense fundamentalism or tense primitivism,<sup>241</sup> both of which seem to be problematic views. I have already criticized tense fundamentalism.<sup>242</sup> Tense primitivism seems to be open to criticism on the grounds that the postulated property of presentness does not seem to be one that we have experiential evidence to support. No matter how closely one examines some presently existing thing, the “presentness” of that thing does not seem to be detectable. Perhaps if we could contrast it with experiences of non-present things this would reveal the property of presentness that is lacked by these other things, but since no such experiences seem available, then it seems as though there is little independent reason to believe in such properties. One might in fact hold that we do observe past events all the time due to the time it takes mediums of information to reach our sensory organs, but when one observes a distant supernova, there is nothing about this event that bears a mark of “pastness”.<sup>243</sup> Nor if we could observe future events

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<sup>241</sup> While it is not inconceivable that one could develop a version of the moving spotlight theory that offers tense reductionist account of the objective present, it is not easy to see what such an account would look like. In the absence of a worked out version of this, I assume that the moving spotlight theorist is committed to either tense fundamentalism or tense primitivism.

<sup>242</sup> See **Section 2.2.1**.

<sup>243</sup> One who holds an indirect realist account of perception would deny that we do directly observe such past events. Either way it seems that any observation evidence for a distinction between those things which possess and those things which lack a property of presentness is undercut.

in a crystal ball does it seem as though there would be anything that marks them out as future.

A further difficulty for the moving spotlight view is that it seems intuitive to think that there is a strong connection between temporal passage and causation. If one thinks of temporal passage of the coming-into-existence of entities, then causation is very naturally understood as the bringing-into-existence of entities. However, it seems that the relations of causation are not states of affairs of certain entities being present, but the entities themselves. In other words, when I raise my arm, it seems like I bring into existence the state of affairs of *my-arm's-being-raised*, and not the state of affairs of *my-arm's-being-raised-being-present*. I would suggest, then, that the moving spotlight view does not fit well with the phenomenology of temporal experience.

### 3.4.2 The “Thinning Tree” View

Storrs McCall argues for an interesting variant of transitory omnitemporalism which combines the view with an account of the structure of time that branches in the direction of the future.<sup>244</sup> On McCall’s model, a variety of possible futures exist. McCall explicitly compares his realism about possible futures to David Lewis’s belief that every other possible world exists in the same sense as the actual world.<sup>245</sup> Time thus has the structure of a tree, with the past as the trunk with a variety of futures branching off from the present time. McCall’s view is known as the “thinning tree” model because he believes in objective temporal passage, which, on his view, consists in the ceasing to exist of all but a single possibility as time passes. So, for example, there exists a variety of possible futures in which I eat a variety of different meals for lunch tomorrow. In some of these possible futures, I eat chicken, whereas in others I eat a hamburger. These

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<sup>244</sup> See McCall (1976), McCall (1984), and McCall (1994).

<sup>245</sup> See Lewis (1986).

possible futures are, on McCall's view, just as much a part of the universe as are the present and the past. Let us suppose that, as a matter of fact, I eat chicken for lunch tomorrow. What happens, then, is that the possible future in which I eat hamburger ceases to exist as my eating chicken becomes present.<sup>246</sup>

There have been many who have been motivated to deny the objective reality of temporal passage because there is something spiritually edifying about the idea that passage is an illusion and genuine reality is changeless and permanent. No other account of temporal passage of which I am aware, however, turns it into something as horrifying as it is on McCall's account. With each passing moment, countless possible futures, with concrete inhabitants just as real as the present me, are being wiped from existence. If this is in fact how the passage of time works, then there is something quite disconcerting about all the possible versions of me who are destroyed with each decision that I make.

Regardless of this, however, the central philosophical objection I would raise to McCall's view is that it exemplifies the tendency which I rejected earlier<sup>247</sup> of treating possibilities as though they are actually existing things. Even if one accepts the idea that there are multiple possible futures compatible with the present state of the universe, treating these possible futures as though they are actualities seems to me extremely wrongheaded. The merely possible future event of my eating a hamburger tomorrow is, in virtue of being *merely possible*, not an actually existing thing. Given that McCall, since he believes in objective time flow, must already think of becoming as irreducible to being, it is difficult to why he would have reason to accept the notion that possibilities must be accounted for in terms of actually existing beings. As such, I suggest that there is something incongruous about the motivations for the thinning tree model.

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<sup>246</sup> One should perhaps note that McCall is much more concerned to develop his view to provide an adequate account of the indeterminism in modern physics rather than to provide for human free will, as might be suggested by this example.

<sup>247</sup> See **Section 1.2.2**.

### 3.4.3 *The Transitory B-series*

A third version of transitory omnitemporalism that I will mention briefly is the transitory B-series model introduced in the last chapter.<sup>248</sup> The transitory B-series is an omnitemporalist view that, unlike the moving spotlight view, lacks any notion of an objective present. There is, nonetheless, temporal passage in this model, which consists in re-arrangement of the ordering of events in the B-series. So, perhaps in the sum total of reality a certain event  $x$  precedes another event  $y$ . As time passes, the sum total of reality might change to one in which  $y$  precedes  $x$ . So, World War I might alter its temporal relation to World War II, so that it succeeds it rather than preceding it.

While such a view would count as a transitory omnitemporalist theory, there seems very little to recommend it as an account of how passage actually works in our experience. The passage that we actually experience does seem to be intimately connected with a shift in what entities are present. The possibility of the transitory B-series model does, however, raise an interesting skeptical possibility for anyone, such as the accretivist, who seeks to combine the Structural Aspect with the Transitory Aspect. Given that there are changes in the sum total of reality, what, if anything, prevents *World-War-I-preceding-World-II* ceasing to exist and being replaced by *World-War-II-preceding-World-War-I*? How do we know this sort of thing is not occurring? While I have no detailed answer to provide to this question, I suspect the key to answering it lies in an account of the relationship of causal dependence that exists between earlier and later events. This would suggest that temporal relations are not external relations that can be altered without changing the nature of the relata, but are internal relations that, once

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<sup>248</sup> See **Section 2.3.3**.

they hold, cannot be so easily altered. This thought, however, is one that I will not explore further in this essay.<sup>249</sup>

### 3.5 Erosionism

Accretivism combines afuturism with the doctrine of the objective reality of temporal passage. As such, it holds that the passage of time consists in the addition to the sum total of reality of new entities, and conceives of the present as the point at which these new entities come into existence. Erosionism in important ways reverses the accretivist picture. Erosionism combines apastism with the objective reality of temporal passage, and thus thinks of temporal passage as consisting in entities ceasing to exist. According to the erosionist picture, the future is as real as the present, and as a present entity becomes past, it ceases to exist. Erosionism has not been a widely defended view, but, as noted before,<sup>250</sup> it has been attributed to such figures as C. I. Lewis, A. J. Ayer, and Jan Lukasiewicz by Michael Dummett.

Perhaps the main sort of argument that can be launched in favor of erosionism is based on verificationist premises. The basic idea is that statements about the past cannot be verified except in terms of what exists in the present, whereas statements about the future can at least *in principle* be verified. If I make a claim about Mars being colonized by the year 2100, one can theoretically observe this fact by simply waiting long enough.<sup>251</sup> However, if I make a claim about Mars having been inhabited in the year 1000, since one cannot observe this past fact, such a claim could only be verified by

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<sup>249</sup> Ultimately, I think this problem may provide the basis of an argument from accretivism to the mereological theory of time, as this view would establish the relationship between earlier and later entities as just such an internal relation. If *x* is a part of *y*, presumably they cannot be altered in such a way that *y* becomes a part of *x*.

<sup>250</sup> See **Section 2.2**.

<sup>251</sup> Statements about the far future, such as the death of the sun occurring in a certain year, may be *practically* unverifiable, but are still *in principle* so.

citing present evidence in favor of the claim. This suggests anti-realism with regard to the past and realism with regard to the future, or, in other words, *apastism*. Combine this with temporal passage, and one has an erosionist view. If one rejects this form of verificationism, as I do, one should not be tempted by this sort of argument.

A second sort of motivation for this view may be ethical. Michael Tooley offers the following quote from Lukasiewicz:

Facts whose effects have disappeared altogether, and which even an omniscient mind could not infer from those now occurring, belong to the realm of possibility. One cannot say about them that they took place, but only that they were *possible*. It is well that it should be so. There are hard moments of suffering and still harder ones of guilt in everyone's life. We should be glad to be able to erase them not only from our memory but also from existence. We may believe that when all the effects of those fateful moments are exhausted, even should that happen only *after* our death, then their causes too will be effaced from the world of actuality and pass into the realm of possibility. Time calms our cares and brings forgiveness.<sup>252</sup>

As comforting as it may be to think that one's past mistakes may simply cease to exist, such that there are no truths about them whatsoever, I find this notion incredibly difficult to believe. In favor of this intuition, I will cite the authority of Descartes, who, when citing items that he perceives clearly, states that even God cannot "make it true at some future time that I have never existed, since it is now true that I exist."<sup>253</sup>

Against the erosionist view, I would again<sup>254</sup> suggest that it seems that there is strong intuitive connection between causation and temporal passage, so that it seems very plausible to think that causes bring effects into existence. This is the central argument of Michael Tooley in favor of his version of the accretivist theory:

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<sup>252</sup> Tooley (1997), pp. 237-38. Interestingly, Tooley identifies Lukasiewicz as a presentist rather than an apastist.

<sup>253</sup> Descartes, *Meditations on First Philosophy*, Third Meditation, p. 25.

<sup>254</sup> See **Section 3.4.1**.

Causal laws, rather than being merely regularities in the history of the world, *control* the course of history; they underlie, and account for, any patterns that the world may exhibit over time. But how is this control to be understood? One way—and, I think, the only satisfactory way—is if causal laws, in conjunction with what is actual as of a given time, determine what states of affairs are then added to what is already actual, thus determining what exists, in a tenseless sense.<sup>255</sup>

The basic idea is that the most intuitive way to make sense of the notion that causal laws determine what happens in the world is to suppose that, when combined with what already exists, causation consists in the adding of new things to the world. When combined with the need to account for cross-time relations, this strongly suggests the accretivist picture as the most natural account of time.

### 3.6 Accretivism

Accretivism has the advantage over presentism that it has natural truth-makers for both claims about the past and for cross-time relations. What grounds the truth of the claim that Anne Boleyn was beheaded is the actual beheading of Anne Boleyn, which exists in the past. Cross-time relations can be understood as holding between the two existing relata that they initially seem to hold between, without need to go to any of the elaborate attempts to reduce them to something much different than they initially appear to be. Accretivism has the advantage over four-dimensionalism in that it can accommodate the Transitory Aspect of our ordinary experience of time, without needing to explain how our illusory experience of this can be generated from a world in which there is no actual passage. Accretivism faces a number of objections that can be raised to it, however, and to these I will turn in the remainder of this section.

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<sup>255</sup> Tooley (1997), p. 111.

### 3.6.1 McTaggart's Argument

While few philosophers accept J. M. E. McTaggart's conclusion that time is unreal, many accept that one or the other part of his famous argument for time's unreality is valid. Roughly speaking, McTaggart's argument can be summarized as follows:

- 1) If time is real, then it must be grounded in either the A-series or the B-series.
- 2) The B-series by itself is insufficient for time.
- 3) The A-series is contradictory, and therefore cannot be real.

Therefore, 4) Time is not real.

McTaggart seems to assume that the A- and B-series exhaust the possible groundings of time. He argues for Premise 2 as follows:

If, then, a *B* series without an *A* series can constitute time, change must be possible without an *A* series. Let us suppose that the distinctions of past, present, and future do not apply to reality. In that case, can change apply to reality?

What on this supposition, could it be that changes? Can we say that, in a time which formed a *B* series but not an *A* series, the change consisted in the fact that the event ceased to be an event, while another event began to be an event? If this were the case, we should certainly have got a change.

But this is impossible. If *N* is ever earlier than *O* and later than *M*, it will always be, and has always been, earlier than *O* and later than *M*, since the relations of earlier than and later than are permanent. *N* will thus always be in a *B* series. And as, by our present hypothesis, a *B* series by itself constitutes time, *N* will always have a position in a time-series, and always has had one. That is, it always has been an event, and always will be one, and cannot begin or cease to be an event...<sup>256</sup>

McTaggart's basic objection to the B-series by itself is that the relations that ground it are permanent, and thus it lacks "change". If something is at a particular place in the B-series ordering, it is always at that place, as things do not alter their position in the ordering, McTaggart says. He rejects the Russellian analysis of change according to which mere

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<sup>256</sup> McTaggart (1928), p. 12.

difference from one time to another is sufficient to ground change, on the basis that this does not capture what seem essentially different about temporal change as opposed to mere difference, which can also hold between places. Though he does not make the point explicit, what McTaggart seems to be getting at is that the B-series by itself, while it may possess difference from one point in time to another, lacks what is essential to time, namely the Transitive Aspect. Note that part of his argument is that the B-relations are permanent, and if *N* is earlier than *O*, it will always be earlier than *O*. Presumably, if *N* and *O* could shift position in the B-series<sup>257</sup>, this would be a change of the sort McTaggart is searching for, though he seems to take it as a given that this sort of thing does not happen. He contrasts this with the A-series, in which events do seem to shift their positions, as they change from future to present to past.

Since there does seem to be a “passage of time” associated with the A-series but not with the B-series, McTaggart’s holds then that the A-series is essential to time. It is this very passage of time that causes problems for the A-series, however. This passage must somehow involve entities possessing all three properties of pastness, presentness, and futurity. These are, however, McTaggart maintains, contrary properties<sup>258</sup>, so nothing can actually possess all three. An entity’s shifting from being future to being present must somehow involve its both being future and being present, but if these are contrary properties, then this seems to generate a contradiction. Note that it is not the A-characteristics or the A-series ordering *per se* that is problematic. The difficulty comes from trying to understand the notion of temporal passage. Presumably, the same problem would arise if things did shift position in the B-series. If *N* changed from being earlier than *O* to being later than *O*, then this would somehow have to involve it being both

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<sup>257</sup> Recall the discussion of the “transitory B-series” in **Section 2.3.3** and **Section 3.4.3**.

<sup>258</sup> McTaggart does not give any reason for thinking these properties are contrary, but the basic idea seems to be that they are determinates under the same determinable.

earlier and later than  $O$ , and since these relations are presumably contrary as well, this would generate the same problem

Why does McTaggart find himself in this difficulty? This is, I would suggest, because he assumes that the kind of change involved in temporal passage must involve there being some state of affairs in which the changing entity possesses both of the properties in question. If  $e$  changes from  $F$  to  $P$ , McTaggart seems to assume, there must exist some state of affairs that includes both  $F_e$  and  $P_e$ , and thus if  $F$  and  $P$  exclude one another as contraries, we can generate a contradiction. The response that I would give to McTaggart should be obvious from my account of how to understand the Transitory Aspect, which is that we should not understand the passage from  $e$ 's being future to  $e$ 's present in terms of some greater state of affairs that includes both them, but as a change in the sum of total of reality from including one state of affairs to including the other. This change cannot be understood in terms of a greater sum total that includes both states before and after the change.<sup>259</sup>

McTaggart discusses Broad's version of an accretivist view, and suggests that it succumbs to his argument as much as any other view. He suggests that even on Broad's view, every event must be both present and past, and must both be at the edge of the sum total of reality and in the interior, and thus the view is incoherent. This is, however, to misunderstand the fact that the change occurs in meta-time, which any coherent version of temporal passage seems to need to postulate.

### 3.6.2 *The Argument from Special Relativity*

Along with McTaggart's argument, one of the most common motivations for philosophers to reject the objective reality of temporal passage is its supposed

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<sup>259</sup> The overall interpretation of McTaggart is heavily influenced by Michael Dummett's classic defense of McTaggart's argument in Dummett (1960).

incompatibility with Einstein's Special Theory of Relativity, one of the central pillars of modern physics. While I have earlier suggested<sup>260</sup> that attempting to draw metaphysical conclusions from physical theories is never as straightforward as some philosophers seem to think, I will in this section briefly present why Special Relativity is taken to be incompatible with the Transitory Aspect and what seems to me to be the most sensible response to this problem.

The basic problem is that Special Relativity is generally taken to rule out any notion of an objective present because it suggests there is no well-defined answer to which distant events are simultaneous. Two distant events A and B will be measured as simultaneous according to one frame of reference, whereas one will be measured as occurring before the other from other frames of reference. So, to take a classic example, if we have one observer standing on the platform of a train station and another observer standing in the middle of a railway car moving with respect to the platform, and two lights flash, one at each end of the railway car, the observer on the car sees the two lights flash simultaneously, while the observer on the platform sees one flash before the other. As there is no physical experiment which could determine which observer's viewpoint is correct, the question of whether the two events are "really" simultaneous is taken to be "physically meaningless." If one asks the question "What is happening on Mars *right now*?", there is no way of answering this question, as no one can receive an instantaneous signal from Mars,<sup>261</sup> and thus there will only be the fact that certain events on Mars will be measured as simultaneous with certain events on Earth from one frame of reference, while other events will be measured as simultaneous from other frames of reference. Thus the notion of an objective present, which seems to be required by any theory which

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<sup>260</sup> See **Section 1.2.5**.

<sup>261</sup> More specifically, no one can receive a signal that moves faster than the speed of light.

acknowledges the reality of the Transitory Aspect, seems to be something not recognized by modern physical theory.

One problem with this argument to which I have already alluded is that there are certain phenomena in quantum mechanics that seem to be in conflict with the Special Relativity in that they seem to require instantaneous communication between distant particles which would thus imply a need for a notion of simultaneity in physics.<sup>262</sup> However one sorts out the conflict between quantum mechanics and relativity, however, I would suggest that the most that seems to be implied by the argument from Special Relativity is that there is no physical means of determining whether two events are simultaneous, but this need not imply that there is in fact no answer to the question of which events are simultaneous. Physics is, roughly speaking, the study of certain kinds of causal interactions in the world. To say that something is “physically meaningless” is simply to say that it cannot be defined in terms of the kinds of causal relationships studied in physics. Why, however, should we *expect* distant simultaneity to be definable in such terms, especially given the prohibitions on the rate at which causal influence can be propagated according to Special Relativity? At best, it seems as though the argument suggests that physics limits our ability to discover which events are in fact simultaneous, but, unless we accept some sort of verificationist principle, this should not be taken to imply that there is no answer to the question. Given that much of our knowledge of the world is the result of our physical interactions with it, it is no surprise that the laws of physics would impose certain limitations on what we can in fact know. This does not, however, imply that there are no truths of the matter regardless of whether or not we can know them.

Craig Bourne makes a similar point in defending presentism against the argument:

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<sup>262</sup> Again, Maudlin (2002) is recommended as a particularly nice discussion of EPR phenomena in quantum mechanics and the conflict they create with Special Relativity.

The question, then, comes down to this: STR is strange—nobody denies that—but what is stranger: the fact that there *are* no absolutely simultaneous events, or the fact that we cannot *know* which events are absolutely simultaneous? Arguably, the epistemological issue is no that strange: it is no surprise, after all, that we cannot detect such a privileged frame if the measurement procedures for establishing simultaneity are as Einstein sets them up to be. But both interpretations are empirically equivalent and perfectly compatible with core STR. Thus, although it may be argued that our inability to know is explained by there being no fact of the matter, it would equally be perfectly respectable for presentists to adopt the less strange view that we merely cannot know which events are absolutely simultaneous, given their other metaphysical commitments.<sup>263</sup>

Bourne’s basic contention, that we can interpret STR as giving us a limitation on what we can know by physical means, seems to me sound. Unless we presuppose that the only things that exist are those things which can be defined in terms of physical relations, I see no reason to think that the inability to give a definition of distant simultaneity in physics should be taken as a problem for the transitory theorist.<sup>264</sup>

### 3.6.3 The “Rate of Passage” Objection

One common set of criticisms of transitory theories is that the very idea of time “passing” or “flowing” is simply incoherent.<sup>265</sup> To say that something flows implies there is a measurable rate at which it flows. It makes no sense, however, to say that time flows at a certain rate, because time is itself what is used to measure the rate of changes in things. J. J. C. Smart expresses a classic version of this argument:

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<sup>263</sup> Bourne (2006), p.181.

<sup>264</sup> It is perhaps worth noting that even if we cannot give an empirical test to determine whether two distant events are simultaneous, we can nonetheless give an empiricist account of the origin of the concept of “distant simultaneity”. Presumably, the concept of distance is empirically respectable. The concept of simultaneity is also empirically respectable, since we can experience co-located events as simultaneous. Yet it also seems perfectly respectable to combine the concept of distance with the concept of simultaneity to form the concept of distant simultaneity, even if doing so eliminates that possibility of detecting whether anything falls under the concept.

<sup>265</sup> Broad (1938) contains one of the first statements of this problem. Markosian (1993) is an important recent discussion.

An express train, for example, may be moving at 88 feet per second. The question, 'How fast is it moving?' is a sensible question with a definite answer: '88 feet per second'. We may not in fact know the answer, but we do at any rate know what sort of answer is required. Contrast the pseudo-question 'How fast am I advancing through time?' or 'How fast did time flow yesterday?' We do not know how we ought to set about answering it. What sort of measurements ought we to make? We do not even know the sort of units in which our answer should be expressed. 'I am advancing through time at how many seconds per \_\_\_\_?' we might begin, and then we should have to stop. What could possibly fill in the blank? Not 'seconds' surely. In that case the most we could hope for would be the not very illuminating remark that there is just one second in every second.<sup>266</sup>

Smart suggests that the only way we could make sense of time passing is the postulation of some additional dimension in which the rate of temporal passage is measured. This, however, seems to lead to an infinite regress since presumably this additional dimension will be something which “passes” as well.

This argument, however, largely misses the point of the transitory theory as I have presented it. The expression “the passage of time” should not be taken to imply that there is a substantial thing, “time”, which undergoes some sort of movement. It is ultimately not “time” but things in time which become, or, alternately, the “sum total of reality” which becomes. We can measure the coming-into-being of new states of a certain entity only against the coming-into-being of new states of another entity. We can say that the second hand of the clock has gone through two rotations as I tie my shoes, for example. Given that I have suggested that any transitory theory is committed to the notion that time is consecutive, both the rotation of the clock hands and the tying of my shoe will be resolvable into some finite number of distinct shorter events which have come into being. One intelligible question is whether the number of events that make up the rotation of the clock hands is less than or greater than that which makes up the tying of the shoes. It is at least conceivable that in the transition from one sum-total of reality to another, not every

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<sup>266</sup> Smart (1966), p. 215.

entity will have a successive state come into being. So, for example, let  $S_1$  and  $S_2$  be two distinct sum totals of reality. Suppose that in  $S_1$   $a_1$  is the latest state of an entity  $a$  while  $b_1$  is the latest state of another entity  $b$ . As the sum total of reality changes to  $S_2$ ,  $a_1$  may be succeeded by a state  $a_2$ , while  $b_1$  remains the latest state of  $b$ . We might informally say that “time is flowing faster” for  $a$  than for  $b$ , but the comparison is always ultimately between the two entities in time.

### 3.6.4 Future Truths

We have seen that one major difficulty for the presentist is in accounting for truths about the past, and different presentists give different accounts of how to ground such truths, each of which I have criticized as inadequate. One might suggest, however, that the exact same problem will inevitably arise for the accretivist in trying to account for truths about the future, and I will have to endorse some sort of strategy for accounting for such truths, presumably one that could be adopted by the presentist not only for truths about the future, but also truths about the past. So perhaps I might need something like future-tensed Lucretian properties to account for the fact that it will rain tomorrow, and, if I allow myself future-tensed Lucretian properties, then I can hardly complain about the presentist’s use of past-tensed Lucretian properties.

The solution to this problem that I shall adopt is to deny that there are truths about the future. There is an old and venerable philosophical tradition of denying that future claims have truth value. This tradition goes back to Aristotle’s famous discussion of the sea-battle in *De Interpretatione*. Aristotle’s concern, as has been the concern of many who have dealt with the problem, is that future truths would interfere with human free will. If it is true that I will fight a sea-battle tomorrow, then it seems that, in some important sense, my future is already set in stone and I cannot choose not to fight the sea-battle. Aristotle’s own suggestion was that the law of excluded middle, the principle that holds that either a proposition or its negation must be true, must be rejected in these

cases. For it seems that it is either true that I will fight the sea battle, or, if that is not true, then it would be true that I will not fight the sea battle, but, in either case, there will be a truth about the future. Some accretivists have followed Aristotle in believing that we must adopt a logic that rejects excluded middle in order to solve the problem.<sup>267</sup> I propose a different route.

One important lesson about language that any philosopher must quick learn is that not every example of what appears to be a statement and its negation in fact is. Classic counter-examples to the law of non-contradictions, such as that seawater is both healthy and not-healthy are examples of this.<sup>268</sup> When we assert that seawater is healthy and that seawater is not healthy, both of which are true, we may seem to be endorsing a contradiction. However, in order to see that there is in fact no contradiction, we must examine the true propositions in more detail, in which case we discover that what is actually true is that “Seawater is healthy to bathe in” and that “Seawater is not healthy to drink”, and that once we spell out the propositions in sufficient detail to elucidate their deeper structure, we realize that they are not in fact contradicting each other. The lesson is that what appears to be a proposition and a negation may very well on inspection of their logical form turn out not to be contradictory at all.

This is also the import of one of the most fruitful philosophical analyses of the twentieth century, namely Russell’s account of apparent reference to non-existents. Consider the propositions “The Present King of France is bald” and “The Present King of France is not bald”. We have what seems to be a statement and its negation, so surely one of them must be true. Just as clearly, however, one cannot legitimately say that either is true. As Russell pointed out, the way to deal with this conundrum is to analyze said

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<sup>267</sup> See Tooley (1997), Part II, for example. Bourne (2006) pursues a similar strategy due to his branching model of the future in his version of presentism.

<sup>268</sup> This example is from Heraclitus.

sentences into their deeper logical form, in which both propositions are actually conjunctive statements that assert the existence of the present King of France, and, given that there is no present King of France, both statements end up being false. A similar strategy applies to all reference to the non-existent. Is it raining or not raining in the Land of Oz? The correct answer is that neither of these is the case, as there is no such place. The accretivist, however, holds that there is no such thing as future events. So, since every assertion about the future seems to be analyzable into a claim that there exists events later than the present, so such claim will turn out to be true. “I will fight a sea battle tomorrow” is analyzable into something along the lines of “There exists a time a day later than the present time at which I am fighting in a sea battle”, whereas “I will not fight a sea battle tomorrow” would be analyzable into “There exists a time a day later than the present time at which I am not fight a sea battle.” If no times later than the present exist, then both of these claims, strictly speaking, turn out to be false. So long as we understand these as claims that are supposed to correspond to some existent states of affairs, then I would suggest that the best strategy for the accretivist is to hold that neither is actually true.

I would be willing to suggest that claims about the future may serve functions in language other than representing something that actually exists, and in virtue of successfully fulfilling those functions, may merit praise somewhat similar to the praise we reserve for claims that are in fact true. If I say “I am going to fight a sea-battle tomorrow”, this may accurately or inaccurately express your intention, even though it cannot correspond to any actual future event. We may say of a prediction about what will happen that it is well-founded, and may say after the fact that it *came true* or was successful, but this does not mean that it was, strictly speaking, true when it was made. We may say, for example, that it is true that the sun will begin to die in about five billion years, but, on my view, if that is taken to represent an actual existing event, then it is strictly speaking false. Nonetheless, one might be able to develop an account according to

which it is legitimate to make the prediction that the sun will die in five billion years. For example, one might construe laws of nature in a broadly Humean fashion as generalizations from what has happened in the past. If events of type *X* have always been followed by events of type *Y* in the past, and we presently encounter an event of type *X*, one might develop an account according to which it is more legitimate to say that “*Y* will happen” than “*Y* will not happen”, even though they are both, strictly speaking, false.

### 3.6.5 *The Dead Past*

Recently, Craig Bourne, David Braddon-Mitchell, and Trenton Merricks have each defended versions of an argument against accretivism on the basis of its alleged incompatibility with our presumably certain knowledge that we exist and are thinking in the present.<sup>269</sup> The argument rests on the claim that there can be a gap between our subjective experience of certain events as being present and the objective notion of what is *really* present. According to the growing block theorist, for *x* to be present is, *roughly speaking*<sup>270</sup>, for *x* to exist and for there to exist nothing later than *x*.<sup>271</sup> It is thus to be on the “edge of reality” in the temporal dimension. According to the thesis of dynamism, new entities come into being along this edge, thus adding to the sum total of existence and changing what is objectively present. To know that we are objectively present would seem to require knowing that we are on this edge rather than somewhere in the interior of the four-dimensional space-time block.

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<sup>269</sup> See Bourne (2002), Braddon-Mitchell (2004), and Merricks (2006).

<sup>270</sup> Among the qualifications that might be needed is a clause to rule out any atemporal entities one might accept in one’s ontology as being present, but I will ignore this complication. Similarly, one might modify the account according to what one holds the primary bearers of temporal relations to be. Caesar should not turn out to be present simply because Caesar is not the sort of entity that can stand in temporal relations. I assume these complications can be dealt with.

<sup>271</sup> At least, this would be the standard analysis given by an accretivist who rejected tense primitivism.

Consider Julius Caesar. According to the growing block theorist, Caesar exists in the past, just as real as any present person. But then, the arguments goes, Caesar's mental states are equally as real as those of any present person, and are qualitatively indistinguishable from what they were when he was objectively present. How then do we, who believe ourselves to have certain knowledge that we are present, know that we are not in the same position as Caesar? How can we be sure that we are at the temporal edge of reality, rather than somewhere in the interior, if our mental states would be the same either way? This problem does not seem to arise for the growing block theory's two main competitors. The presentist holds that only what is present exists, so that having subjective experiences at all is a guarantee that those experiences are objectively present. The orthodox four-dimensionalist holds that there is no objective notion of the present, and to think that something is present is simply to affirm its simultaneity with that particular thought, and so "I am thinking in the present" is trivially true.

Peter Forrest presents what would seem to be the most sensible response on behalf of the growing block theorist to this argument.<sup>272</sup> Forrest denies that Caesar has subjective experiences at all. The mistake, Forrest suggests, is in viewing consciousness as a state akin to Caesar's being wet or under six feet tall. Consciousness is, instead, an activity, and "Activities occur only at the boundary of reality, while states can be in the past".<sup>273</sup> Chris Heathwood objects to this account that it requires "the semantic and metaphysical gymnastics Presentists train for but Growing Block Theorists thought they could avoid."<sup>274</sup> His objection is that "Caesar was conscious when he crossed the Rubicon" should be made true in a parallel fashion to "Caesar was wet when he crossed the Rubicon," but Forrest requires that it be made true in a much different manner.

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<sup>272</sup> Forrest (2004).

<sup>273</sup> Forrest (2004), p. 359.

<sup>274</sup> Heathwood (2005), p. 250-1.

I would suggest, however, that this is something that we should expect from the accretivist. I have already that any theory that recognizes the objective reality of temporal passage will have certain truths that are not made true by being. Any truths about something's changing state, in the transitory sense of change rather than the differential sense of change, will be irreducible to facts about that thing being in certain states. Consider Julius Caesar once more. According to the accretivist, Caesar exists in the past and is, at various times, in various spatial locations relative to the Rubicon. He is at one time on one side of the river, later in the center of the river, and still later on the other side of the river, and at points in between at times in between. Caesar, when he is in the middle of the river, is wet, but is he in motion? Not according to one who is a realist about the Transitory Aspect of Time. If I get up at the present moment and walk across the room, I am moving, but that is because new states of me are coming-into-being. The static existence of various states of Caesar in the past does not suffice to constitute a change in Caesar, and so, in an important sense, Caesar, in the past, is not moving. Of course, if I now say that "Caesar was moving in the past", that is true, but what makes that statement true is not simply the past states of Caesar, but those states plus the passage of time. The passage of time, however, is not an entity.

I have suggested that, according to the accretivist, what makes it true that Caesar was moving in the past is not merely the past states of Caesar but something along the lines of these plus temporal passage. As temporal passage is not to be understood as an entity, but rather the increase in entities, then certain formulations of the truth-maker principle must be rejected. It is perhaps important to note, however, that this does not mean that the accretivist theorist is not a realist about statements such as "Caesar was moving in the past". While it is a mistake to construe temporal passage as an entity, it is nonetheless mind-independent, and thus it is an objective matter whether temporal passage occurs in the world or not.

The non-transitory presentist has two sorts of reduction to perform. First, he or she must reduce claims that appear to make reference to past and future entities to claims about present entities. Second, he or she must reduce claims about temporal passage to claims about what exists at the present moment. The transitory presentist has only the former sort of reduction to perform. It is this sort of reduction, the attempt to ground claims about the past or future in terms of claims about the present, that accounts for the “metaphysical gymnastics” about which Heathwood worries, namely the various sorts of attempts to ground truths about the past that we saw in previous sections.

The growing block theorist requires no such athleticism for claims about past states of the world. What presently accounts for Caesar’s having been wet is the still existing state of Caesar being wet. There is no need to reduce that to a claim about present entities. And while the Growing Block Theorist does hold that the various states of Caesar in the past do not suffice to ground claims about Caesar’s crossing the Rubicon, this is in virtue of a resistance to reductionism about claims about change. This is a stark contrast the presentist’s need to reduce claims about the past to claims about the present, which are the result of the limited resources of their view rather than an anti-reductionism.

Forrest claims in response to the problem of accounting for the certainty of our subjective awareness of the present that past entities are “dead”, i.e. that they have no subjective experience. He bases this on the claim that consciousness is an activity rather than a state. Now, it would take a significant excursus into the philosophy of mind to defend the proposition that consciousness is an activity rather than a mere state, but, given what I have said, Forrest’s basic approach is at least plausible.

### *3.6.6 Creation ex Nihilo*

An objection which is sometimes offered to the accretivist position is that the notion of temporal passage that I have offered requires that ordinary causation become a

matter of creation *ex nihilo*. The entire point of the theory is that new things come into existence at the temporal edge of reality. Presumably, these things are caused to come into existence by the previously existing things. So, let us suppose that some event *E* is in the present and causes some event *F* to happen next. Then it appears as though on the accretivist model *F* must come into existence as a result of *E*'s causal activity. This seems to grant finite entities power that was traditionally reserved for the gods.

It is not clear whether this objection bears any special weight for the accretivist picture, or whether it applies equally to any theory that acknowledges the reality of temporal passage understood as a change in the sum total of reality. So, if I am transitory presentist, and I walk to refrigerator and open it, then I am bringing into existence a whole new state of affairs of the refrigerator door being open. I am not sure this should be taken as a serious objection to the view any more than simply as a statement of what the view in fact is. I believe the intuition that those who offer this objection have is, however, that accretivism does differ from the transitory presentist in that all that is brought into existence on the presentist's story are new arrangement of previously existing entities. So, the door exists, and it acquires or loses properties as time passes, and assuming a Platonic realism about properties, the properties themselves do not come into existence, only the arrangements. The assumption then seems to be that the accretivist requires something more than this.

Why would one assume this? One reason has to do with the way that accretivism is standardly presented in the contemporary literature. I have said the most common form of accretivist theory that people are introduced to is the so-called "growing block theory". The growing block theory, as it is standardly presented, basically starts with the four-dimensionalist idea that the world is "four-dimensional block", and then understands the growing block theories as committed to that basic view, only with the added theses of afuturism and transience understood as new entities coming into existence. This model imagines time as space-like in exactly the same way that the four-dimensionalist does,

and so what exists at different points in time will be distinct in much the same way in which what exists at different points in space are distinct. I have suggested, however, that the accretivist as I have defined his position need not hold that time is to be understood at all like a spatial dimension. If the accretivist held either the perdurantist or exdurantist theory of persistence, then they would this sort of problem would arise for their view, as the new entities that came into existence would be wholly distinct temporal part or stages of an object. However, if the accretivist held either an endurantist theory of persistence or an intradurantist theory of persistence, the “new entities” that come into existence are not wholly distinct from what previously existed, and thus the problem is deflated. At best, this argument seems to suggest that one should reject the “growing block” version of accretivism, but does not seem to tell against the more general theory.

## CHAPTER FOUR

### CONCLUSION

Four-dimensionalism and presentism are the two dominant theories in the contemporary literature in the philosophy of time. In this essay I have argued that accretivism is superior to both of these theories in virtue of the fact that it can give a richer account of time that incorporates all of the five aspects of our ordinary experience of time into a comprehensive view. Four-dimensionalism is committed to reducing or eliminating the Transitory Aspect of Time, while presentism has difficulty giving an account of the Structural Aspect of Time. If one shares the goal of this essay, which is to develop an account of time that incorporates all of the aspects of time as revealed in our ordinary experience, accretivism emerges as a theory which seems to fulfill this goal better than the two dominant theories. Thus I would suggest that, at the very least, it deserves to be taken seriously as a rival to the two major theories.

While I hope to have established at least a *prima facie* case for accretivism, there are several areas in which my argument needs to be developed further. First, the basic phenomenology of time, the account of the five aspects, needs to be worked out in greater detail. There are a number of questions to be addressed that I have not addressed in this essay. For example, are all of the five aspects equally grounded in our experience, or are some in fact more fundamental than others? How exactly do we perceive temporal passage, if it is not an entity? Second, in answering certain objections to the accretivist view, I have gestured at certain ideas that need to be developed in more detail. In particular, more work needs to be done on the connection between consciousness and temporal passage as suggested in Section 3.6.5. Furthermore, more needs to be said to develop an account of laws of nature that is compatible with there being no future events, as mentioned in Section 3.6.4. Lastly, a great deal of work needs to be done on the

connections between the accretivist view and contemporary physics, which I have only hinted at in this essay.

Of course, the broader project of incorporating the accretivist view within a larger theory that gives a complete account of all five aspects of time has only been begun in this essay. Accretivism is committed to the reality of temporal passage, and to the Tensed Aspect being objectively real. While a significant part of my argument against presentism involved the Structural Aspect, I said very little in the way of giving a positive account of the Structural Aspect. Other than their initial presentation, I have done very little to touch upon the Durational or the Differential-Repetitive Aspects in this essay. As all five of these aspects seem to be intimately related, it is difficult to fully give an account of any of them in isolation from the others, and so a complete account of all five aspects is really necessary for a complete defense of an accretivist view.

Broadening the project even further, a complete account of time must address in more detail the relationship between time and other basic metaphysical features of our world. If time is not a “fourth dimension” of space, then how are we to understand the relationship between time and space? Is there a relationship between temporal and modal notions in virtue of which we can make sense of the notion, proposed by Peirce, for example, that the past is “necessary” while the future is merely “possible”? Is there more to be said about the relationship between becoming and being? What is it for a being to be “in time” as opposed to “atemporal”, and which entities are in time? What is the connection between time and causation? These questions I posit as the subjects for future inquiry.

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