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On A and B Theories of Time

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ON A AND B THEORIES OF TIME

by

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Abstract

On A-and B-Theories of time

by

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Our metaphysical notion of temporality is exhausted by the concepts of fluid and static time. Following James Ellis McTaggart, philosophers refer to these times as the A-series and B-series respectively. To have a metaphysical argument against the reality of time as such, therefore, separate arguments against the reality of both temporal series are required. In the dissertation, I shall offer a number of both types of arguments. In the first chapter, McTaggart's program is assessed. It is concluded that McTaggart has an argument against the reality of the A-series, but does not have one against the reality of the B-series. In the second chapter, additional arguments against the reality of the A-series, as well as against hybrid A/B series, are presented. In the third chapter, it is argued that the B-series is as unreal as its counterpart, the A-series, is. This outcome leaves us with the following philosophical predicament: on the one hand, our philosophical notion of time is exhausted by the concepts of fluid and static time; on the other hand, neither concept, nor any of their amalgamation, is adequate to give us a coherent metaphysical theory of time. The dilemma, I believe, is a sufficient reason for the conclusion that time, *as it is conceived by philosophers*, is not part of physical reality.

Preface

The history of human knowledge presents us with many cases of reason going against our ordinary sense-experience and commonsense judgments. Take, for instance, the sun's celestial movements. Even nowadays, when the knowledge that the sun does not rise and set is a commonplace, we still state with strait faces that the sun rises and sets at certain times of the day. Such is the binding force of our sensory experience that in our everyday goings our ancient geocentric bias totally eclipses our modern understanding of the cosmos. Analogously, I hold, time is an illusion stemming from our psychological predisposition to perceive things and events as necessarily temporally ordered. In actual fact, however, time is no more and no less than "a necessary representation given *a priori*."[1] That is my conviction. But my goal in this thesis is more modest. I do not argue that time as such is unreal (though I believe it is). My nonexistence claim is limited to two basic metaphysical concepts of time, viz. the notions of A-and B-time. I shall argue that neither the concept of A-time nor the concept of B-time nor, by extension, any of their various amalgamations, is theoretically viable. My arguments in these pages are only against these two *metaphysical* concepts of time. And since the metaphysics of time is in effect exhausted by these two concepts of temporality, I conclude that time, *as it is conceived by philosophers*, is nonexistent.

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[1] Immanuel Kant, *Critique of Pure Reason* (1781), Paul Guyer and Allen W. Wood (trans.), (Cambridge: Cambridge University Press, 1998), A31.

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Chapter I: McTaggart's Argument

1.1   McTaggart's A-series/B-series Distinction

1.1.1   At the outset of the last century, an article appeared in *Mind*. Despite its overall sophistic tenor and a number of technical shortcomings, it would exert a strong sway over the subsequent generations of analytical metaphysicians. The article was James Ellis McTaggart's "The Unreality of Time."[2] As its title implies, McTaggart argues that time is not part of concrete reality. Specifically, he argues that since our metaphysical notion of time is constituted by two fundamental concepts of temporality, the concepts of fluid and static time; he dubbed them the A-series and the B-series respectively, and since on his view neither concept is theoretically viable, he concludes that time as such is nothing but an illusion arising from our perception of essentially atemporal reality, "Whenever we perceive anything in time – which is the only way in which, in our present experience, we do perceive things – we are perceiving it more or less as it really is not" (*NE,* §333).[3]

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[2] J. M. E. McTaggart, "The Unreality of Time," *Mind* **17** (1908), 457-74. A somewhat augmented version of the essay makes up Chapter XXXIII of McTaggart's unfinished magnum opus *The Nature of Existence,* C. D. Broad (ed.) (Cambridge: Cambridge University Press, 1927). I will be quoting primarily from *The Nature of Existence*, abbreviated as *NE*, and indicating section numbers instead of page numbers. I will abbreviate "The Unreality of Time" as *UT*, followed by page number.

[3] This is essentially a Hegelian view of time as opposed to Kantian one according to which time is nothing but a cognitive construct superimposed on reality. McTaggart is explicit about that his idea of temporal order resembles that of Hegel rather than that of Kant: "Hegel regarded the order of temporal series as a reflection, though a distorted reflection, of something in the real nature of the timeless reality, while Kant does not seem to have contemplated the possibility that anything in the nature of the noumenon should correspond to the time-order which appears in the phenomenon" (*NE*, §350).

Nowadays, almost no philosopher endorses this sweeping metaphysical thesis.[4] Most do see fluid time as entirely illusory. The rest is split between those who believe to the contrary and those who hold fluid and static times to be equally real.[5] Yet, as I shall argue in this study, McTaggart is essentially right; the truth is that neither concept of time, nor any of their amalgamations, is grounded in reality.

McTaggart begins his argument for the unreality of time with his celebrated distinction between two fundamental concepts of time. On the one hand, we envisage time as the flow from the future, through the present, and into the past, this is McTaggart's A-series.[6] On the other hand, we conceptualize time as a static sequence of moments standing in earlier than/later than relations; this is McTaggart's B-series:

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[4] T. L. S. Sprigge, "The Unreality of Time," *Proceedings of the Aristotelian Society* **92** (1992), pp. 1-19 and present undertaking, at least as far as the two metaphysical conceptions of time are concerned, are rather rare exceptions. Mathematicians and physicists, on the other hand, are more open to the idea of the unreality of time. Consult, for instance, Gödel's "A Remark about the Relationship between Relativity Theory and Idealistic Philosophy" in *Albert Einstein: Scientist-Philosopher,* P. A. Schilpp (ed.) (Evanston, Ill: Library of Living Philosophers, 1949), and more recent J. Barbour, *The End of Time* (Oxford, New York: Oxford University Press, 1999).

[5] The most prominent B- time theorists are: B. Russell, "On the Experience of Time," *The Monist* **25** (1915), pp. 212-33, D. C. Williams, "The Myth of Passage," *The Journal of Philosophy* **48** (1951), pp.457-72, W. V. Quine, "Identity, Ostension, and Hypostasis," in *From a Logical Point of View* (Evanston: Harper & Row,1963), J. J. Smart, "The River of Time," *Mind* **58** (1949), pp. 483-94, D. H. Mellor, *Real Time II* (London: Routledge, 1998), T. Sider, *Four-Dimensionalism* (Oxford: Clarendon Press, 2001). The A-time theorists are lesser in numbers, but not in stature; among them we find A. Prior, *Past, Present, and Future* (Oxford: The Clarendon Press, 1967), P. Geach, "Some Problems about Time" in *Logic Matters* (Berkeley & Los Angeles: University of California Press, 1972), Q. Smith, *Language and Time* (Oxford: Oxford University Press, 1993). Among hybrid A/B-time theorists, the following names stand out: C. D. Broad, *Scientific Thought* (New York: Harcourt, Brace and Company, 1923), G. Schlesinger, *Aspects of Time* (Indianapolis: Hackett Publishing Company, 1980), M. Tooley, *Time, Tense and Causation* (Oxford: Clarendon Press, 1997).

[6] An alternative, yet ontologically equivalent image of temporal passage would be that of the world flowing in time from the past, through the present, and into the future. Basically, the difference between these two images of temporal passage is that either we conceive of the world as a stationary object and of time as a wind, of a sort, unceasingly blowing from the future; or we envisage the world as itself inexorably moving from the province of the past into the land of the future, riding, as it were, the tidal wave of time. On the two temporal passage metaphors consult, for instance, J. J. Smart (1949) who speaks of "the metaphor of time as a river which flows or a sea through which we sail."

> Positions in time, as time appears to us *prima facie*, are distinguished in
> two ways. Each position is Earlier than some, and Later than some of
> the other positions…. In the second place, each position is either Past,
> Present, or Future…. For the sake of brevity I shall give the name of the
> *A* series to that series of positions which runs from the far past through
> the near past to the present, and then from the present through the
> near future to the far future, or conversely. The series of positions
> which runs from earlier to later, or conversely, I shall call the *B* series
> (*NE,* §§305-306).[7]

Ever since McTaggart's articulation of the A-time/B-time distinction, efforts to

defend either the A- or B-temporal ontology, or to bring about a synthesis of the two,

have largely been defining the metaphysical debate concerning the nature of time.

The fluid/static distinction is, of course, an ancient one; it harks back to the

Parmenidean/Heraclitean dispute. Parmenides thought of reality as essentially static,

thus taking temporal passage to be an illusion. Heraclitus, on the other hand, thought

of the ultimate reality to be in continuous state of flux. A century later, Aristotle

contemplated both possibilities and "distinguished before and after and tied time to

what is countable, presaging B-series accounts; he also investigated the now,

presaging A-series accounts."[8] At the outset of the Middle Ages, Saint Augustine was

deeply puzzled by the notion of temporal transience and wondered whether or not it

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[7] McTaggart also theorizes about the C-series; in fact, the bulk of Book VI of *The Nature of Existence* is devoted to elucidation of the nature of this series, the only series which McTaggart deems to be real albeit non-temporal. Because an exposition of McTaggart's C-series is orthogonal to my present purposes, I shall not take up the subject in this thesis. It is the A- and B-series that is my immediate concern.

[8] P. Turetzky, *Time* (London & New York: Routledge, 1998), p.118.

would make more sense to hold the concept of static time.[9] But it is in McTaggart that

we first find the contrast between the two notions of temporality being fully

employed in a philosophical analysis of the nature time. Indeed, McTaggart has

shown us "how many of the most important questions about time are really question

about his two series."[10]

Regrettably, in the literature on the topic, the A/B distinction is often watered

down to signify no more than a mere phenomenological/ontological divide. Yet, it is

quite clear that McTaggart takes the difference between his two temporal series to be

strictly ontological. In his theory of non-temporality unlike, say, in that of Kant's,

phenomenology plays second fiddle to metaphysics.[11] As such, McTaggart's main

objective is to the core metaphysical; he sets out to show that neither the A- nor B-

conception of time is grounded in reality.

1.1.2   While the concept of the B-series is fairly straightforward (which, of course, as

we shall see in Chapter III, does not preclude it from being metaphysically

problematic), it is unclear whether the A-series can be thought of as a genuine series;

at least it is not clear whether it can be thought of as such in a strict sense of the term.

This fact gives rise to a dilemma. If we do not take the A-series to be a genuine series,

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[9] St Augustine, *The Confections*, Book XI.
[10] D. H. Mellor "The Time of Our Lives," in *Philosophy at the New Millennium*, Anthony O'Hear (ed.), (Cambridge: Cambridge University Press, 2001), pp. 45-59.
[11] To be sure, for McTaggart, both the A- and B-series are *phenomenon bene fundata*. (McTaggart utilizes here Leibniz's terminology). Be it as it may, his target is not our perception of temporal reality *per se*; it is temporal reality itself, or rather the essentially atemporal nature of reality. As such, concerns pertaining to temporal experience, which are imbedded in McTaggart's temporal metaphysics, are orthogonal to the main thrust of his argument which, all things considered, is a metaphysical argument for the unreality of time.

then the A-series/B-series distinction disintegrates; at best, it demarcates not two distinct types of temporal series, but a temporal series and something else. If, conversely, we take the A-series to be a series in a strict sense of the term, then it seems that we can hardly distinguish it from the B-series because in this case the A-series is as static as the B-series is. Let us delve into this issue in some detail.

Consider first McTaggart's account of the B-series; to constitute such a series, he says,

> there is required a transitive asymmetrical relation, and a collection of
> terms such that, of any two of them, either the first is in this relation to
> the second, or the second is in this relation to the first. We may take
> here either the relation of "earlier than" or the relation of "later than,"
> both of which, of course, are transitive and asymmetrical. If we take the
> first, then the terms have to be such that, of any of two of them, either
> the first is earlier than the second, or the second is earlier than the first
> (*NE*, §305).

It turns out that if we take the A-series to be a bona fide series, this account of the B-series is not unlike an account of the A-series because by taking the A-series to be a serially ordered set of temporal points we take it to be subject to the basic laws which govern all serially ordered sets. Now, on the *axiom of extensionality*, the immutability of set-membership is a sufficient condition for the identity for sets, because $\{a,b\} = \{b,a\}$. Yet, this condition is not adequate to give us a criterion of identity for ordered sets because $<a,b> \neq <b,a>$. An additional necessary condition is required; namely, the condition of *immutability of order* because a series whose order

mutates, whether uniformly or otherwise, cannot remain the same series, since at times it is *<a,b>* and at some other times it is *<b,a>*. The A-series, therefore, if it is a genuine series, must be as internally static with respect to both its composition and its order, as its counterpart, the B-series certainly is.

It is quite certain that on condition that the A-series is a bona fide series, no sense can be given to the notion of it being *internally* fluid. Suppose we say that the A-series flows in the sense that events come from the future, pause for a moment in the present, and then inexorably recede further and further into the past. Under this scenario and on condition that the A-series is internally static, when one event moves, then all events move with it in unison. What we apparently have here is the notion of a static time that moves as *one rigid whole* in relation to something external. In contrast, if the A-series moves internally, then this entails that either distances between its temporal points vary or their relative positions fluctuate or both is the case. Indeed, there are three possible ways in which a temporal series can be said to flow internally, none of which, it seems to me, is satisfactory:

(a)   Relative positions of the elements of a fluid temporal series are continuously rearranged,

(b)   Temporal distances between the elements of a fluid temporal series continuously change,

(c)   Both, relative positions of the elements of a fluid temporal series and the distances between them are in the state of flux.[12]

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[12] It could be said about a fluid temporal series that it grows in volume, such that new elements are constantly added to it. I shall delve into this issue in Chapter II.

On the first scenario, we have something like this: e_1 is past in relation to e_2, then it is either future or present in the same respect and so forth. On the second scenario, an internally fluid temporal series would be like a rubber cord, continually stretching and contracting. On the third scenario, it would be twice over a chaotic series.

But surely, neither picture of internally flowing temporal series can be true of reality since they are all incoherent in the extreme. If an event e_1 is past with respect to an event e_2, it is always past in that respect and it is always past by the same temporal distance from e_2. The outbreak of WWI, for example, is and has always been twenty-five years in the past with respect to the outbreak of WWII. Apparently, no sense can be made of the idea of an internally fluid serially ordered set in general and of internally fluid temporal series in particular. The A-series, therefore, must be thought of as internally static. Indeed, McTaggart makes it clear that he takes the A-series to be internally static, in the sense that temporal distances between its elements and their relative locations do not change:

> If, then, anything is to be rightly called past, present, or future, it must
> be because it is in relation to something else. And this something else
> to which it is in relation must be something outside the time-series. For
> the relations of the A series are changing relations, and no relations
> which are exclusively between members of the temporal series can
> ever change. Two events are exactly in the same places in the time-
> series, relatively to one another, a million years before they take place,
> while each of them is taking place, and when they are a million years in
> the past (*NE*, §327).

Of course, we habitually observe 'fluidity' of temporal ordering as in cases of orders of succession, e.g., an order of appearance of actors on the theater stage. But in what sense is this a fluid order? It is so strictly in an existential sense – first one actor appears (exists) at the stage, then another does, and the rest. Yet, if an actor *x* appears before an actor *y*, then *x* always before *y*, otherwise we would have a different order of appearance, i.e., a different ordered series.

Since a fluid serially ordered set of temporal items (whatever they might be: events, moments, temporal points, etc.) is not possible, what exactly does McTaggart mean when he asserts that the A-series is changeable?

To answer this question we have to consult the text. From time to time McTaggart takes A-characteristics, viz. past, present, future to be monadic properties, since he often says that such and such event *e is* past, or present, or future; yet, at other times he treats them as relations to something external to the A-series, as in the beginning of the passage quoted on previous page. Indeed, in the original paper he says that it seems to him "a more reasonable view" that the A-characteristics are relations (*UT*, p. 467) and in the later version, it is "quite clear" to him that they are bona fide relations (*NE,* §326).[13] Yet, it seems to me certain that McTaggart's master argument involves A-monadic properties, not A-relations because "...every event has them [A-characteristics] all. If *M* is past, it has been present and future. If it is future, it will be present and past. If it present, it has been future and will be past" (*NE*, §329). Not surprisingly, we find in McTaggart two radically different accounts of A-

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[13] There are additional textual evidences for this construal of temporal fluidity most notably in *NE*, §§ 326-28 and §§ 331-32.

change, one which is articulated in terms of A-relations and the other in terms of A-properties. What is more, it is not always clear which account he intends at different phases of his argument. Still, despite this substantial ambiguity, I believe we are justified in interpreting McTaggart's A-series as a serially ordered set proper.

What then is this A-ordering? I already mentioned that this ordering is immutable, that the A-series is internally static in the very same manner as the B-series is. Take, for instance, an A-series of events; an event e_1 is past, an event e_2 is present, and an event e_3 is future. In what way is this A-ordered set different from a B-ordered set of the same events such that an event e_2 is later than an event e_1 and earlier than an event e_3? The difference here is in name only; in all other respects, the two series are identical, as can be seen in the diagram below.[14]

$$\text{past} \quad \underset{e_1}{+} \qquad \underset{e_2}{+} \qquad \underset{e_3}{+} \quad \text{future}$$

$$\text{earlier} \quad \underset{e_1}{+} \qquad \underset{e_2}{+} \qquad \underset{e_3}{+} \quad \text{later}$$
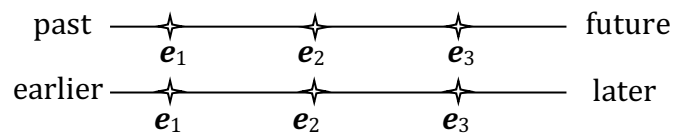
Fig. 1 A and B temporal series.

C. D. Broad, in his painstaking analysis of McTaggart's philosophy, also takes the A-series to be a bona fide ordered set of temporal items because it is

> … formed by the various possible degrees of pastness in decreasing order of magnitude, the characteristic of strict presentness, and the various possible degrees of futurity in increasing order of magnitude. Except for the fact that it is compact it might be represented by the

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[14] Although present is not a part of the B-series and simultaneity is not a part of the A-series, at least not overtly, the point here is that the A-and B-series have the same topological structure and the same elements.

series of negative integers, the singles integer 0, and the series of

positive integers. Thus

$$\ldots -3, \ -2, \ -1; \ 0; \ 1, \ 2, \ 3, \ldots$$

Pastness   *Futurity* [15]

If Broad is right in his exegesis of McTaggart's theory of time, then

topologically, the A-series and the B-series are indistinguishable. Given that the

elements of the B-series constitute also the elements of the A-series and that the

order in question is one and the same, the inescapable conclusion that follows is that

the two series are alike in all relevant aspects. J. J. Thomson develops a similar

"indistinguishably" thesis.[16] She points out that on condition that the A- and B-series

are comprised of the same elements and given that the order of these elements is

exactly the same, then the A- and B-series are identical in all relevant aspects:

> ... the order of the events in the A series is the same as the order of the
>
> events in the B series. So if we opt for the familiar account of the
>
> identity conditions for series ... - namely that series S is identical with
>
> series S′ just in case they have the same members, and their order in S
>
> is the same as their order in S′ - then we are committed to supposing
>
> that the A series just is the B series.[17]

We thus must conclude that if we take the A-series to be a bona fide series, it

cannot be intrinsically differentiated from the B-series because the two series are

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[15] C. D. Broad, *The Examination of McTaggart's Philosophy* (Cambridge: Cambridge University Press, 1938), p. 289.

[16] J. J. Thomson, "McTaggart on Time," *Philosophical Perspectives* **15** (2001), pp. 229-52.

[17] Ibid. p 233.

alike in all relevant respects. The elements of the two temporal series and their

ordering are the same. McTaggart's A-time/B-time distinction, therefore, cannot be

articulated in terms of internally fluid/internally static time dichotomy.

1.1.3   Recently, Clifford Williams argued against the A-time/B-time distinction from

an opposite stance.[18] He contends that the distinction must be abandoned because

transience is an essential feature of both A- and B-time. This thesis Williams calls

"The Transition Argument." He also maintains that the two types of temporal passage

are indistinguishable in principle:

> The real difference between the two kinds of time involves two kinds of
>
> flow – A-flow and B-flow. A-time is not the only kind of time with a
>
> claim to transiency. B-time, too, possesses transition. To say this,
>
> however, is to raise the question of how B-time flow differs from A-time
>
> flow…. there doesn't seem to be any way to differentiate them, and,
>
> consequently, that there doesn't appear to be any way to differentiate
>
> the two kinds of time.[19]

Before I address Williams' argument, let me briefly fill in the metaphysical

background against which it is advanced. The B-theorist employs, among other

theoretical devices, *the spatial simile* – the thesis that time and space both have

breadth. "There is a common topological and metrical structure between any given

---

[18] Clifford Williams, "The Metaphysics of A- and B-Time," *The Philosophical Quarterly* **46** (1996), pp. 371-81; "A Bergsonian Approach to A- and B- Time," *Philosophy* **73** (1998), pp. 379-93; "Beyond A-and B-Time," *Philosophia* **31** (2003), pp. 75-91.
[19] C. Williams (2003), p. 75.

spatial dimension and the temporal dimension... objects are spread out in space... objects are spread out in time as well."[20] Quite apart from the question whether the spatial simile is a legitimate theoretical device, a question arises: If space and time are thought of as extensions, how then should we go about distinguishing between them? A conceptual divide between "spatial extension" and "temporal extension" must be drawn, otherwise, we would not be able to differentiate between the two types of extension.[21]

Taking up this challenge, Williams argues that it is transience that constitutes the dissimilarity between spatial and temporal extensions: "if there were no transition between different moments or events, temporal extension would not differ from spatial extension. There must be something that differentiates the two kinds of extension, and this can only be transition."[22] On the face of it, this seems to be an odd argument. After all, it is a *prima facie* fact that we journey between spatial localities. So, if both spatial and temporal expanses are traversable, then the transition feature cannot assist us in distinguishing the two types of extension.

Yet, there is more to Williams' argument than meets the eye. His motivation for the transition argument is that the feature of B-time that Broad aptly labels "The Extensive Aspect of Temporal Facts" is not sufficient for the existence of time.[23] Williams' point, if I understand it correctly, is that since on a pure B theory , the B-

---

[20] T. Sider (2001), p. 87.
[21] The B-theorist, of course, would claim that there is no such dissimilarity at all. On his account, there are simply no topological differences between the two types of extension; they all are of the same stock. I will address the notion of the spatial simile and related issues in section 3.3 of Chapter III.
[22] C. Williams (2003), p. 79.
[23] C. D. Broad (1938), p. 267. This is also the general idea of McTaggart's essentiality argument which I will discuss in detail in section 1.3.

extension is rigid, it is hard to say in what way, if any, it is different from the other three rigid spatial extensions. In other words, if the B-extension is not transitory, it is not different from spatial extensions; to all intents and purposes, it is the fourth spatial extension.[24] Thus, the first issue Williams raises is whether or not the B-distances are transitory. If they are, then there is a B-passage as well as an A-passage. If, on the other hand, there is no such thing as B-passage, then the B-extension is indistinguishable from spatial extensions.

Having argued that transience is as much part of B-time as it is of A-time, Williams proceeds with a list of arguments for the view that the two types of transience are like two peas in a pod. Despite the somewhat inconclusive result of Williams' project, he has shown (as had Broad before him) that all is not well and good with McTaggart's A-series/B-series distinction. Given the fact that the A-time/B-time controversy is at the very heart of modern analytical metaphysics of time, the question arises whether the century-long debate is exceedingly misguided.

1.2   The Two Notions of Temporal Flow

1.2.1   If the A/B distinction is to be upheld, we must find a way to differentiate between the two temporal series. Since the A-and B-series cannot be differentiated internally, the only option is to differentiate them externally. As we have seen, on the external view of temporal fluidity, call this picture of temporal flow "the external

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[24] It might be argued that the B-temporal dimension has a certain feature spatial dimensions totally lack; namely, directionality. Indeed, it is often argued that time's arrow constitutes a difference between B-time and space. But this objection cannot be used against Williams because the concept of one-directionality of time is dependent on the concept of temporal transition; the former is empty without the latter.

doctrine of temporal passage," temporal flow takes place outside the A-series such that the A-series moves as one rigid whole in relation to something external to it. On the internal conception of temporal fluidity, call it accordingly "the internal doctrine of temporal passage," temporal flow is non-relational; the A-series flows within; it is like a river, only that it is a river without banks rolling its waters uniformly with no relation to anything external.[25] In "fluid temporal series," therefore, the term "fluid" is ambiguous; it could be read either as "externally fluid" or as "internally fluid."[26] On the external reading, "fluid temporal series" stands as follows:

>   *Def. I*: **S** is a fluid temporal series $\equiv_{def.}$ **S** is a series of temporal items that flows
>
>   as one rigid whole in relation to something external to it.

When "fluid temporal series" is read internally, it has the following sense:

>   *Def. II*: **S** is a fluid temporal series $\equiv_{def.}$ **S** is a series of temporal items that flows
>
>   within irrespective of an external point of reference.

Now, in "fluid temporal series" and its proxies, e.g., "the A-series," the term "series" is short for "serially ordered set." Thus, properly analyzed, "fluid temporal series" stands as follows:

>   *Def. III*: **S** is a fluid temporal series $\equiv_{def.}$ (i) **S** is a *serially ordered set* of temporal
>
>   items; (ii) **S** is *fluid*.

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[25] Compare this account of temporal passage with Newton's account of absolute time, "Absolute, true, and mathematical time, of itself, and from its own nature, flows equably without relation to anything external, and by another name is called duration." Isaac Newton, *Principa* F. Cajori (ed.) (Berkeley: University of California Press, 1947), p.6.

[26] G. Schlesinger offers a word of caution in this regard. He says that talk about temporal passage "may be attempted in two totally different senses. These two senses must, under no circumstances, be conflated." The two senses (roughly) are what I call the external and eternal doctrines of temporal passage. George Schlesinger, "The Two Notions of the Passage of Time" *Noûs* **3** (1969), pp. 1-16.

If in *Definition III* we read "fluid" internally, its two clauses, as I have argued in subsection 1.1.2, are mutually exclusive because in the first clause, the A-series is conceived as a static row whereas in the second clause, it is in the perpetual state of flux. Apparently, on (i), the A-series is modeled on a Dedekind-complete ordered field, whereas on (ii), it is nothing like a continuum. On the internal reading, therefore, *Definition III* is an amalgamation of two competing conceptions of fluid temporal series:

> *Def. IV*: **S** is a fluid temporal series $\equiv_{\text{def.}}$ **S** is an *immutable* series of temporal items.

> *Def. V*: **S** is a fluid temporal series $\equiv_{\text{def.}}$ **S** is a *mutable* series of temporal items.

On *Definition IV*, the A-series/B-series distinction is a nonstarter. If, on the other hand, we adapt *Definition V*, then we have a logically imprecise doctrine of A-time, since, it is an *a priori* truth that fluctuations within a set, temporal or not, preclude it from being an ordered series. Strictly speaking, "an internally fluid temporal series" is a contradiction in terms, for it basically amounts to "a fluctuating ordered set of temporal items," that is, to "an unordered ordered set of temporal items." As such, the notion of internally fluid temporal series is without any ontological import whatsoever; there is simply no such thing as an unordered ordered set of temporal items.

1.2.2   It appears that the only sensible reading of 'fluid temporal series' is that which is given by *Definitions I*. However, by accepting these definitions, we are compelled to state that the A-series is different from the B-series only in that it moves as a rigid

whole with respect to something external, whereas the B-series is static both internally and externally. In the footnote on pages 10-11 of Vol. II of *NE,* McTaggart offers such an account of temporal passage. He says there that if the A-series flows, it must flow as a rigid whole, in relation to the B-series, which itself must be stationary. He also considers the converse picture of temporal passage:

> The movement of time consists in the fact that later and later terms
>
> pass into the present, or – which is the same fact expressed in another
>
> way – that presentness passes to later and later terms. If we take it the
>
> first way, we are taking the *B* series as sliding along a fixed *A* series. If
>
> we take it the second way, we are taking the *A* series as sliding along a
>
> fixed *B* series. In the first case time presents itself as a movement from
>
> future to past. In the second case it presents itself as movement from
>
> earlier to later (*NE*, §306, footnote 2).

Figure 2, I believe, faithfully renders the metaphysics of temporal passage based on the external doctrine of temporal flow. On the (a) scenario the B-series moves as a rigid whole in relation to the A-series from future to past; on the (b) scenario the A-series moves as a rigid whole in relation to the B-series from earlier to later times. A third scenario such that both series move in opposite directions is logically feasible. On this scenario, however, we cannot differentiate between the two temporal series, since both externally fluid and internally static and both are composed of the same elements and have the same order. Since on this scenario the two time series move in opposite directions, it could be held that they distinguishable in this respect. But this does not give us the A-series/B-series distinction.
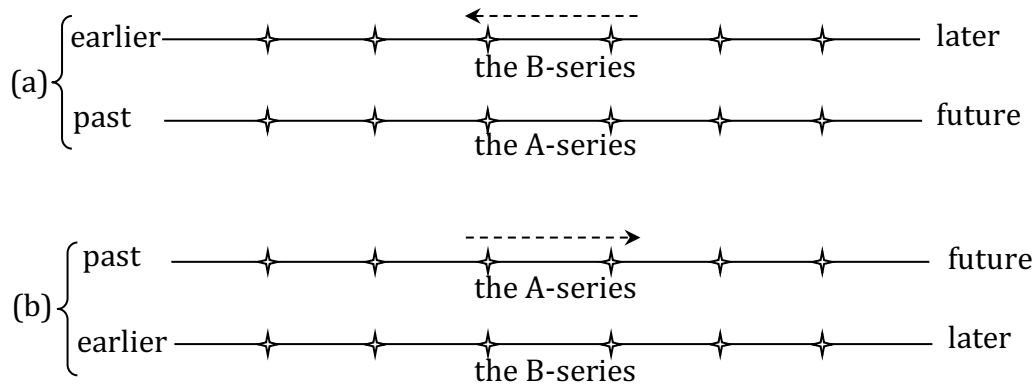
Fig. 2 Directions in A and B temporal series.

It seems that McTaggart's external doctrine of temporal passage stems from

his realization of the fact that if the A-series is a *bona fide* ordered series, it must be

internally static, as all ordered series are. This leads him to find the external doctrine

of temporal passage to be the only conceptually viable alternative. Yet, as we shall

see, the external doctrine of temporal passage plays no role in his principle argument

for the unreality of the A-series.[27] Indeed, the very design of this master argument

turns on the idea of events/moments exemplifying mutually exclusive properties of

pastness, presentness, and futurity which has nothing to do with the external

doctrine of temporal passage. McTaggart talks more often about the A-series in terms

of monadic properties than in terms of relations and switches between these two

diametrically different concepts of the A-series with an astonishing ease. And

although he is insistent that A-characteristics are relations, he casts the contrast

between the A- and B-series in terms of the contrast between monadic properties of

---

[27] That is why, I think, in the literature on the topic, the external doctrine of temporal passage is generally overlooked. Nathan Oaklander's "McTaggart's Paradox Defended" is one of few exceptions, in *The Ontology of Time* (Amherst, New York: Prometheus Books, 2004), pp.51-62.

pastness, presentness, and futurity and relations of earlier than/later than. We thus have an apparent inconsistency here: on the one hand, events and moments exemplify A-monadic properties of pastness, presentness, and futurity and on the other, they stand in two-place relations to something external to the A-series.

How then should we reconcile this inconsistency? McTaggart appears to be of two minds on this issue. The contradictory nature of the A-series, McTaggart says, "would arise in the same way supposing that pastness, presentness and futurity were original qualities, and not, as we have decided that they are relations" (*NE,* §332). Yet, McTaggart does not offer us an argument for the contradictory nature of the A-series based on the supposition that A-characteristics are relations. Besides, McTaggart says that he sees "a more positive difficulty in the way of the reality of the A series" (*NE,* §328). This "positive difficulty" is his celebrated temporal transience paradox. Indeed, the paradoxical nature of the A-series becomes apparent only when we consider events/moments instantiating monadic properties of pastness, presentness, and futurity. And it is not at all clear how it is that the same contradiction arises upon taking A-characteristics to be relations. And even if there is some contradiction that arises when we take pastness, presentness, and futurity to be relations, it surely cannot be the same contradiction that arises from taking them as being monadic properties.

Before turning to the contradiction in question, viz. to McTaggart's celebrated temporal transience paradox, let us first consider what I shall call henceforth McTaggart's essentiality conjecture. This conjecture, together with the temporal transience paradox, is at the center of McTaggart's argument for the unreality of time.

1.3   The Essentiality Conjecture

1.3.1   McTaggart's argument for the unreality of time is two-pronged. Its initial stage aims at showing that "the distinctions of past, present, and future are essential to time" (*NE,* §324). This is McTaggart's essentiality conjecture. As one would expect, at the second stage, McTaggart seeks to establish the unreality of the A-series. This is attained via his famous temporal transience paradox. This two-pronged line of attack, therefore, enables McTaggart to promote his argument against the reality of A-time as his more general argument against the reality of time as such. In the literature on the topic, the essentiality conjecture and the temporal transience paradox are often called McTaggart's 'positive' and 'negative' theses respectively.[28] I shall address these two arguments separately. In this section, I will take up the essentiality conjecture. The temporal transience paradox shall be the subject matter of the next section.

McTaggart's claim that the A-series is essential to the nature of time is somewhat ambiguous because he also asserts that both the A- and B-series are essential to time, "the distinction of past, present, and future is as *essential* to time as the distinction of earlier and later" (*NE*, §306). The qualification that immediately follows this assertion that the A-distinction is "more *fundamental* than the distinction of earlier and later" only adds to the ambiguity. This is the passage in its entirety:

> Since distinctions of the first class [B-distinctions] are permanent, it
>
> might be thought that they were more objective, and more essential to

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[28] See, for instance, Heather Dyke, "McTaggart and the Truth about Time" in *Time, Reality & Experience*, Craig Callender (ed.) (Cambridge: Cambridge University Press, 2002) and Nathan Oaklander (2004).

the nature of time, than those of the second class [A-distinctions]. I

believe, however, that this would be a mistake, and that the distinction

of past, present, and future is as *essential* to time as the distinction of

earlier and later, while in a certain sense it may, as we shall see, be

regarded as more *fundamental* than the distinction of earlier and later

(*NE,* §306).

If in the above passage we read "more *fundamental*," as "more essential," as, it

seems to me, is McTaggart's intention, then we have a notion of degrees of

essentiality, i.e., the B-series is essential to time, but the A-series is more essential to

it. This Orwellian treatment of the notion of essentiality is exceedingly dubious, if not,

in fact, altogether unintelligible. For if we take, as I think we should, "*x* is essential to

y" to bear the meaning "it is necessary *y iff x*," or more plainly, "under no condition

there exists *y* without *x*," then given that logical necessity does not come in degrees

and that "*x* is essential to *y*" is, in effect, a modal statement, it follows that essentiality

too does not come in degrees. Hence, either the A-and B-series are both *equally*

essential to the nature of time, or only one is.

This ambiguity, however, can be easily avoided. As we have seen in the

previous section, on McTaggart's picture of temporal passage, both series are

required for temporal passage to take place. So, perhaps, the following sense could

be made of the idea that the A-and B-series are both essential to time:

(1)   Time *iff* temporal passage

(2)   Temporal passage *iff* (the A-series & the B-series)

(3)   ∴ Time *iff* (the A-series & the B-series)

How then should the superlative in "is more *fundamental* than" be interpreted in this case? §610 of *NE* sheds some light on this question. In it, McTaggart asserts the A-series is more fundamental than the B-series because the earlier than/later than relations are defined in terms of pastness, presentness and futurity, "The term *P* is earlier than the term *Q* if it is ever past while *Q* is present, or present while *Q* is future" (*NE*, §610). Yet, the main reason, as I see it, for holding the A-series to be more fundamental than its counterpart is that in McTaggart's view time requires change, "there could be no time if nothing changed" (*NE,* §309). It is within the framework of this thesis that a sense can be given to McTaggart's notion of degrees of essentiality. The A-series is more fundamental than the B-series because it is the A-series that brings about change.

1.3.2   McTaggart begins his exposition of the essentiality conjecture by stating that time necessarily involves change, and that for there to be change, there must exist the 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?" (*NE*, §309) He answers this question in the negative.[29] Yet, it is not exactly clear what type of change McTaggart has in mind. On some occasions, it seems, he means ordinary changes in things, such as a leaf changing its color from green to yellow. In other places it seems that he has in his crosshairs changes in the A-properties of events. Additionally, there is no clear demarcation line enabling the reader to follow the frequent shifts in

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[29] In the course of arguing against the reality of the A-series, McTaggart comes to an implausible Parmenidean conclusion that changes in things are illusory. At the end, however, he did not prove the unreality of change, this quintessentially Mooreian fact of our everyday experience.

meaning. One thing, however, is clear; McTaggart thinks that the ordinary changes in things require the reality of the *A*-series, "... if there is any change, it must be looked for in the *A* series alone. If there is no real *A* series, there is no real change" (*NE*, §311).

What is then this connection between changes in the ordinary properties of things and changes in the A-properties of events? The leaf cannot change its color unless the property "being yellow" first is in the future then it is in the present and the property "being green" first in the present and then in the past. But the B-series does not allow such, or for that matter any other form of temporal dynamism. The conclusion, therefore, is that there can be no changing of the leaf's color unless the A-series is real. This is how McTaggart lays out this contention:

> Can we say that, in 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 not possible. 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 and later 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 (*NE*, §310).

McTaggart argues that on the B-picture of reality events are forever stacked, as it were, in B-locations. Apparently, in this reality, no change is possible; nothing could change in this frozen river of time; the leaf is and has always been green in the relative B-location and it can never *become* yellow.[30] McTaggart further argues that B-ordered events do not change *qualitatively* – once a certain event always a certain event. Indeed, what is changeable in an event? Well, nothing, nothing at all. For if something were changeable in an event, then it would not be the same event. If *Leibnitz's Law of Identity* holds at all, it undoubtedly holds in the case of events. Here is how McTaggart puts this contention:

> Take any event – the death of Queen Anne, for example – and consider what change can take place in its characteristics. That it is death, that it is the death of Anne Stuart, that it has such causes, that it has such effects – every characteristic of this sort never changes. "Before the stars saw one another plain" the event in question was a death of an English Queen. At the last moment of time – if time has a last moment – the event in question will still be a death of an English Queen (*NE*, §311).

Yet, as McTaggart points out, in one respect A-ordered events do change. A future event **e** will inevitably become present and then, in an instant, it will become past. It is this type of change that McTaggart takes to be the basis of all change and it

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[30] The B-theorist would be quick to point out that the B-order of events gives rise to variation over the B-distances; on his view, this is all that there is to change. I will delve extensively into this issue in Chapter III.

is this type of change that he deems to be paradoxical. And this brings us to McTaggart's temporal transience paradox.

1.4   The Temporal Transience Paradox

1.4.1   The initial phase of McTaggart's temporal transience paradox is basically this:

(1)   Pastness, presentness, and futurity are *prima facie* incompatible properties; no event instantiates more than one at once.

(2)   However, the reality of the A-series entails that any event instantiates all three temporal properties at once.

Apparently, (1) and (2) are incompatible. This is how McTaggart articulates this initial phase:

Past, present, and future are incompatible determinations. Every event must be one or the other, but no event can be more than one. If I say that any event is past, that implies that it is neither present nor future, and so with others.... The characteristics, therefore, are incompatible. But every event has them all (*NE*, §329).

On its face, this reasoning is rather an oddball. Many B-theorists, however, defend its theoretical legitimacy. N. Oaklander, for instance, argues that

McTaggart does *not* begin by assuming that every event is (timelessly or simultaneously) past, present, and future, but rather he denies it. Thus, the common critique of McTaggart that he errs at the first step by *assuming* every event is past, present and future is a non sequitur.[31]

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[31] N. Oaklander (2004), p.53.

Oaklander's charitable reading, however, is not supported by the text (although, as we shall see in section 1.5, it is not entirely off the mark). McTaggart explicitly states that "every event has them all." Worse, he does not give an argument for this crucial conjecture; not even a hint as to how it might go. Unless, of course, we are willing to accept the three sentence which immediately follows the opening claim to be such an argument:

> If *M* is past, it has been present and future. If it is future, it will be
>
> present and past. If it is present, it has been future and will be past.
>
> Thus all the three characteristics belong to each event. How is this
>
> consistent with their being incompatible (*NE*, §329)?

The initial reaction people usually have when they first encounter this reasoning is utter incredulity.[32] It appears that McTaggart is totally oblivious to the profound distinction between simple and compound temporal attributes. Surely, just because (i), (ii), and (iii) are true, it does not follow that (i)*, (ii)*, and (iii)* must also be true.

> (i)   Any past event instantiates the simple property _is past and compound
>
> properties _has been present and _has been future,

(i)*   Any past event instantiates the simple properties _is past, _is present, and _is future,

(ii)   Any present event instantiates the simple property _is present and compound properties _has been future and _will be past,

(ii)*   Any present event instantiates the simple properties _is present, _is, past and _is future,

(iii)   Any future event instantiates the simple property _is future and compound properties _will be present and _will be past.

(iii)*   Any future event instantiates the simple properties _is future, _is present, and _is past.

Broad was quick to point out that there is no contradiction to be avoided in the first place; pastness, presentness, and futurity are incompatible only if they are instantiated by events *at the same time*. But they are never instantiated in this way:

When it is said that pastness, presentness, and futurity are incompatible predicates, this is true only in the sense that no one term could have two of them *simultaneously* or *timelessly*. Now no term ever appears to have any of them timelessly, and no term ever appears to have them simultaneously. What appears to be the case is that certain terms have them *successively*. Thus there is nothing in the temporal appearances to suggest that there is a contradiction to be avoided.[33]

Yet, there is more to McTaggart's reasoning than meets the eye. It is more than just an artless equation of simple and compound temporal attributes. The air of

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[33] C. D. Broad (1938), p. 313.

fallaciousness that surrounds the initial pace of the argument is due solely to the

haphazardness of McTaggart's way of reasoning. What is more, McTaggart is fully

aware of the apparent strangeness of his claim and acknowledges, in the passage that

immediately follows its articulation, that a natural way to counter it would be to say

that events do not exemplify all three simple temporal properties simultaneously:

> It may seem that this can easily be explained. Indeed, it has been
>
> impossible to state the difficulty without almost giving the
>
> explanation…. It is never true, the answer will run, that *M is* present,
>
> past, and future. It *is* present, *will be* past, and *has been* future. Or it *is*
>
> past, and *has been* future and present, or again *is* future, and *will be*
>
> present and past. The characteristics are only incompatible when they
>
> are simultaneous, and there is no contradiction to this in the fact that
>
> each term has all of them successively (*NE*, §330).

Indeed, when we have successive instantiation of pastness, presentness, and

futurity, we have perfectly compatible facts, which are expressible by perfectly

consistent tense elocutions. But, McTaggart argues, this is not the whole picture.

There are further concerns which arise upon contemplating the idea that events

instantiate different temporal properties at different times. Namely, iterated tenses,

e.g., *e* is future in the past, *e* is present in the present, *e* is past in the future, are

suspect because they imply an infinite hierarchy of the A-series.[34] McTaggart then

argues that at any level of this hierarchy we have a dilemma: either events instantiate

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[34] A. Prior (1967) considers McTaggart's uneasiness with iterated tenses to herald the advance of temporal logic, "one could say that there is tense-logic itself in McTaggart, though Findlay was first to see it as such," p.1.

pastness, presentness, and futurity at once or they instantiate them successfully. It is this dilemma, neither horn of which is metaphysically viable, that is at the heart of McTaggart's temporal transience paradox.

1.4.2   Having acknowledged the obvious fact that pastness, presentness, and futurity are incompatible properties only when they are instantiated simultaneously, McTaggart then invites us to consider an alternative possibility, namely, that they are instantiated successively, as, for instance, when an event *e is* present, *will be* past, and *has been* future, and then he asks, "But what is meant by "has been" and "will be"? And what is meant by "is," when, as here, it is used with a temporal meaning, and not simply for predication" (*NE*, §331)? In answering this question, McTaggart invokes the notion of ordinary property instantiation over time:

> When we say that *X* has been *Y*, we are asserting *X* to be *Y* at a moment
> of past time. When we say *X* will be *Y*, we are asserting *X* to be *Y* at a
> moment of future time. When we say that *X* is *Y* (in the temporal sense
> of "is"), we are asserting *X* to be *Y* at a moment of present time (*NE*,
> §331).

This notion of ordinary property instantiation over time is depicted in Figure 3 below:

x is Y	*x* is Y	*x* is Y
past moment	present moment	future moment
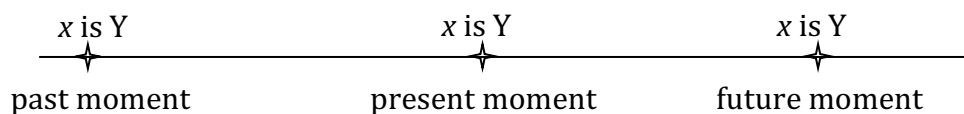
Fig. 3 Ordinary property instantiation over time.

McTaggart then assumes without additional argument that the same mechanics are in play in the case of instantiation of temporal properties of pastness, presentness, and futurity, thus, in effect, positing a second-order A-time,

> Thus our first statement about M – that it is present, will be past, and has been future – means that M is present at a moment of present time, past at some moment of future time, and future at some moment of past time (*NE*, §331).

This unargued assumption can be represented analogously to that in Figure 3 as follows:

e is F   e is N   e is P

past moment   present moment   future moment
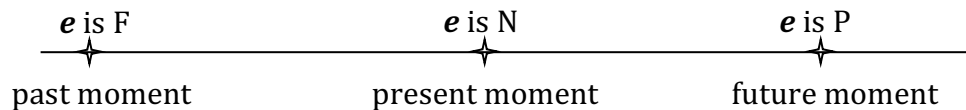
Fig. 4 Temporal property instantiation over time.

It appears that McTaggart is taken in here by the grammatical similarity between statements expressing ordinary and temporal property instantiation. For him, for instance, "x is red" is on a par with "x is past." And since being red is always being red at some moment of time, McTaggart surmises that being past, present, and future is too always being past, present, and future at some moment of time. This reasoning leads McTaggart to the conjecture that the instantiation of A-properties always involves a higher-order A-time, because being a process, it, as all processes, must unfold over time. And since past, present, and future cannot unfold over

themselves, it follows that they unfold over a higher-order time. This is McTaggart's initial step toward infinite regress of A-attributions.

McTaggart then proceeds to argue that "every moment, like every event is both past, present, and future" (*NE*, §331). Unfortunately, this shift from event-talk to moment-talk is largely overlooked in the literature; yet, it is an integral part of McTaggart's argument. At the outset McTaggart claims that any event *e* is past, present, and future. Then he points to the obvious fact that this is a contradictory claim. Apparently, this contradiction is avoidable by positing a second-order A-series: event *e* is past at a future moment, present at present moment, and future at a past moment. Then McTaggart states that a second-order A-series is too comprised of moments. These second-order moments, McTaggart then claims, instantiate properties of pastness, presentness, and futurity. We, thus again, as in the case of events, have only two available options; either second-order moments instantiate pastness, presentness, and futurity simultaneously or they instantiate them successively and thus over a third-order A-time and so on.

It is this switch from the event-talk to the moment-talk and not, as is commonly held, McTaggart's initial claim that any event instantiate pastness, presentness, and futurity at once, that is the weakest link in his argument, because it is not at all clear why second-order moments, or for that matter first-order moments, should instantiate properties of pastness, presentness, and futurity. It is at moments, not by moments, that pastness, presentness, and futurity are instantiated by events. It is sensible to state that event *e* is future and then it is past, but it is not sensible to state that a moment was in the future and then it moved into the past. Indeed, as I

have argued in section 1.2, McTaggart is well-aware of the fact that moments of time, if there to be such entities, are permanently ordered, they do not migrate in relation to each other, though it is conceivable that they can move as one rigid whole in relation to something external.

McTaggart seems to be saying that a second-order A-series moves as a rigid whole in relation to the first-order A-series and a third-order A-series moves in the same fashion in relation to a second-order A-series and so on *ad infinitum*. This picture of temporal reality stems from McTaggart's shift from the event-talk to the moment-talk, but it is not at all clear what justifies this rather sudden shift. Yet, we can discern the motivation for the shift. McTaggart does not intend to introduce higher-order events. Indeed, what such entities could possibly be? But a talk of higher-order times, it seems, is plausible. That is why McTaggart's temporal transience paradox is formulated in terms of higher-order terms of times and not in terms of higher-order events.

Now, McTaggart's treatment of the phenomenon of temporal properties instantiation as an analog of the phenomenon of regular property instantiation (see Figure 4) cannot be true of reality. Any past event *e* is not future in the past, that is, it does not instantiate the property of futurity at a past moment, it is *at* a past moment *simpliciter*; it is this temporal fact of being-at-a-past-moment that makes this event being past, viz. makes it instantiate the property of pastness; and this is true for presentness and futurity: *e* is present means *e* is-at-a-present-moment and *e* is future means *e* is-at-a-future-moment. A consistent picture of A-temporal reality is depicted

in Figure 5.[35] In this diagram it can be clearly seen that it is not A-times (as in Figure 4) which are at A-times, but that it is only events which are at A-times. First an event *e* is in the future, then it moves to the present, and eventually it recedes into that past. On this picture no infinite hierarchy of A-series, therefore, arises.
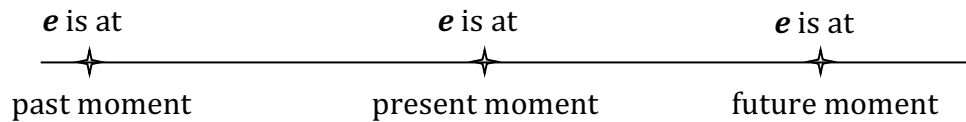
Fig. 5 No infinite hierarchy of A-series.

It is hard to say what exactly compelled McTaggart to hold that moments, in addition to events, also instantiate pastness, presentness, and futurity. Be it as it may, once it is held that moments do themselves instantiate pastness, presentness, and futurity at other moments, the original dilemma articulated with respect to events reappears in the case of moments; either moments of time instantiate pastness, presentness, and futurity at once or they instantiate them successively. The former horn of the dilemma is patently contradictory and the latter one inevitably leads to the infinite regress of A-series. Indeed, if we accept McTaggart's dilemma a propos moments, then we have no choice but to admit the reality of an infinite hierarchy of A-series. The gist of McTaggart's claim, therefore, is that an A-series of any order is either essentially self-contradictory or this contradiction can only be resolved by positing a higher-order A-time. But since the contradiction cannot be resolved

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[35] It is consistent in so far its theoretical structure is concerned. Whether it is true of reality is altogether a different question.

conclusively at any level, we have an infinite regress of A-series. McTaggart then concludes that:

> Such an infinity is vicious. The attribution of the characteristics past,
>
> present, and future to the terms of any series leads to a contradiction,
>
> unless it is specified that they have them successively. This means, as
>
> we have seen, that they have them in relation to terms specified as past,
>
> present, and future. These again, to avoid a like contradiction, must in
>
> turn be specified as past, present, and future. And, since this continues
>
> infinitely, the first set of terms never escapes from contradiction at all
>
> (*NE*, §332).

1.4.3   Still, the question persists whether McTaggart's infinite regress of A-series is vicious. Consult, for instance, the exchange between Q. Smith and N. Oaklander (1984) which, incidentally, they frame not in terms of the regress of A-series, but in terms of the regress of temporal attributions.[36] Smith admits the regress, but holds it to be benign. Oaklander, on the other hand, holds it to be outright vicious. As a rule, A-theorists take the regress to be benign and their opponents take it to be vicious because, as Mellor puts it, "at no stage in it can all the A-facts it entails be consistently stated."[37] G. Priest, although he adapts Mellor's treatment of the regress, nonetheless

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[36] Q. Smith, "The Infinite Regress of Temporal Attributions" in *The New Theory of Time*, N. Oaklander and Q. Smith (eds.), (New Haven, CT: Yale University Press, 1984) pp. 180–94. N. Oaklander, "McTaggart's Paradox and the Infinite Regress of Temporal Attributions: A Reply to Smith," the same volume, pp.195–201.
[37] D.H. Mellor (1998), p.74.

sharply disagrees with him on this point. Priest takes the regress to be benign and concludes that "McTaggart's argument, therefore, fails."[38]

Priest's position is of particular relevance to the issue in hand. Before discussing Priest's interpretation of McTaggart's infinite temporal regress, which I think is wrong, let me first say something about how I understand the difference between vicious and benign regresses in general. It is not easy to come up with a clear criterion of the vicious and the benign with respect to the notion of infinite regress, but perhaps definition by example will do. Let us start with benign infinite regresses. The following is Priest's example of it:

P is true, (P is true) is true, ((P is true) is true) is true…[39]

Here, it would appear, we are dealing with an *infinite series* of propositions; in no stage of this infinite reiteration of the first proposition there crops up a contradiction or any other sort of logical trouble. John Passmore too identifies a benign infinite regress with an infinite series, and distinguishes this from an infinite regress proper which he takes to be vicious in all cases.[40] Here are Passmore's examples of benign and vicious infinite regresses in that order:

(i) Every line is infinitely divisible,

(ii) To move along a line one must move through all its parts.

Now, I distinguish between three types of infinite regress: (i) logical infinite regress, (ii) epistemological infinite regress, and (iii) ontological infinite regress. I take McTaggart's infinite regress to be an instance of ontological infinite regresses,

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[38] G. Priest, *Logic: a very Short Introduction* (Oxford, New York: Oxford University Press, 2000), p. 60.
[39] Private correspondence.
[40] J. Passmore, *Philosophical Reasoning,* (New York: Charles Scribner's Sons, 1961), Chapter 2.

for it involves the question concerning the roster of existence; it is, in other words, about what exists, or rather in McTaggart's case, about what does not exist. Priest's example and Passmore's first example are instances of logical infinite regress. Here is an example of epistemological infinite regress. If to know *x* is to know its cause, then in order for this cause to be known, the cause of this cause must be known and so *ad infinitum* (unless, of course, one assumes that there exists the primal uncaused cause of everything). It has the form of 'why x? -- because y; why y? -- because z; 'why z -- because…' Epistemological infinite regress, it seems to me, is always vicious because it defers explanation indefinitely.

Here is another example of ontological infinite regress. Take two objects A and B. Count them; this is the one and this is the other. But look, in fact we have three objects A, B, and the compound object A+B. But by having three objects we have four, i.e., A, B, A+B and the compound object A+B+(A+B) and so *ad infinitum*.[41] Yet, the intuition we have is that the regress stops at the third object, or may be even at the second. This instance of ontological infinite regress is vicious in the sense that it cannot be true of reality; two objects simply do not generate an infinite number of objects, there are at most three objects.
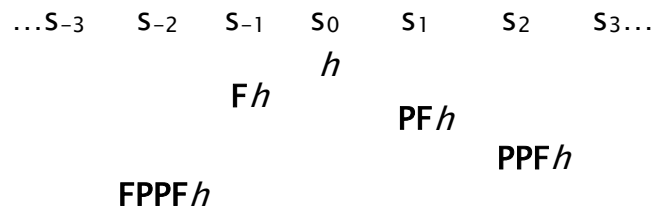
Now, back to Priest's reading of McTaggart's infinite regress of A-series. Priest offers an ingenious interpretation of this infinite regress as an instance of *logical* infinite regress. As one would expect, he maintains that McTaggart's infinite regress

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[41] This is, of course, resembles of the famous 'Third Man Argument'.

is perfectly benign. In arguing his case, Priest employs Arthur Prior's logical machinery in conjunction with the notion of a static time series as follows:[42]

> Suppose that *h* is true in just s_0. Then any statement with a compound tense concerning *h* is true *somewhere*. For example, consider **FPPF***h*. This is true in s_{-2}, as the following diagram shows:

$$\ldots \text{S}_{-3} \quad \text{S}_{-2} \quad \text{S}_{-1} \quad \text{S}_0 \quad \text{S}_1 \quad \text{S}_2 \quad \text{S}_3 \ldots$$

$$h$$
$$\mathbf{F}h \qquad \mathbf{PF}h$$
$$\mathbf{PPF}h$$
$$\mathbf{FPPF}h$$

Priest then concludes that "... we can do the same for every compound tense composed of **F** and **P,** zigzagging left and right, as required. And all this is perfectly consistent."[43]

In understanding McTaggart's infinite regress, however, the crucial question which ought to be asked is whether McTaggart's iterated tenses, such as future in the past, past in the future, etc., denote distinct A-series. As I have argued in the previous subsection, they indeed do. On McTaggart's view such expressions as '*e* will be past in future' imply that there actually exist two A-series; the same would follow were we to use more complex iterated tenses, such as **FPPF***h,* **PF***h,* **PPF***h*, etc. Indeed, the very

notion of an event *e* being past or future at a time implies a second-order A-series because it amounts to the notion a moment being at another moment. It is this infinite hierarchy of A-series which McTaggart holds to be vicious. It is vicious

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[42] Incidentally, Prior most likely would not approve of such a hybrid theory of time, for he held the concept of static temporal series all elements of which are equally in existence, to be without any ontological import.

[43] G. Priest (2000), p.60.

ontologically because each A-series requires the existence of a higher order A-series since at any level of the hierarchy the dilemma in question is present.[44] It is for this reason that I deem McTaggart's infinite regress of A-series to be vicious.

One, however, might ask "What precisely is wrong with the benign infinite regress of temporal attributes Priest offers in *Logic*?" I think nothing is wrong with it as long as we do not take the compound tenses to denote distinct A-series in the hierarchy of A-series. However, if we take the compound tenses to denote distinct A-series, then either we have a patent contradiction or if not then a higher-order A-series, and all this goes indefinitely; at any level we have the unresolvable dilemma. And since the dilemma cannot be resolved conclusively at any level we have vicious infinite regress.

If we treat McTaggart's temporal regress as a logical regress, as it seems to me Priest does, then, of course, the regress is benign. This latter interpretation, however, is unwarranted. McTaggart's argument is through-and-through metaphysical, since it deals with the issue of what is out there, or rather with the issue of what is not out there. In McTaggart's case, we are, using Quine's phraseology, dealing with the problem on what there is, and not with the problem of how we logically regiment the language of temporal discourse. To be sure the latter problem is integral to metaphysical inquiry concerning the nature of time, yet, it is also distinct from this inquiry as was demonstrated by Prior, who has shown us that we can have a logically regimented tensed language in the world of ours that has neither past nor future.

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[44] Another reason for holding ontological infinite regress of A-series to be unacceptable is that an infinite number of A-series violates Ockham's razor.

McTaggart skillfully uses ontological infinite regress of A-series as an argument against the reality of fluid time. Priest's interpretation of it as a logical infinite regress, therefore, is unwarranted.

1.5   The General Structure of McTaggart's Argument

1.5.1   Let us now go back to the beginning of section 1.4. It appears that it is (2) that is the crux of the temporal transience paradox; it, therefore, must be shown to be true; and since the truth of (1) is self-evident that would show the conjunction of (1) and (2) to be genuinely paradoxical because (1) and (2) cannot both be true. Naturally, a question arises: How does McTaggart prove the truth of that the reality of the A-series entails that any event instantiates all three temporal properties at once? Yet, in the end the soundness of the paradox does not hinge on such a proof. McTaggart does not argue, as Mellor thinks he does, that "because each event is always changing its A-times, it has to have them all."[45] It is patently clear that the assertion that any event is past, present and future at once is simply false, or rather, as E. Lowe points out, it is incoherent.[46]

The significance of the temporal transience paradox, as I have argued in the previous section, is that it has the form of a certain dilemma, namely, either events instantiate pastness, presentness and futurity at once or they instantiate these properties successively. The former horn of the dilemma is patently contradictory, whereas the latter one generates a vicious infinite regress of the A-series. It is

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[45] D. H. Mellor (1998), p. 73.
[46] E. J. Lowe, "The Indexical Fallacy in McTaggart's Proof of the Unreality of Time, *Mind* **96** (1987), pp. 62-70.

McTaggart's analysis of simple-tense predications that is of crucial importance to understanding McTaggart's temporal transience paradox. The following, I believe, is the essence of McTaggart's analysis of simple-tense predications:

(i)   "*e* is past in the future," = "there is a future moment *t*, such that *e* instantiates pastness at *t* and *t* is *not* an element of the first-order *A*-series,"

(ii)   "*e* is present in the present," = "there is a present moment *t*, such that *e* instantiates presentness at *t* and *t* is *not* an element of the first-order *A*-series,"

(iii)   "*e* is future in the past" = "there is a past moment *t*, such that *e* instantiates futurity at *t* and *t* is *not* an element of the first-order *A*-series."

It is these P-at-*t*, N-at-*t*, and F-a-*t* relations which bring about the vicious infinite regress of temporal attributions. Apparently, instantiations of pastness, presentness, and futurity over time commits us to a second-order time because the process of exemplification of temporal properties is *prima facie* a process over a second-order time since relations the P-at-*t*, N-at-*t*, and F-at-*t* are essentially *t′*-at-*t″* relations. And since McTaggart explicitly states that this second-order time is A-time, "But every moment, like every event, is both past, present, and future" (*NE*, §331), we are dealing here with the exemplification of first-order A-properties over a second-order A-time. The same goes for second-order pastness, presentness, and futurity; they too are exemplified successively because they are no less incompatible with one another than the first-order temporal properties, and so on *ad infinitum*.

The crux of McTaggart's paradox is not that events instantiate all three temporal properties at once, they in fact never do, but that the instantiation of A-properties entails infinite regress, or if not then we have a contradiction. What McTaggart should have said, therefore, is that we have only two alternative scenarios: either A-properties are instantiated simultaneously or successively. And then he should have shown that neither alternative is viable. This would have been decisive. Instead, he has chosen to posit an unargued assumption that the contradiction arises at the first level of instantiation only to disclaim it immediately thereafter as patently nonsensical; he then again reintroduces it at the second level and so forth. This unwieldy strategy can be completely avoided if we take the temporal transience paradox to be not the conjunction of (1) and (2), but as a dilemma. So construed, the paradox has the form of a catch-22: either pastness, presentness, and futurity are instantiated *simultaneously*, which is a blatant contradiction or if not, they are then instantiated *successively*, and thus over a second-order A-time and so *ad infinitum*. Whichever horn of the dilemma one chooses, the outcome is the same – the reality of A-time must be rejected. Despite the numerous deficiencies of McTaggart's exposition of the temporal transience paradox, when critically and charitably construed, it conveys a singularly potent metaphysical result – the notion of temporal transience is essentially incongruous; and as such, it is without any ontological import whatsoever.

1.5.2   I take the intended general structure of McTaggart argument against the reality of time to have the following form:

(1)   time $\equiv$ A-series   (the essentiality conjecture),

(2)   ¬ A-series exists   (the temporal transience paradox),

(3)   ∴ ¬time exists   (conclusion).

Yet, on McTaggart's own admission, time involves both the A- and B-series. As it stands, McTaggart's argument amounts to the rejection of the reality of A-time and not, as he claims, to the rejection of the reality of time *per se*. McTaggart, in effect, makes two metaphysical claims, one of which has larger ontological implications than the other. The larger claim is that time *per se* is nonexistent and the more modest claim is that A-time is unreal. The lesser claim is argued for via the temporal transience paradox, whereas the larger claim, to all intents and purposes, is left unargued. McTaggart simply grounds the larger claim that time as such is unreal on the lesser claim that the A-series is unreal via the essentiality conjecture. This move amounts to an unwarranted inflation of the ontological scope of the temporal transience paradox. This inflation has rightly been criticized by Schlesinger:

> the claim that time is unreal is not an intrinsic part of McTaggart's argument. His argument is designed principally to show that the notion of an A-series gives rise to a contradiction. If his argument is correct, it implies only that the A-series is unreal. The most natural conclusion to draw from this would be that time should be thought of as consisting of the B-series alone."[47]

Apparently, to yield (3), (1) should state that time as such is A-time and nothing else. So modified, the argument has the following form:

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[47] George N. Schlesinger (1980), p. 41.

(4)　time = the A-series

(5)　¬ A-series exists

(6)　∴ ¬time exists

Yet, it is not how McTaggart argues his case. The A-series, he says, is as essential to time as the B-series is. Because McTaggart's argument against the reality of time *per se* cannot be underwritten by his argument against the reality of A-time, he has failed to prove what he set out to prove – the unreality of time as such. In the absence of an argument against the reality of B-time, or a direct argument against the reality of time as such, McTaggart's argument for the delusiveness of time is inconclusive. However, an argument against the reality of B-time would, in conjunction with the argument against the reality of A-time, be sufficient to complete McTaggart's project. I will offer a number of such arguments in Chapter III.

Chapter II: A and A/B Theories of Time

2.1   Varieties of A and A/B theories

2.1.1   It is generally agreed that the foremost difficulty for A and A/B theorists is to give a non-metaphorical account of the notion of temporal passage. McTaggart argued that no such account is possible in principle because the concept of temporal passage is inherently inconsistent. Yet, denial of the reality of temporal flow is patently counterintuitive, for "there is hardly any experience that seems more persistently, or immediately given to us than the relentless flow of time."[48] Surely, says the voice of commonsense, there must be something in reality that corresponds to our notion of temporal passage. Events come and go, things take shape and perish, and everything succumbs to the gnawing tooth of time. The voice of commonsense notwithstanding, McTaggart is right – the notion of temporal flow, in any shape or form, is ontologically empty; there is simply nothing in reality that corresponds to our deep-seated belief in the reality of temporal passage.

McTaggart presented one argument to that conclusion, but there are many more. In fact, there are as many arguments to that effect as there are versions of A and A/B theories, for each version is rooted in its own, inevitably erroneous, concept of temporal flow. In this chapter, I will give an account of the major brands of A and A/B theories. The exposition seeks to bring to the fore the principal difficulties which besiege the concept of temporal passage.

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[48] George N. Schlesinger, "E Pur Si Mouve," *The Philosophical Quarterly* **41** (1991), pp. 427-41.

Let us begin with the three basic theories of time. The variety of temporal theories is constrained by three basic temporal ontologies; namely, Presentism (the Pure A-universe), Possibilism (the Burgeoning-Universe), and Eternalism (the Block-Universe). The differences between the three temporal ontologies are expressed schematically in Figure 6 below.

the Pure A-Universe   the Burgeoning Universe   the Block-Universe
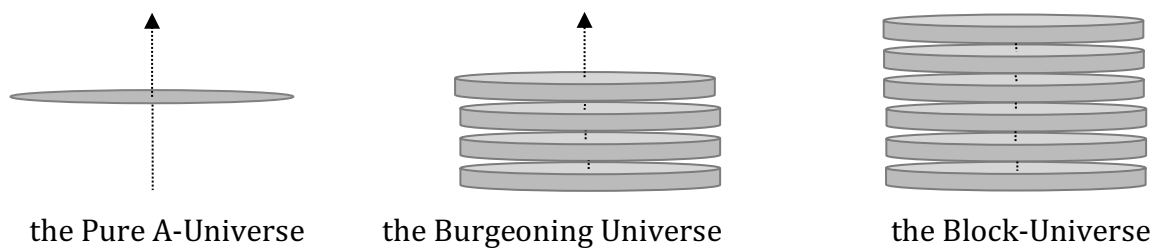
Fig. 6 The Pure A-universe, the Burgeoning-Universe, and Block-Universe.

Unlike the Pure A-universe which is devoid of the past and future regions (it is as ephemeral as the present itself, to which its existence is reduced; it, as one might say, is present-thin), the Block-universe is a full-blown entity; it is also, in contrast to its two alternatives, static in every imaginable respect. In the Block-Universe, nothing changes and nothing can be added to or subtracted from its existential roster; it is a very solid block universe, indeed.[49] The Burgeoning Universe, on the other hand, has both dynamic and static features. Like a coral reef, it continuously grows in bulk and complexity, building on what is, striving toward what is not yet in existence.

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[49] I will delve into the Block-Universe hypothesis in Chapter III.

The interjectory of the three basic temporal ontologies depicted in Figure 6 and the three basic metaphysics of time, viz. the A theory, the B theory, and the A/B theory, gives us the set of nine possible metaphysical theories of time, as shown in Figure 7. Some pairings in Figure 7 are counterintuitive. For instance, the marriage between an A theory and Eternalism is, on its face, a nonstarter, since it gives rise to a self-contradictory hypothesis of static/flowing time. Yet, recently, Dean Zimmerman took it upon himself to "search for a stable eternalist A theory."[50] On the other end of the spectrum, nothing can be more discordant than a B theory and Presentism; yet, as I shall show in Chapter III, the Block-Universe hypothesis does inevitably lead to the notion that all temporally ordered segments of the Block-Universe exist at one and the same durationless moment; which is another way to say that all temporally ordered slices of the Block-Universe are simultaneous and, therefore, are co-present.

	A theory	**B theory**	**A/B theory**
Presentism	A Presentism	B Presentism	A/B Presentism
Possibilism	A Possibilism	B Possibilism	A/B Possibilism
Eternalism	A Eternalism	B Eternalism	A/B Eternalism

Fig. 7 The set of nine possible metaphysical theories of time.

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[50] D. W. Zimmerman, "The A theory of Time, the B theory of Time, and 'Taking Tense Seriously'," *Dialectica* **59** (2005), pp. 401–57. I take Zimmerman's A Eternalism to amount to A/B Eternalism, for what he argues for is, in fact, the Block-Universe plus the dynamic Now.

2.2   The Moving-Now Model of Temporal Passage

2.2.1   Let us first consider the question whether the moving-now is an element of the A-series. In the first chapter, I argued that if we take the A-series to be a genuine series, its elements must be permanently ordered. Suppose then that the A-series is a genuine series and that the moving-now is one of its elements. From these two suppositions it follows that all elements of the A-series move in unison with the moving-now in relation to something external. How then, on this hypothesis, should we go about distinguishing the moving-now from the other elements of the A-series? We surely should not say that all the elements of the A-series are nows, for in such case everything would be now. There must be something unique about the moving-now. What is then that particular feature of the moving-now that other elements of the A-series lack? As far as I can tell, on a pure A theory, the moving-now is indistinguishable from any other temporal point in the A-series. If, however, we assume an A/B picture of time, then it could be said that the moving-now moves along the B-series, one B-segment at a time; and while it 'hovers over' a given segment of the B-series it brings into existence whatever is situated at that segment so that what is no longer and not yet in the spotlight of the moving-now does not exist.[51] It is this feature of the moving-now about which it then can be said that it sets it apart from the other elements of the A-series.

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[51] Compare this picture with Broad's description of the moving-now as "policeman's bull's-eye traversing the fronts of the houses in a street" quoted in full on page 47.

Apparently, on this picture, all other members of the A-series are existentially inert; that is, they play no role in bringing things into existence. In fact, postulating these members is of no theoretical consequence whatsoever, for they neither add to nor take away from a theory of the moving-now. In the light of this understanding and for the sake of economy, it would be prudent to dispose of the notion of the A-series altogether and hold that it is just the moving-now that moves in relation to the static B-series, as shown in Figure 8.
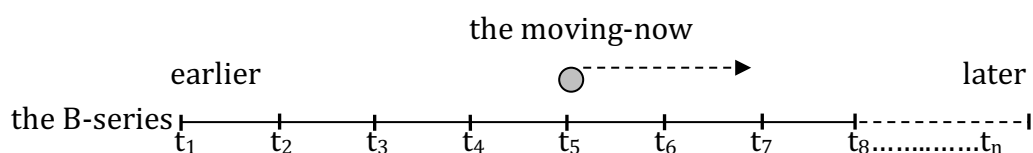
Fig. 8 The now moves in relation to the static B-series.

The B-series + the moving-now hypothesis is sometimes called in the literature the cinematographic conception of temporal passage.[52] The aim of the analogy is to communicate the idea that even though the relations of the elements of the B-series are static, the movement of the moving-now along the B-series (alternatively, the movement of the B-series in relation to the stationary now) animates the 'world-film', as it were. This analogy, of course, does not help a bit to clarify the nature of the moving-now. Despite the fact that we are told an ostensibly sound story of the 'world-film', all frames of which are in place but only one frame being existentially active at a time, the story, though internally coherent, is without

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[52] See, for instance, H. Bergson, *An Introduction to Metaphysics*, T.E. Hulme (trans.), (New York: The Liberal Arts Press, 1949).

any ontological import whatsoever, for it says nothing about the nature of the moving-now. Indeed, in what sense the 'lens' of the moving-now moves in relation to the 'world-film' spread over the B-series thus animating its characters or, conversely, what sense can be given to the idea that the 'world-film' itself moves in relation to the lens of the static-now? Such pictures are too metaphorical to have a theoretical worth. The cinematographic analogy, therefore, must be rejected as being nothing but a figure of speech; by itself, it cannot give us a coherent theoretical account of the notion of the moving-now, and more generally, about the nature of temporal passage.

2.2.2   Apparently, the moving-now model of temporal passage, properly classified, is a hybrid A/B theory, for it involves the static B-series and the dynamic now moving in the direction from past/earlier to future/later, as shown in Figure 9. I doubt that a pure A-model of the moving-now, that is, a model that does not involve the B-series, or some point of reference external to the moving-now, is theoretically feasible, for it would hinge on an inherently contradictory notion of a non-relational movement of the moving-now.
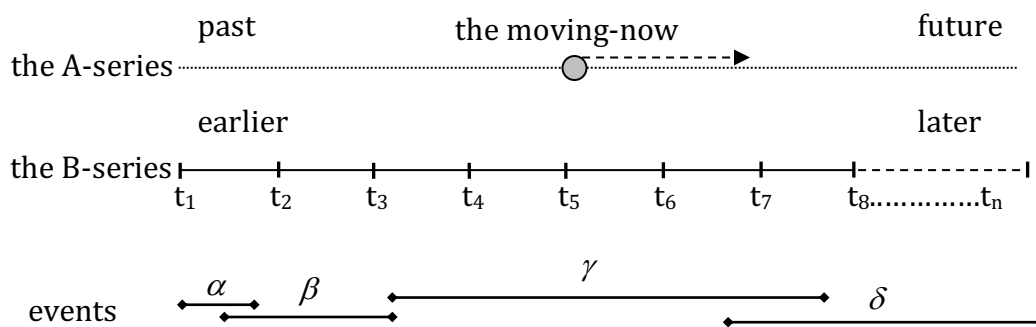

Fig. 9 The non-relational movement of the moving-now.

This twofold time hypothesis is implicit in McTaggart. But it is in C. D. Broad that the hypothesis is explicitly articulated (although he does not endorse it):

> We are naturally tempted to regard the history of the world as existing
> eternally in a certain order of events. Along this, and in a fixed
> direction, we imagine the characteristic of presentness as moving,
> somewhat like the spot of light from policeman's bull's-eye traversing
> the fronts of the houses in a street. What is illuminated is the present,
> what has been illuminated is the past, and what has not yet been
> illuminated is the future.[53]

Upon considering the moving-now model of temporal passage, numerous questions present themselves: For instance, it reasonable to ask, How fast does the moving-now move? Alternatively, we could ask how fast the 'world-film' moves in relation to the static-now? Is it a member of the A-series? If it is, what then is its relation to the other members? What are these other members? Are they moving-nows all sliding in unison along the B-series? If, on the other hand, the moving-now is not a part of the A-series, do we not, in effect, have a three-layer time hypothesis, viz. the A-series plus the B-series plus the moving-now? Is this an ontologically cost-effective picture of reality? These, and the like, questions are unavoidable in considering the moving-now model of temporal passage.

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[53] C. D. Broad, *Scientific Thought* in *Metaphysics: the Big Questions,* P. Van Inwagen & D. Zimmerman (eds.) (Malden Massachusetts and Oxford: Blackwell Publishes, 1998), p 84.

Despite its being theoretically cumbrous and exceedingly metaphorical, the moving-now model finds its ardent proponents. G. Schlesinger is one of them.[54] Having found himself in agreement with Broad that the standard moving-now model (i.e., the one depicted in Figure 8) lacks theoretical coherency, Schlesinger devised his own model. The gist of his theory is that a sense can be made of the idea of the moving-now by relativizing its movement to a higher-order time:

> The movement of the NOW in the standard series of time may be
>
> explicated by explaining that the NOW is at t_1 in the ordinary series
>
> when it is at T_1 in the super-series and at t_2 in the ordinary series when
>
> it is at T_2 in the super series.[55]

Responding to N. Oaklander's devastating critique of this picture of temporal reality,[56] Schlesinger later abandoned his two-dimensional picture of temporal flow in favor of relativizing the movement of the moving-now to possible worlds.[57] I am not sure what to make of this latter, exceedingly complex, edition of his theory, but I believe that by addressing the questions I have raised above, we should come to the conclusion that the moving-now model, in any shape or form, is unattainable. Let me address one problem in particular; namely, the problem of the speed of the moving-now or, more broadly, the problem of the rate of temporal passage.[58]

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[54] George N. Schlesinger, "Temporal Becoming" and "How to Navigate the River of Time," in *The New Theory of Time* N. Oaklander & Q. Smith (eds.) (New Haven and London: Yale University Press, 1994).
[55] Ibid, p.218.
[56] Nathan Oaklander, "McTaggart, Schlesinger, and the Two-Dimensional Time Hypothesis" in *The New Theory of Time*.
[57] George N. Schlesinger (1991), pp. 427-41 and "The Stream of Time," in *The New Theory of Time*.
[58] The two problems are essentially the same because as in the case of the flowing river of time, so in the case of the moving-now, the same conundrum of the rate of temporal flow arises.

2.2.3   In his influential "The River of Time," J. J. C. Smart lays out the problem of the

rate of temporal passage as follows:

>…with respect to motion in space it is always possible to ask "how fast
>
>is it?" 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."… 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
>
>what 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 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.[59]

Smart's contention is that second per second rate cannot possibly be a rate of

temporal passage, because it cannot be a rate at all, and since there are no other ways

to express the rate of temporal passage, the very notion of temporal flow must be

abandoned as having no analogue in physical reality. Indeed, any type of physical

flow, be it the flow of a river, of an atmospheric mass, of an electric current, and the

like must occur at a certain rate. It is a distinct fact of physical reality that rateless

flow of a material substance is not possible. Therefore, on conditions that (a) time is

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[59] J.J.C. Smart (1949), p.485.

a physical phenomenon and (b) it flows, time necessarily must flow at a rate. Besides, if time flowed, we would have used the expression sec/sec or such to describe its rate, which would reduce it to what physicists call "dimensionless constant." However, it is the physical fact that rates are not dimensionless. Hence, the notion of temporal flow is ill-formed.[60] Broad too rightly held the notion of the rate of temporal passage to be wholly incongruous:

> If anything moves, it must move with some determinate velocity. It will
> always be sensible to ask "How fast does it move?" even if we have no
> means of answering this question. Now this is equivalent to asking
> "How great a distance will it have traversed in unit time-lapse?" But
> here the series along which presentness is supposed to move is
> temporal and not spatial. In it "distance" *is* time-lapse. So the question
> becomes "How great a time-lapse will presentness have traversed in
> unit time-lapse?" And this question seems to be meaningless.[61]

As far as I can tell, the only plausible answer to the question, "At what rate does time flow and in relation to what does it flow?" at least provisionally, is that since time cannot flow in relation to anything non-temporal, or in relation to itself, and since it must flow at a rate and not in relation to another flowing time, it must flow at the rate of a certain number of static temporal intervals per temporal unit. What we in effect have here is a three-tier model of temporal flow because the first-

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[60] I owe this observation to Michael Levin.
[61] C.D. Broad (1938), p. 277.

order fluid time flows in relation to second-order static time at the rate of a third-order time unit. Pictorially,
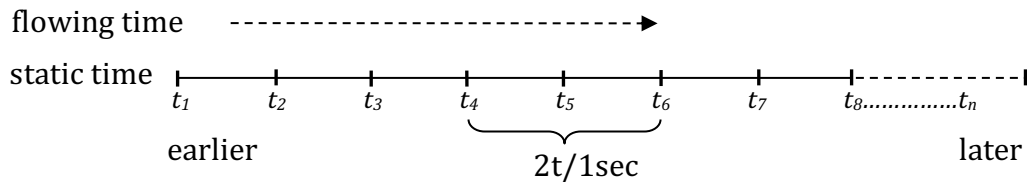
Fig. 10 The first-order fluid time flows in relation to second-order static time.

As before, a question arises at what rate a third-order time flows. The only answer, as far as I can tell, is that it flows at the rate of fourth-order temporal intervals per fifth-order temporal unit and so *ad infinitum*. There arises an additional difficulty. Suppose fluid time flows over second-order static temporal distances. If so, it must flow at the rate given by a number of second-order static time units per third-order (either fluid or static) time unit. Over what static distances then does the third-order fluid time flow? If it flows over first-order static distances, then both first-order and second-order fluid times flow over the same static temporal spans, which is a utterly nonsensical proposition. If, on the other hand, a third-order fluid time flows over forth-order static spans, then in addition to the infinite number of fluid temporal series we have are an infinite number of static temporal series. Thus, we have the same vicious infinite regress whether we take the second-order time to be fluid or static.

Such pictures of temporal passage are too cumbersome to be plausible. Furthermore, any notion of the rate of temporal passage is too metaphorical to have any analytical value, for either A-time is conceived as a fluid object, of a sort, and B-time is conceived as a static space-like expanse over which A-time flows at the rate of

a certain number of B-points per second-order A-time unit, or A-time is conceived as a fluid object flowing over another fluid object at some inexplicable rate.

Additional problem is that any type of physical flow takes place in relation to something external to it, for to flow *physically* is to flow from one external point to another external point. Therefore, were time to flow, it would flow in relation to external points of reference which themselves must be temporal points, for surely time cannot flow in relation to spatial points. This, of course, would mean that there are at least two times: one that flows and one that is static in relation to which the former flows. For a pure A-theorist, however, this should be unacceptable, since he does not admit the reality of static time. Therefore, the second-order time in relation to which the first-order time flows must itself be fluid. This would mean that it in turn must flow in relation to a third-order fluid time and so *ad infinitum*.

2.2.4   Ned Markosian takes issue with such analyses of the notion of the rate of temporal passage.[62] He rejects the hypothesis that "If time flows or passes, then there is some second time-dimension, with respect to which the passage of normal time is to be measured."[63] Markosian thinks that "it is sensible to compare the pure passage of time to time itself."[64] Accordingly, on his account, "the question "How fast does time pass?" is a sensible question with a sensible answer: time passes at the rate of one hour per hour."[65] In arguing his case, Markosian appeals to the authority of

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[62] Ned Markosian, "How Fast Does Time Pass?" *Philosophy and Phenomenological Research* **53** (1993), pp. 829-44. Markosian's paper largely draws on Smart's rate of temporal passage argument he gave in "The River of Time."
[63] Ibid, p.838.
[64] Ibid, p.843.
[65] Ibid, p.843.

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Arthur Prior, who indeed held that the notion of time passing at a certain the rate, e.g., sec/sec is perfectly cogent; the notion of time passage, Prior asserted, did not need to involve the concept of a second-order time.[66] To demonstrate the alleged validity of his claim, Prior draws a parallel between accelerated motion, expressed as meter/sec/sec, and the rate of temporal passage expressed as sec/sec. Evidently, Prior is misled here by the superficial similarity of the two concepts and does not realize that unlike the sec/sec rate, the meter/sec/sec rate does express a certain magnitude. More importantly, the dimension of acceleration is not meter/sec/sec, but [meter/sec]/sec; a standard fraction. Thus, with a little algebra, it becomes meter/sec*sec. The important point is that we have the dimension of time in the denominator and something else in the numerator. The coherence of that sort of fraction, however, does not show the coherence of a fraction with time in the numerator and denominator.[67]

Markosian also contemplates an antirealist reply to the rate of temporal passage argument; namely, that "the passage of time is a change whose rate simply cannot be measured, so that there is no need to posit any second time-dimension with respect to which the passage of normal time is to be measured."[68] I find this thinking unconvincing for the following reasons. To begin with, Markosian's antirealist position is a *non sequitur*, for whether or not the rate of temporal passage is measurable in principle is not in question here. Let us therefore turn to his other suggestion. Markosian's contention is that time passes at the rate of a temporal unit

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[66] A. Prior, *Papers on Time and Tense* (new edition) (Oxford: Oxford University Press, 2003), p.9.
[67] I owe this observation to Michael Levin.
[68] N. Markosian (1993), p.843.

per temporal unit, where both temporal units are of the same temporal dimension.[69]

But how could this be? Rate is a speed of either relational (extrinsic) or non-relational (intrinsic) change. An example of the former would be the speed of a moving car, an example of the latter would be the rate of crop growth.[70] It is one of the basic tenets of mathematical physics that rates are measured by chronometers plus non-temporal measuring devices, such as measuring tapes, scales, etc. Accordingly, in order for us to determine a rate of either qualitative or quantitative change at least two *distinct* Cartesian dimensions (coordinates), one of which is temporal, are needed. For instance, in Figure 11, the rate of crop growth is expressed using two distinct Cartesian dimensions of time and weight.
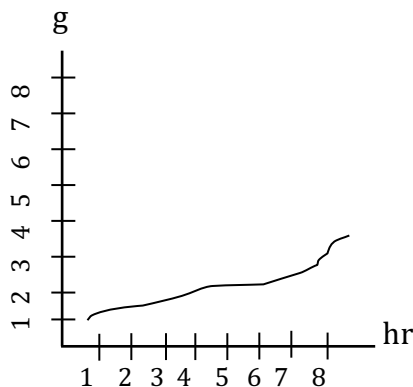
Fig. 11 The rate of crop growing expressed using two Cartesian coordinates.

Surely, we cannot express the rate of this particular qualitative change using just either time or weight units; both parameters are needed. Gram per gram, meter per meter, and such parings simply cannot give us the rate of change. Why then one

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[69] The term "dimension'" in this instance denotes Cartesian coordinates, i.e., a mode of measure.
[70] Not all changes go at a rate. Being a presidential candidate and then being a president, for instance, is an example of such a change. We, however, can ignore this complication as having no bearing on the issue in hand.

should think that the rate of temporal passage is somehow excluded from this elementary principle of mathematical physics? Temporal unit per the *same type* temporal unit is no more a rate of change than gram per gram or meter per meter is. What then can be said about such a peculiar change as temporal flow? Well, if time flows, it must flow at a certain rate. This can be expressed as $Rate^t = 1sec/1sec^*$ where the second occurrence of "second" refers to a second-order time unit. The reality of a second-order time is essential to time passage. Without such a two-dimensional time hypothesis we are simply in the lurch when it comes to expressing the rate of temporal flow.   I see no way around this conclusion.

It might be argued that the rate of temporal flow can be expressed without an appeal to second-order time by using two distinct temporal units of measure, namely B-intervals and A-units. In this case, the rate of temporal flow would be expressible as B-interval/A-unit. Although this idea can be expressed using Cartesian coordinates, as shown in Figure 12, its ostensible legitimacy is misleading. On this analysis, A-time is conceived as an object moving over the B-dimension at a rate of a certain number of B-points per A-units. But A-time is not an object, it itself is a dimension; it is nonsensical to say that it moves over B-time
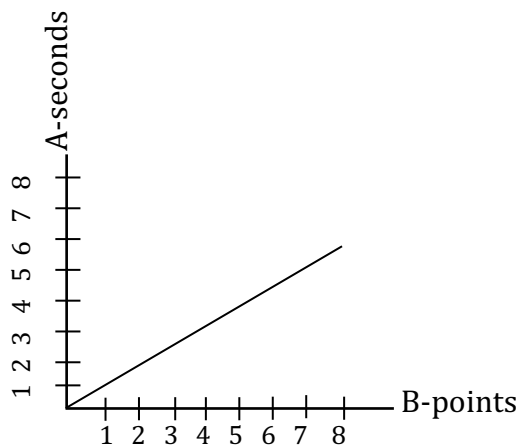
Fig. 12 A-time is not an object, it is a dimension.

P. van Inwagen has another argument against the rate of temporal passage. He points out that minute per minute is not really a rate because one minute divided by one minute gives us 1 and 1 is not a rate:

"Sixty seconds per minute" is not an answer to this question, [How fast does time move?] for sixty seconds *is* one minute… and '1' is not, and cannot ever be, an answer to a question of the form, 'How fast is such-and-such moving?'— no matter what "such-and-such" may be."[71]

Eric Olson echoes van Inwagen:

The real problem with saying that time passes at one second per second is not that this is a funny sort of rate, but that it is no rate of change at all. One second per second is one second divided by one second. And when you divide one second by one second, you get one. Not one of anything, just one. Dividing anything by itself, unless it is zero, gives you one. Sixty seconds per minute and twenty-four hours

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[71] Peter van Inwagen, *Metaphysics* (Bolder, Colorado: Westview Press, 2002), p.59.

per day are also one, because sixty seconds is equal to one minute and twenty-four hours is one day. And one is not a rate of change. A thing can change at a rate of one mile per hour or one degree per minute, but not at a rate of one."[72]

Hud Hudson, N. Markosian, R. Wasserman, and D. Whitcomb disagree with both van Inwagen and Olson.[73] Their analysis, however, is amiss, for it hinges on wrongly equating the rate of change in physical systems, in their case chronometers, with the rate of temporal passage itself. They write

Suppose that a car is passing at a constant rate of 1 kilometer per minute. Letting 'C' abbreviate 'the rate of the car's passage' and 'k/m' abbreviate 'kilometers per minute', we have C = 1 k/m. Now consider the following principle: *The Inverse Rate Equivalence Principle* (IREP): n $x/y = \frac{1}{n} y/x$. IREP tells us that if the xs pass at a rate of n per y, then the ys pass at a rate of $\frac{1}{n}$ per x. So, for example, if Montana completes passes at a rate of 20 per game, then the games go by at a rate of .05 per completion. Applying IREP to the case of the car gives us 1 k/m = 1 m/k. In other words, if the car passes at a rate of one kilometer per minute, then time passes at a rate of one minute per kilometer covered

by the car. This would simply be an alternative way of expressing the rate of time's passage: 1 m/k = R.[74]

Surely, it is not time that "passes at the rate of one minute per kilometer," it is the large hand of the clock that moves a one-minute-notch on the dial while the car covers one kilometer. But let us grant, if only for the sake of argument, that it is time itself that passes as the car goes one kilometer per minute. On the IREP, we are allowed to say that time passes at the rate of one minute per one kilometer. But consider now a three-lane highway such that there is a car in each lane and they travel at different speed: one car is cruising at ½ kilometer per minute, the second car passes at one kilometer per minute, and third car zooms at two kilometers per minute. Should we not then say that on the IREP time passes at three different rates? It seems to me that it is exactly what the IREP demands. Yet, it cannot be true that the rate of passage of time varies from one moving object to another. What in fact varies is the speed of moving objects, not of the rate of temporal flow.

It seems to me there is no way that we can endow the notion of the rate of temporal passage with a sense and the harder we try the more obvious it becomes that all such attempts are futile; Hudson et al is a case in point. We thus must conclude that the notion of rate of temporal passage, in any form or shape, is incoherent, and since there can be no rate at which time flows, there can be no temporal flow *per se*.

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[74] H. Hudson, N. Markosian, R. Wasserman, & D. Whitcomb (2009), p. 3.

2.3   The Burgeoning Universe Model of Temporal Becoming

2.3.1   One of the early proponents of the Burgeoning Universe model of temporal becoming was C. D. Broad. The following is a succinct articulation of his theory which

> ...accepts reality of the present and the past, but holds that the future is simply nothing at all. Nothing has happened to the present by becoming past except that fresh slices of existence have been added to the total history of the world. The past is thus as real as the present. On the other hand, the essence of a present event is, not that it precedes future events, but that there is quite literary *nothing* to which it has the relation of precedence. The sum total of existence is always increasing, and it is this which gives the temporal series a sense as well as an order. A moment *t* is later than a moment *t'* if the sum total of existence at *t* includes the sum total of existence at *t'* together with something more.[75]

David Zeilicovici, a contemporary proponent of the theory, refers to it as the "creationist" picture of temporal becoming and distinguishes between "event-creationist" and "time-creationist" facets of the theory.[76] On the time-creationist story "at any present moment, future time does not exist."[77] This means that newer and newer moments are constantly created in concordance with creation of events. On the event-creationist story only new events are created at already existing time

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[75] C. D. Broad, *Scientific Thought* (London: Routledge and Kegan Paul, 1923), quoted from *Metaphysics: the Big Questions*, p.87.
[76] D. Zeilicovici,"Temporal Becoming minus the Moving-Now" *Noûs* **23** (1989), pp. 505-24.
[77] Ibid, p. 237.

slots as it were. On this theory, events do not come from the province of the future and thus they do not recede into the instantaneous province of the present; they come into existence *simpliciter* and then, in due course, are superseded by newer events.

On the whole, the Burgeoning Universe model of temporal becoming is designed to avoid problems which arise from treating temporal passage as a sort of motion (the moving-now hypothesis, A-series sliding over the B-series model, and the like). The model also serves as an antidote, on the one hand to an ephemerality of the presentist universe, and on the other hand, to the Block-Universe model that denies not only the reality of temporal passage, but also the reality of change itself.

Despite its theoretical upsides, the theory places emphasis on explaining the nature of flux, not the nature of temporal passage *per se*, that is, on this theory, the dynamic character of the universe "serves as the physical analogue of time flow."[78] It is tacitly assumed that by offering a dynamic model of the universe, one would offer, *mutatis mutandis*, a dynamic model of time. This stratagem is mistaken because it ignores the fact that the growth of the burgeoning universe is a form of change and as all changes, it must occur in time and, therefore, is distinct from time.[79] Explaining the nature of change in physical systems is one thing, explaining the nature of time as such is altogether another. Unless, of course, it is held that time is change. But as far as I know no Burgeoning Universe theorist ascribes to this view.

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[78] Storrs McCall, "A Dynamic Model of Temporal Becoming," *Analysis* **44** (1984), pp. 172-76.
[79] It was known since Aristotle (*Physics, Book IV*) that change and time are distinct phenomena.

2.3.2　Let us now consider one of the most fully developed models of the Burgeoning

Universe; namely, that of Storrs McCall's.[80]　McCall distinguishes four possible

theories of reality:　This is how he diagrammatically represents them:

Minkowskian　　Distinguished　　Multiple Realities　Dynamic World
World　　　　Branches World　　　World
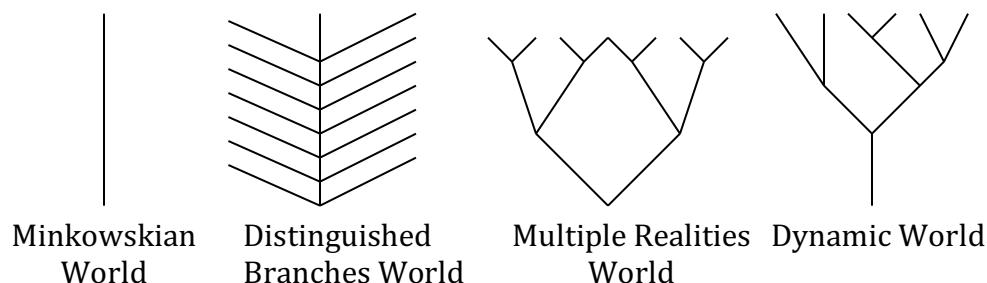
Fig. 13 Four models of the Burgeoning Universe.

The Minkowskian world is the Block-Universe.　The Distinguished Branches

world is the same as the Minkowskian world plus all unactualized possibilities.　The

Multiple Realties world is the Everett-Wheeler world in which all possible quantum

outcomes are actual.　Finally, the Dynamic world is the Burgeoning Universe.　The

Minkowskian and Distinguished Branches worlds, it seems to me, are the same, since

the former contains unactualized possibilities in the very same manner as the latter

does, that is, in both worlds sentences of the type "It is possible that___" have the

same semantic content, i.e., they refer to unactualized possibilities.　In the Everett-

Wheeler world, on the other hand, "It is possible that___" refers to actualized

possibilities.　Distinction between the Minkowskian and Distinguished Branches

worlds on one the hand and the Everett-Wheeler world on the other is parallel to that

between modal realism and modal antirealism.　Also, the Everett-Wheeler world

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[80] Storrs McCall, "Objective Time Flow," *Philosophy of Science* **43** (1976), pp. 337-62.

might be conceived in two ways: either as a static Block-Universe or as a Burgeoning Universe.[81]

The ontology of a dynamic non Everett-Wheeler world could be conceived in two opposite ways. On one picture, the Dynamic world grows by adding new slices, so that at every new moment of its existence, the sum total of entities it contains is different. This is Broad's burgeoning universe. In contrast, McCall's burgeoning universe changes not by adding new branches, but by shedding them. The idea here is that to every actual state of affairs, there corresponds myriads of possible ones, but as the possible states of affairs become actual all relative possibilities die out. In the very beginning of McCall's world there exists the entire set of unactualized possibilities plus one actual state of affairs and at the end, there are no possibilities at all, everything is actual, or which is the same, only one possibility bears the title of being the actual.[82]

How does this theory help us to understand the nature of fluid time? McCall's answer is that time flow is conceived by analogy to the dynamic character of the universe. I find this answer unsatisfactory. Whether one explains time flow by analogy to a flowing stream or by analogy to the growing universe, all one does is to paint a metaphorical picture of temporal reality. The challenge, however, is to offer a non-metaphorical analysis of the notion of temporal passage. Another, related deficiency of McCall's model is that it tacitly assumes a second-order time over which the universe grows. To be sure, McCall is aware of this difficulty:

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[81] McCall does not draw this latter distinction.
[82] Observe that at the beginning of its existence, McCall's universe is the same as the static Everett-Wheeler universe and at the end of its existence it is the same as Minkowskian universe.

> … anything that grows or changes can do so only in time, and since the
> universe is already a collection of four-dimensional manifolds, a fifth
> dimension would be needed for it to change in. What this shows is that
> the analogy with the three-dimensional tree, which grows and changes
> in time, should not be carried too far. A second time dimension would
> be an extravagance in a theory that is already extravagant enough.[83]

How does then McCall propose to deal with the difficulty? Here is his solution which:
"…we can say that the progressive falling away of future branches on the universe-
tree does not "take" time, but instead "generates" time.[84] I find his solution lacking
any coherency.

Despite its apparent upsides, the Burgeoning Universe model of temporal
passage does not have broad appeal among contemporary temporal theorists. The
main reason for this, as I see it, is that it being the middle ground between Presentism
and the Block-Universe hypotheses, the model lacks decisiveness of either fluid-time
theory or its static-time counterpart. It thus should not come as surprise that it easily
loses its potential recruits to either strong-minded side.

2.4   Presentism

2.4.1   Although Presentism is often identified with one or another theory of fluid
time, it is completely independent from any of them, since the notion of the present

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83 Storrs McCall (1976), p. 348.
84 Ibid, p. 348.

does not require the notion of temporal fluidity. Let us first consider Arthur Prior's

paradigmatic concept of the present:

> … the reality of the present consists in what the reality of anything else
>
> consists in, namely the absence of a qualifying prefix. To say that
>
> Whitrow's lecture is past is to say that *it has been the case* that Whitrow
>
> is lecturing. To say that Scott's lecture is future is to say that *it will be*
>
> *the case* that Scott is lecturing. But to say that my lecture is present is
>
> just to say that I am lecturing – flat, no prefixes. The pastness of an
>
> event, that is to say its having taken place, is not the same thing as the
>
> event itself; nor is its futurity; but the presentness of an event *is* just the
>
> event. The presentness of my lecturing, for instance, is just my
>
> lecturing.[85]

What should we take Prior's presentism to be? Its true nature can only be

appreciated within the framework of his program, which is to construct a logically

regimented tensed discourse in the world of ours that has neither future nor past. As

I see it, Prior's presentism is rooted in the commonsense belief that things which are

no longer present or not yet present simply do not exist; in the roster of existence

only present entities are listed. Dinosaurs are no longer in existence and future

events such as the Sun growing cold are not yet in existence. Indeed, the

commonsense belief in the fundamental distinction between the ontological status of

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[85] Arthur Prior, "The Notion of the Present," *Studium Generale* **23** (1970), pp. 245-48. Reprinted in *Metaphysics: the Big Questions*, pp. 81-82.

the past and future, on the one hand, and the present on the other, "can be given up briefly, if at all; and then only by a mighty effort of will!"[86]

The same commonsense conviction was held by Saint Augustine for whom it was "abundantly clear that neither the future nor the past exist, and therefore it is not strictly correct to say that there are three times, past, present, and future."[87] Unlike Augustine, however, Prior did not concern himself with the ontology of time, at least not primarily, for him producing a logically regimented temporal language was a perfectly self-contained philosophical enterprise independent from any ontological consideration, including that concerning the nature of the present. This fact is especially surprising given that one of the impetuses behind his program is the temporal ontology of Augustinian type.

Though for Prior only present time is real and only present items exist, his "present" is not the present of the moving-now theory or that of the Burgeoning Universe model. He ties presentness to existence; in fact, for him existence and presentness are "one and the same concept, and the present simply *is* the real considered in relation to two particular species of unreality, namely the past and the future."[88] I am not sure in what way, if any, the real can form a relationship with the unreal, but I find myself in agreement with Prior on his adamant rejection of the reality of the past and future and affirmation of the reality of the present.

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[86] Dean Zimmerman, "The Privileged Present: Defending an 'A theory' of Time" in *Contemporary Debates in Metaphysics*, T. Sider, J. Hawthorne, D. Zimmerman (eds.) (Malden, MA: Blackwell Publishes, 2008), pp. 211-15.
[87] St. Augustine, *The Confessions*, Book XI, §20.
[88] A. Prior (1970), p. 80.

2.4.2   Usually Presentism is taken to be the thesis that only present items exist, there are no non-present items.[89] Yet, thus understood, Presentism is either trivially true or manifestly self-contradictory. It is trivially true if the domain of the universal quantifier is all present things, and it is self-contradictory if the domain of the universal quantifier is unrestricted and encompasses all past, present, and future items. Pr_1 is tautological, Pr_2 is contradictory:

(Pr$_1$) For any present x, x is present,

(Pr$_2$) For any present and non-present x, x is present.

The majority of presentists, however, see nothing wrong with (Pr$_1$), nor do they detect any defect in the following biconditionals:

(i) x is present *iff* x exists,

(ii) x exists *iff* x is present.

I take it that they reason that since tautological statements are perfectly consistent, (Pr$_1$), being a tautology, is too a consistent ontological assertion. Yet, being consistent is not sufficient for an ontological assertion to give as an explanation of a phenomenon in question; ontologically, tautologies are empty assertions. Consider, for instance, a tautological answer to the question "Why does the Sun shine?" "The Sun is shining because it is shining" is a perfectly consistent statement, yet, its 'because' is without any heuristic value whatsoever. What is needed here is an explanation of *why* the Sun shines. Giving an adequate physical model of

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[89] Quentin Smith is a rare exception; he proposes a theory of degree of existence according to which both past and future items exist, only to lesser degree than the present ones. "Time and Degree of Existence: a Theory of 'Degree Presentism'" in *Time, Reality & Experience*, C. Callender (ed.) (Cambridge: Cambridge University Press, 2002), pp. 119-36.

thermonuclear reaction, on the other hand, would constitute an answer to the question "Why the Sun shines?" Analogously, limiting present items to the existing items or vice versa is not much of explanation. What is need here is a theory that explains why there are no non-present items.

Another objection that has been raised against Presentism is that on this theory, sentences such as "Dinosaurs were roaming the earth in the Jurassic period" and "The Sun will eventually grow cold" are not about what *is*; they, therefore, have no truthmakers; it then follows that such sentences are neither true nor false. But surely, "Dinosaurs were roaming the earth in the Jurassic period" is true and so presumably is "The Sun will eventually grow cold." Presentist's way out of this difficulty is to analyze, "Dinosaurs were roaming the earth in the Jurassic period" and "The Sun will eventually grow cold" as "It *was* the case that [Dinosaurs are roaming the earth in the Jurassic period]" and "It *will be* the case that [The Sun is cold]." This analysis gives us consistent syntaxes of temporal discourse but lacks temporal semantics. One could have perfectly regimented tensed language that totally lacks any ontological import. Indeed, the presentist does have such language, the language in which tensed elocutions are not about real tenses.

There exists yet another difficulty for presentism. *Prima facie* things of the past and future do stand in some sort of relation with present things, but if so, then it follows that things of the past and future exist, for surely existent things cannot stand in any relation with nonexistent ones – Presentism fails. Bigelow calls this argument the argument from relations:

Take as a first supposition that, in order for a relation to hold between two things, both of those two things will have to exist. Call this the principle that all relations are existence entailing. Add as a further premise the supposition that relations sometimes hold between a present thing and something else which is not present. The conclusion follows ineluctably, that some things exist which are not present.[90]

Even after this brief treatment of presentism, it should be evident that it has its share of problems; though, I must add, I find it the most plausible theory of time to date.

2.5   B-Accounts of the Phenomenology of Temporal Passage

2.5.1   As I see it, there are only two alternatives available to the B-theorist to contend with the phenomena of temporal passage; one, as far as the B theory is concerned, is consistent and the other is not. The consistent alternative is to hold the A-series to be entirely delusive and thus without any analogue in reality whatsoever. Accordingly, since the phenomenon of temporal flow is *prima facie* an integral part of human experience, the consistent B-theorist should delegate construction of a theory of the phenomenology of temporal flow entirely to psychology. Furthermore, the consistent B-theorist should not attempt to incorporate such a psychological theory of temporal passage into the structure of a B theory of time. Indeed, as far as I know, no B-theorist ever attempted to come up with such a psychological/metaphysical

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[90] John Bigelow, "Presentism and Properties" in *Philosophical Perspectives* **10**, *Metaphysics*, James E. Tomberlin, (ed.), (Cambridge, Massachusetts: Blackwell, 1996), pp. 35-52.

hybrid. And this is for a good reason. Such a hybrid theory of time cannot be counted as a metaphysical theory proper.

An inconsistent alternative is to try to incorporate A-theoretical elements into the structure of a B theory. This option is unacceptable to the B-theorist right from the start, for it generates A/B hybrid theories of time.

Even though the consistent alternative resolutely relegates explanation of the nature of temporal flow to the province of psychology, hardly any B-theorist can resist the temptation to offer a B-account for the phenomenology of temporal flow. Accordingly, there exists considerable diversity of B-opinions as to what exactly the phenomenology of temporal flow amounts to. Some B-theorists view any A-account of the nature of time as misleading, specious, and outright detrimental to the metaphysics of time. D. C. Williams, for instance, cannot spare even one good word for the idea of temporal fluidity which he regards, as a myth and "not one of those myths which foreshadow a difficult truth in a metaphorical way, but one which is fundamentally false, deceiving us about the facts, and blocking our understanding of them."[91] Some other B-theorists, in contrast, are less adamant. D. H. Mellor, for instance, though he does not admit the reality of A-time, holds that "the A-scale is only a way we have of locating events in time; a compelling way, indeed, which we could not do without, but not the way things are in reality."[92] Mellor's account of the phenomenology of time, I believe, warrants a closer examination.

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[91] D. C. Williams (1951), p.460.

[92] D. H. Mellor (1998), p 15. In another place, Mellor articulates the distinction between A- and B-times even more pointedly as the distinction "between the time of our lives and the time of reality." "The Time of Our Lives" in *Philosophy at the New Millennium*, Anthony O'Hear (ed.), (Cambridge: Cambridge University Press, 2001), pp. 45-59.

Mellor does not deny that A-statements have truth-value, he maintains that they do, only that on his account what makes them true or false are not A-facts, which he deems to be nonexistent, but B-facts.

> …for any X, statements of the forms 'It is now X', 'X was last week', 'X is
>
> due tomorrow' are made true respectively by being said at X, in the
>
> week after X, and the day before X is due.   But those are all B-series
>
> facts, about when things happen and are said, regardless of which if any
>
> of those things and sayings are present – which is why these B-series
>
> facts imply no contradiction. And that is why, if we are to say without
>
> contradiction what in reality makes A-series statements true, we must
>
> take reality itself to contain no A-series facts, i.e., no such facts as X's
>
> being now, or a week before now, or due a day after now.[93]

Given us his theory of A-propositions (and therefore A-beliefs), Mellor then turns to the explanation of the nature of the phenomenology of temporal flow itself, because, as he readily acknowledges, "if it is not a fact about the world that such-and-such events are happening now, then something must be said about what else it is, for this too seems not only true but a most important thing to say and believe."[94] Here is how Mellor delineates his (non-psychological?) model of the phenomenology of temporal flow:

> … there are undeniable changes in us which explain why we feel that
>
> time flows despite the fact that in reality it does not. These changes are

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[93] D. H. Mellor (2001), 49.
[94] Ibid, p. 50.

those we need to keep making in our A-series beliefs in order to keep

them true... Our beliefs about what is past, present, and future are

changing all the time... These, and all other changes we are continually

making in our A-series beliefs, are real changes, with real causes and

real mental and physical effects. They are the changes that embody our

experience of the flow of time. Even though time does not flow in

reality, in our minds the time of our lives really does flow...[95]

This might be so; time might not flow in reality but only appears to flow to

sentient beings. Be it as it may, the central question still persists "What makes our A-

beliefs about what is past, present, and future to change all the time?" If, as Mellor

claims, it is not something in the world that makes them change, then surely A-beliefs

are delusional and, therefore, cannot be true of reality. If, on the other hand, A-beliefs

do reflect *real* temporal order, then A-time must too be real. Mellor, of course, would

deny this conclusion. He would say that A-beliefs do reflect *real* temporal order, only

that this temporal order is the B-order. I, however, do not see how this claim can be

consistently maintained. The main reason for my skepticism is that were it true that

A-propositions and A-beliefs have as their truthmakers B-states of affairs, it would

follow that both types of temporal proposition are semantically identical. Hence, it

would follow that A-propositions are translatable into B-propositions, the

assumption Mellor, and all adherers of the so-called new theory of B-time,

unequivocally denies.

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[95] D. H. Mellor (2001), pp. 55-56.

Furthermore, it appears Mellor's usage of the term 'real' is rather loose. On the one hand, when it is applied to A-changes, it ranges over both the intentional and concrete realms; on the other hand, when it is applied to B-facts, it ranges exclusively over the concrete realm, for if it does not, and since there are evidently A-changes in the intentional real, then it follows that A-changes take place in reality (broadly conceived). Indeed, if there are A-changes in us and we are legitimate parts of reality, then A-changes and with it A-times are legitimate parts of reality as well. Having said this, I must admit that at least at first the idea that there are *real* A-facts in the intentional realm and none in the concrete one seems rather equitable. There are, indeed, many things in the mind which are not in the real world and vice versa. If this is Mellor's position, then how should we interpret his assertion that A-changes, and with it A-time "are real changes, with real causes and real mental and physical effects"? Compartmentalizing reality into two spheres, the mental and the concrete, would not do the trick. It is precisely against this fallacy of ontological compartmentalization that A. Prior speaks when he admonishes philosophers for their tendency to "speak as if the real world were just one of a number of different big boxes in which various things go on, the other boxes having such labels as 'the mind', 'the world of Greek mythology.'"[96] It seems what Mellor says is that A-time is real (in the mental box), but B-time real too (in the concrete realm box), only that the latter is somehow more real than the former. This Orwellian logic is faulty on its face. If A-changes and with it A-time are real, then they are real period, where 'reality' ranges over both intentional and concrete realms.

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[96] A. Prior (1976), p. 80.

A different but relevant question is this: Do, on Mellor's view, changes in our A-beliefs occur in time? or using his terminology: Are A-beliefs changing all the time? If they are changing all the time, i.e., changing in time, then there exists *real* A-time. If, on the hand, they do not, then how should we account for them changing but not in time.[97] I suppose a friend of Mellor's B theory would riposte that one believing that P at one time, i.e., at one B-location and believing ¬P at another time, i.e., at another B-location, is exactly what changes in our A-beliefs amounts to. On this view, reality of A-changes is denied but their phenomenality is preserved. Indeed, no A-time is required on this reading of Mellor's argument. Then again, if this is so, then we are entitled to the following questions: How is that one travels from one B-location to another for if he does not, then how could he have these two contrary beliefs? Surely believing that P at one B-location and *then* believing that ¬P at another B-location does require some sort of movement of the believer (soul, mind, etc.) along the B-time axis. It seems Mellor cannot avoid the implication of his theory of A-beliefs that there exists a certain movement of the A-believer along the B-time axis; namely the moment from earlier B-loci to later ones. I thus conclude that Mellor's account of the phenomenology of temporal flow has too many loose ends.

2.5.2   Let us now consider the case of Adolf Grünbaum. While he decidedly relegates temporal passage to the realm of human psyche and gives his categorical 'no' to the

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[97] I take the idea of there being changes without time rather plausible, but it is not how Mellor argues his case.

question whether there exists temporal passage, he nonetheless factors the idea of the Now-manifold into his schema of reality as the following passage shows:

> The transience of the Now is a feature of psychological (and common sense) time in the sense that there is a *diversity* of the Now-contents of immediate awareness. Hence it is a matter of fact that the Now "shifts" in conscious awareness to the extent that there is a *diversity* of the Now-contents, and it is likewise a fact that the Now-contents are temporally *ordered*. But since these diverse Now-contents are ordered with respect to the relation "earlier than" no less than with respect to its converse "later than," it is a mere *tautology* to say that the Now shifts *from* earlier *to* later.[98]

Grünbaum's notion of "the Now-contents" is central to his account of the phenomenology of temporal passage. Yet, it is not entirely coherent. It appears that Grünbaum's intention is to convey the idea that physical reality is comprised of B-ordered temporal loci which have ontological contents, such that each B-locus permanently has one and the same ontological content. This way, temporal passage basically amounts to consecutive acts of awareness of a sentient being of sequentially ordered Now-contents; at a given point on the B-time axis a sentient being is aware of there being earlier-than-now-contents and later-than-now-contents. If this exegesis is correct, then the use of 'Now' in this context is entirely superfluous, in fact it is

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[98] A. Grünbaum, *Philosophical Problems of Time and Space* (Dordrecht, Holland: D. Reidel Publishing Company, 1963), p. 315-16.

misleading; a term such as B-located ontological contents would be more appropriate. How should we deal with this conceptual deficiency?

Grünbaum holds that the Now-contents (i.e., ontological contents of B-loci) are temporally ordered by the relation of earlier/later than, as shown in Figure 14. Factoring sentient beings into this picture of reality gives us consecutive acts of awareness of different Now-contents and thus generating the notion of temporal passage. Yet, this temporal awareness, Grünbaum argues, does not provide us with justification for holding that there is the privileged Now, the Now that is shifting "*in the future direction along the time-axis.*" Grünbaum is insistent on that the phenomenon of temporal passage "has no relevance at all to the time of physical events, because it has no significance at all apart from the egocentric perspectives of a conscious (human) organism and from the immediate experience of that organism."[99]

now   now   now   now   now   now…. now

t_1 t_2 t_3 t_4 t_5 t_6 …….t_n

the B-time axis
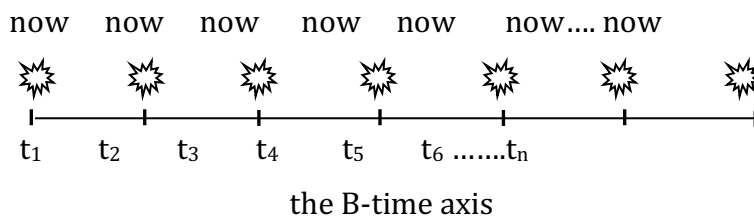
Fig. 14 Grünbaum's earlier/later than temporally ordered nows.

Is this a consistent picture of temporal reality? I think not, for in order for there to be different acts of awareness of Now-contents, consciousness, and with it the whole conscious being, must move at a certain pace from one Now-content to the next, thus generating a movement alongside the static time-axis. We thus have physical objects, viz. human bodies, moving along the B-time axis.[100] The same

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[99] A. Grünbaum, (1963)*,* p.324.
[100] An alternative picture would be of the B-series moving in relation to stationary human bodies. Consult the discussion of the two metaphors of temporal passage in footnote 8.

problem is generated by Mellor's view of the A-believer. Certainly, consciousness, mind, and agent of belief, etc., cannot move by itself, it is not a disembodied phenomenon, so if it moves along the B-time axis, then it must drag its corporeal vessel along the B-time axis. Thus, a given sentient being *first* is aware of one Now-content by existing in the B-locus which houses this specific Now-content, *then* it is aware of the adjacent Now-content occupying the adjacent B-locus, etc. Indeed, Grünbaum endorses (though with some reservation) Herman Weyl's similar picture of the phenomenon of temporal passage: "The objective world simply *is*, it does not *happen*. Only to the gaze of my consciousness, crawling along the life-line of my body, does a section of this world come to life as a fleeting image in space which continually changes in time."[101] Grünbaum (and Mellor) cannot escape the implication of this picture of temporal passage that something does *literally* move along the B-time axis. Yet, he resolutely upholds the view that temporal flow "depends for its very *existence* on the perspectival role of consciousness, since the coming *into* being (or becoming) of an event is no more than the entry of its effect(s) into the immediate awareness of a sentient being (man)."[102]

Suppose then that the phenomenon of temporal passage does arise from the unidirectional movement of consciousness along the B-time axis. Can this be a consistent B-position? I do not see how this view can be upheld by a consistent B-theorist since, in addition to the reasons already discussed, we have something moving along B-time axis at a speed that can only be measured in terms of a second-

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[101] H. Weyl, *Philosophy of Mathematics and Natural Science*, (Princeton: Princeton University Press, 1949), p.16.
[102] A. Grünbaum (1963), pp.325-26.

order time. What this second-order time could possibly be is not at all clear, nor is it

at all clear what the rate of such passage could possibly be.[103] One thing, however, is

entirely clear, the existence of this second-order time cannot be allowed on a

consistent B theory of time.

One might defend Grünbaum's, and the like, views on the following grounds. It

might be said, as indeed is often said, that an individual consciousness does not hop

from one B-locus to another, but is evenly spread over a certain stretch of the B-time

axis, the stretch which is even in length to its lifespan; it is, in the B-theorist's argot, a

continuant whose temporally ordered parts exist together but not at the same

time.[104] This rejoinder is indefensible, for if it is one and the same individual

consciousness, then it should be aware of all relevant Now-contents *at once*

analogously to one being aware of a landscape that is within one's visual field.

Indeed, such individuals are contemplated by the theologians, they designate them by

the term 'sempiternal beings' as oppose to eternal beings proper. But we are dealing

here with ordinary conscious beings which are aware of one and only one 'Now-

content' at any given moment. It might be further countered that a conscious

continuant is not a monolith stretched over B-distances, but a conglomerate of fully

conscious fully functional temporally ordered parts (beings) each of which is aware of

its own Now-content, the Now-content that is specific to the B-locus inhabited by the

conscious part which is endemic to this B-locus. On this picture of reality a conscious

continuant is comprised of innumerable conscious beings. This picture of reality

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[103] A perfectly parallel problem is discussed in subsections 2.2.3-2.2.4.
[104] I will delve extensively into this and related issues in the next Chapter.

must be rejected on the grounds of Ockham's razor, as well as for certain additional reasons.[105]

2.5.3   In my conversations with Derek Parfit, an avowed B-theorist, he once conveyed the impression that the problem of temporal passage is indeed wearisome for the B-theorist, a fact, which I take it, suggests that until and unless the problem is resolved, the B theory cannot be considered to be whole. Indeed, the fact that the moving-now is an unalienable constituent of human experience is as captivating as it is puzzling for the B-theorist. Carnap reports that Einstein, a B-theorist by default, was captivated by the notion of the moving-now:

> Once 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 grasped by science seemed to
> him a matter of painful but inevitable resignation.[106]

An even more vivid case of this theoretical wavering is Hans Reichenbach. The early Reichenbach is a paradigmatic A/B theorist who holds that "an essential content is omitted from [the four-dimensional] picture."[107]   This essential content Reichenbach identifies with the moving-now. Yet, in his last book, Reichenbach

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[105] I would delve extensively into these reasons in the next Chapter.

[106] R. Carnap, "Carnap's Intellectual Biography," in *The Philosophy of Rudolf Carnap,* P. A. Schilpp (ed.), 1963, pp. 3-84, p.37.

[107] H. Reichenbach, "Die Kausalstruktur der Welt und der Unterschied von Vergangenheit und Zukunft." Quoted from A. Grünbaum, *Philosophical Problems of Time and Space,* pp. 318.

allocates only a minor introductory chapter to the question of temporal fluidity which he now thinks "reveals the highly emotional content associated with the experience of time" and warns us to guard against the temptation "to look for answers [to the question of temporal passage] that satisfy emotions rather than clarify meanings."[108] And although the later Reichenbach still thinks "that physics can account for time flow and for Becoming,"[109] the bulk of the book is devoted to the physics of B-temporal order, which certainly has no use for the notion of temporal flow.

The undeniable phenomenological experience of temporal fluidity prompts the considerable majority of B-theorists to interpret it as a purely psychological phenomenon. This is surely a consistent position. Yet, at the end of the day, the entire array of diverse opinions as to what exactly this phenomenology of temporal fluidity amounts to converge on some or another notion of consciousness 'crawling' along the B-time axis. Apparently this majority finds it impossible to completely avoid an allusion to something (consciousness) moving alongside the static B-time axis thus admitting, however tacitly, the reality of objective time flow. It seems that a pure B theory is as unachievable as a pure A-series is; though, of course, for different reasons. But even when we consider the notion of B-time *per se*, it still reveals itself as essentially an inconsistent hypothesis. I now shall turn to the exposition of a number of such inconsistencies.

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[108] H. Reichenbach, *The Direction of Time* (Mineola, New York: Dover Publications, 1971), p. 2.
[109] H. Reichenbach (1971), p. 17.

Chapter III: Eternalism

3.1 The Argument against Object-Eternalism

3.1.1 Eternalism, understood as a metaphysical thesis, is about the makeup of physical realty; it hinges on two premises. One premise is topological – the universe is a set of temporally ordered entities (slices, segments, events, etc.). The other premise is ontological – these temporally ordered entities are existentially on a par, they are all equally part of reality.[110] The conjunction of these two premises yields the inference that temporal distances do not have an effect on existence; regardless of how far apart the universe's temporally ordered entities are, they are all equally real, all equally in existence. In the eternalist's universe, the E-universe for short, being trumps time.[111]

In this section, I will be dealing primarily with the problems of object-eternalism, the conjecture that the E-universe is a temporally ordered set (*toset*) of

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[110] In line with what these constituents are taken to be, eternalism branches into two major types: object-eternalism and event-eternalism. The former hinges on the idea that the universe is comprised of temporally ordered concrete three-dimensional segments which are all equally in existence (T. Sider 2001), whereas the latter is articulated in terms of the idea that it is only events, not objects, which are temporally extended equally real entities (D.H. Mellor 1998). The majority of eternalists are object-eternalists. But both camps presuppose time-eternalism, the conjecture that there exists an ordered set of equally real temporal loci. Though time-eternalism is an essential component of the two strains of the eternalist's hypothesis, nobody espouses pure time-eternalism, the picture of reality according to which there are ontologically vacuous temporal loci, that is, that there exists pure B-time devoid of objects/events. For this reason, in my dealings with eternalism, I will restrict myself to the analysis of object-and event-eternalism and will address issues pertaining to time-eternalism only when it is called for and even then only tangentially.

[111] So construed, eternalism is akin to the block-universe hypothesis and four-dimensionalism. All three theories, of course, are deeply rooted in the B theory of time. There are, of course, numerous subtle differences between these three theories. For present purposes, however, I will ignore them and employ the term 'eternalism' as referring to an umbrella thesis that covers a family of metaphysical hypotheses each of which pivots on the notion of space-like time, viz. B-time.

concrete equally real three-dimensional segments. Since the E-universe's temporally

ordered segments are all equally in existence, it follows that the object-eternalist

should take such terms as "the universe's first temporally ordered segment," "the

universe's second temporally ordered segment," etc., to be wholly topological; that is,

reflecting the static space-like temporal ordering of the segments, not the order of

their coming into being. In the E-universe, there are simply no such things as

existentially prior or later temporally ordered segments, they are all came into

existence at once, exist at once and will go out of existence at once, if the E-universe is

a finite entity, or have ever been in existence *en masse*, if the E-universe is an

everlasting entity. In short, all temporally ordered segments of the E-universe are of

the same age, the same age the E-universe is, whatever this age might be.[112]

Henceforth, I shall refer to this notion of existential equality of the temporally ordered

segments the *ontological parity principle*.[113]

  This doctrine of ontological egalitarianism is essential to object-eternalism, for

if it fails, then either an A or A/B theory must be factored into its theoretical

framework. These theories, however, are wholly incompatible with the eternalist's

hypothesis. This fact can be clearly seen upon the following reflection: if the

temporally ordered segments of the E-universe do not come into being *all together*,

but consecutively, then in the beginning, there was the first segment, then, in due

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[112] Notice that on the eternalist's account the age of the universe is not what it is *now* at present time, i.e., roughly 13.5 billion years, but what it 'will be' at the end of its existence, if the universe is a finite entity. I have put the simple future form of the verb 'to be' in single quotes to indicate that this is not an ordinary sense of future tense, for on the eternalist's account, the universe is as old at its end as it is old in its beginning; it is always of the same age. I will address this, to put it bluntly, as an outright bizarre consequence of the eternalist's hypothesis in due course.

[113] I believe Richard Gale refers to the same principle when he speaks of "democratic equality of all times." *The Philosophy of Time,* R. M. Gale (ed.) (London: Macmillan, 1968).

course, the second segment came into existence and so on. In turn, this apparently dynamic reality might be of two types. If to the first segment the second segment is added, and then the third segment is added to the block comprised of the preceding two segments and so forth, then we would have a burgeoning universe. If, on the other hand, the second segment replaces the first segment and the rest replace each other in sequential order, so that at any given moment of the E-universe's existence there exists only one segment, then we would have a pure presentist's universe. Apparently, none of these two scenarios is acceptable to the object-eternalist. Moreover, the temporally ordered segments of the E-universe not only come and go at once, they continually exist at once, for if they do not then as before we have a dynamic universe. Hence, in the E-universe, no temporally ordered segment goes into or out of existence by itself; either all segments exist together as *one whole* or there is no such thing as the E-universe.

As far as I can tell, the ontological parity principle has migrated into the object-eternalist's ontology from the commonsense ontology of space. Since spatial distances have no effect on being – regardless of how spatially far apart objects are they are all equally real – so, it is held by the object-eternalist, temporal distances are ontologically neutral as well – regardless of how temporally far apart the segments are, they all are equally in existence. Michael Rea succinctly puts the object-eternalist's belief as follows: "non-present objects are like spatially distant objects: they exist, just not here, where we are."[114] Apparently, this reasoning is rooted in and

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[114] M. C. Rea, "Four-Dimensionalism" in *The Oxford Handbook of Metaphysics*, Michael Loux and Dean Zimmerman (eds.) (Oxford, New York: Oxford University Press, 2003), pp. 246-80; p.246. Rea's usage of the demonstrative 'here' is not fitting in this context. A more accurate eternalist's position should

justified by the spatial simile, the conjecture that temporal separations are analogous to spatial separations in all relevant aspects.[115] In the E-universe, being trumps time precisely because in it time is a space-like phenomenon. Arthur Prior aptly labeled this notion of time "the tapestry view of time," a view about which he thought "logicians ought to retrace their steps."[116] I think Prior was right in this regard.

Note that on object-eternalism, so construed, temporally ordered segments should not be taken to be the E-universe's temporal parts *per se*, as unfortunately often is the case. Conceivably, time has temporal parts, i.e., *t*-points. But how could anything else besides time have temporal parts? Hence, the segments should be understood as temporally ordered *concrete* parts of the E-universe. Thus, the term "temporal part," when it is applied to the temporally ordered segments of the E-universe, should be regarded as a misnomer.[117] Furthermore, a consistent eternalist should not construe the segments as four-dimensional entities, but as three-dimensional instantaneous cross-sections of a four-dimensional whole.[118] For if the E-universe is comprised of four-dimensional segments, then each segment is extended in its own temporal dimension, as it were. Hence, there would be as many temporal

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read something like this: "non-present objects are like spatially distant objects: they exist, just not *now*, *when* we are."

[115] I shall say more about the spatial simile in section 3.4.

[116] Arthur Prior, "Some Free Thinking about Time" in *Metaphysics: the Big Questions*, Peter van Inwagen & Dean Zimmerman (eds.) (Malden Massachusetts: Blackwell Publishers, 1998), pp.104-07.

[117] On the ambiguity of the term "temporal part" consult, for instance, E. J. Lowe's "Theories of persistence and the notion of 'temporal parts,'" in *Questions of Time and Tense*, R. Le Poidevin (ed.) (Oxford: Clarendon Press, 1998).

[118] The instantaneity condition is integral to the object-eternalist's picture of reality because if the segments are durative entities, then they ought to be comprised of subsegments which in turn are either durative or instantaneous and so on *ad infinitum*. However, it is not at all clear how concrete objects can be instantaneous entities; it is usually events which are either instantaneous or not. I shall not further dwell on this problem, for there exist much more serious inconsistencies and outright contradictions in the object-eternalist's hypothesis.

dimensions as there are 4/D segments, plus the common B-temporal dimension. Such

a lavish temporal ontology must be rejected as uneconomical, if not for any other

reason.

3.1.2   The foregoing construal of the notion of the E-universe might tempt us to take

it to be the largest possible spacetime worm stretched along the B-time axis, as shown

in Figure 15. This visualization of the E-universe, however, is not entirely accurate.

The accurate picture would be this. If we visualize a given segment of the E-universe,
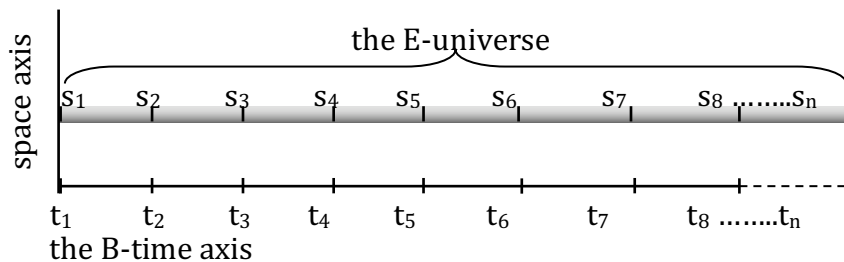
Fig. 15 The spacetime worm stretched along the B-time axis.

say the segment co-present with my writing this sentence, as a sphere with all its

atoms, molecules, stars, galaxies, etc., then the E-universe would be represented as a

lineup of temporally ordered spheres each containing exactly the same amount of

matter and energy as its neighbor (this is the required on the principle of

conservation of mass/energy) only that the arrangement of matter/energy would be

unique to each sphere. At the first B-point on the B-time axis, we have a small, dense,

and hot sphere, in the middle of the B-time axis there exist large spheres

characterized by vast empty spaces hither and thither speckled with stars, dust

clouds, and galaxies, and at the last B-point, we are back to small, dense, and hot

sphere.[119] This picture of reality is graphically depicted in Figure 16.
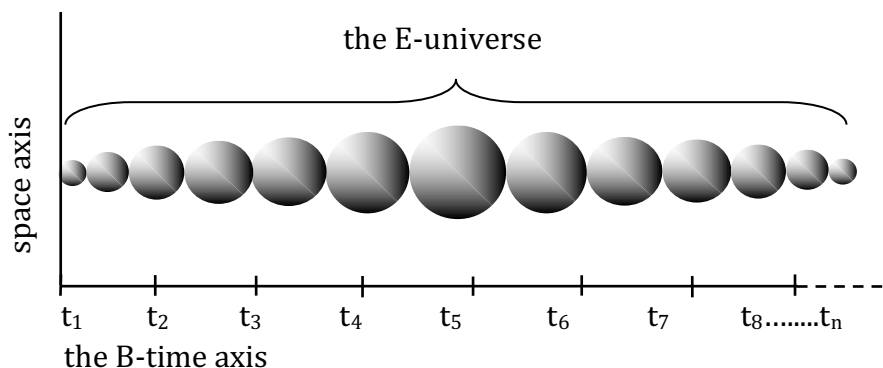
Fig. 16 The E-Universe

When object-eternalism, so construed, is taken to its logical conclusion, it

reveals itself as essentially an inconsistent hypothesis, for its two central premises are

in effect incompatible. On the topological premise, the instantaneous three-

dimensional segments are temporally ordered, viz. exist at different times. On the

ontological premise, however, they *have always* existed (or at least as long as the E-

universe exists). A given segment occupies a certain (instantaneous) temporal

location, yet its lifespan is equal to that of the E-universe itself; it is both a momentary

entity and something with an indefinitely long lifespan. Demonstrably, being

instantaneous and many billions years old are incompatible properties. More

pointedly, if the E-universe is an eternal entity, then all its segments both exist

instantaneously and eternally, they are both instantaneous and eternal entities.

The object-eternalist, no doubt, would deny that the lifespan of an

instantaneous segment is both instantaneous and eternal; he would say that each

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[119] This picture of the E-universe presupposes Big Bang/Big Crunch theory. If, on the other hand, the
E-universe is an eternal entity, then we would not have the first and the last spheres.

segment exists at one and only one temporal location and that its lifespan is equal in length to the length of that location. Yet, on the ontological parity principle, which, we have seen is integral to the object-eternalist's hypothesis, when the object-eternalist speaks about all temporally ordered segments existing *en masse*, or a given instantaneous segment *always* being in existence, he is required to use some notion like "for all time," or "unceasingly," or "everlastingly," or "continuously," etc. An account of there existing equally real, yet temporally ordered segments inevitably runs into this topological instantaneity/ontological eternality contradiction. The object-eternalist simply cannot escape such implications of his theory.

Now, each instantaneous segment of the E-universe must be a full-blooded three-dimensional object. For instance, the segment that is simultaneous with my writing these lines is the whole universe with all its atoms, stars, galaxies, etc., and such is true about any other segment. Such terms as "temporal segments," "temporal slices," "temporal slivers," and the like, therefore, are rather misleading. One might conceive of temporal segmentation by analogy to slicing a fruit– here is one slice of an apple, here is another… all slices together equal the whole apple. In the temporal segmentation, however, should such a phenomenon exist, each temporal slice of the apple is a whole apple and there are infinitely many such apples, each slightly different from its temporal neighbor. As mentioned earlier, each segment of the E-universe has a definite mass which is equal to the mass of its temporal neighbor, but since the number of these segments is infinite, then so must be the mass of the whole E-universe. This conclusion is in blunt conflict with the contemporary scientific outlook. The universe does not have an infinite mass, it has a finite mass at any one

time; or at least its mass is not infinitely larger than that of the temporal segment in which I am writing this sentence.

The object-eternalist might counter that the scientist when he estimates the mass of the universe refers to one and only one of its segments. Suppose the object-eternalist is right, should not then the E-universe with its infinite mass be the subject of the scientific analysis? As far as I know, cosmology is not about the E-universe. It is about the fluid universe with the finite and constant mass. In the matters of scientific hypothesis about observable reality, the scientist's hypothesis takes precedent over a philosophical speculation. The object-eternalist's conjecture, therefore, must be abandoned as contrary to the modern scientific outlook on reality.

Another objection to the reality of the E-universe can be drawn from the following consideration. Since there can be no scientific tool in principle that could enable us to observe the gamut of the instantaneous three-dimensional segments of the E-universe in its entirety, or even just a two-segmental part of it, because for such an observation to take a place, the observer must have an atemporal viewpoint, the E-universe hypothesis must be abandoned as not being scientifically verifiable in principle. Hence, as far as natural science is concerned, object-eternalism is not a viable hypothesis.

3.1.3   The version of eternalism hitherto discussed can be summarized as follows:

[E]   The E-universe is a *toset* of equally real, instantaneous, three-dimensional segments.

Suppose then [E] is true. Take now a concrete object x, such that x is not a momentary entity.   On the object-eternalist's hypothesis, such object is a continuant, a thing whose parts *exist together but not at the same time*; it, therefore, is comprised of temporally adjacent instantaneous three-dimensional parts. Since we are dealing here with a concrete object, it follows that these parts must be concrete as well. Surely, concrete objects cannot have three-dimensional abstract parts. Nor can some temporally ordered three-dimensional parts of concrete objects be more concrete than their other parts. Concreteness, like existence, does not come in degrees.[120] And even if we would allow the possibility of concreteness to come in degrees, the question would arise which of temporally ordered three-dimensional parts of x should we take to be more concrete than the others? Certainly not those which are in a closer proximity to the present, for on the eternalist's picture of temporal reality there is no such thing as the present. It, therefore, is not open to the eternalist to hold a degree of concreteness hypothesis. Hence, if x is a temporally extended three-dimensional object, then on the pain of inconsistency, the eternalist has no choice but to hold that all of x's temporally ordered three-dimensional parts are equally concrete.

Now, since all concrete objects are in space, all temporally ordered three-dimensional parts of concrete continuants must be in space as well. It cannot be

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[120] Quentin Smith in fact does subscribe to the idea that existence comes in degrees; present objects on his view are indeed more real than non-present ones, 'degree presentism' he call his conjecture. "Time and Degree of Existence: a Theory of 'Degree Presentism'" in *Time, Reality & Experience*, C. Callender (ed.) (Cambridge: Cambridge University Press, 2002). I find this view of temporal reality severely wanting. Existence is an all or nothing phenomenon. Indeed, what sense can be made of notions of less-and more-existing entities? Suppose x is a less existing entity than y. We then are entitled to ask: "by how much is it less existing?" Could an answer be, say, "by half"? I do not see how this can be an answer, for no sense can be made of the notion of a half-existing entity.

overstated that on a consistent object-eternalism, temporally ordered parts of continuants are not only temporally adjacent (temporally ordered); they also must be spatially adjacent (spatially ordered) since they all exist in space. This spatial proximity of temporally ordered parts of continuants is a very peculiar feature of the E-universe, indeed. Apparently, the space in which these temporally ordered parts are situated is not our ordinary three-dimensional space, for if it were, then temporal worms would be observable phenomena, in fact, such a world would be teeming with temporal worms. Hence, on the object-eternalism, a hyperspace that houses temporally ordered three-dimensional parts of continuants must be postulated. Positing such hyperspace is not contrary only to the contemporary scientific picture of reality; it is quite unnecessary on the principle of theoretical economy.

Additional difficulty arises when it is realized that in order to house the three-dimensional parts of continuants, the hyperspace must itself be three-dimensional. Hence, if such hyperspace were to exist, then ordinary three-dimensional objects would not be three-dimensional, but in fact six-dimensional, or rather seven-dimensional, that is, they would be extended in three ordinary spatial dimensions, in three hyper-spatial dimensions, plus the one temporal dimension. Apparently, on this picture of reality, our ordinary space and the hyperspace must share the same time, for if not, then the hyperspace has its own hypertime and therefore, continuants in addition to being temporally extended would be hyper-temporally extended as well. Either seven-dimensional or eight-dimensional picture of reality are uneconomical hypotheses in the extreme; they, therefore, should be unequivocally rejected and with them we should reject the eternalist's metaphysics.

Take now an object at rest. According to the object-eternalist, it has some of its temporally ordered parts at the same place, literary there are multitudes of such parts sharing the very same place, and the longer the continuant is at rest the more of its temporally parts share the same place. Is this a plausible picture of reality? I think not. The objector might rejoin that there is not only the temporally ordered multitude of temporal parts of the continuant at rest, there is also the temporally ordered multitude of places such that each place is occupied by only one and only one part of the continuant. We, however, are entitled to the following question: "*Where are these places?*" The only plausible, at least initially, answer to this question is that they are next to each other. But this use of 'next', as we have seen, gets the object-eternalist in trouble, for it requires posting of a hyperspace. It appears that object-eternalism is an untenable hypothesis.

3.1.4 On object-eternalism, I, writing these lines, am not wholly present; I am only a minute part of the whole extended over certain temporal distances, an entity whose parts exist together, but not at the same time. But *prima facie*, I am wholly present; here are my two arms, two legs, I also have my thoughts, my feelings, etc. I am, by all accounts, a whole human being and I am here/now. Having here/now a body, thoughts, desires, etc., are Moorian facts. Even if we accept the main premise of object-eternalism that there are continuants, still I am here/now, not there/then. Am I then an instantaneous part of a continuant? "Yes," emphatically says the object-eternalist. Well, here is a question for him: How an instantaneous sentient being can be aware of duration, succession, and the like phenomena? Apparently he cannot, for

in order for the duration-awareness to arise, the very *same* sentient being must first exist at one temporal point, then at another, etc. Without such successive 'hopping' from one temporal point to another there could not be the duration-awareness. But on the object-eternalist's hypothesis, a part of a continuant is forever confined to one and only one 4D-point; it is, and has always been at this point; it has never been anywhere else; it is not a spatiotemporal traveler, this 4D-point is its only spatiotemporal dwelling, its eternal prison as it were.

      Peter Geach, utilizing Quine's example, speaks of related trouble with object-eternalism. "Tabby at *t* eating mice," says Geach, is a perfectly legitimate proposition because "a cat can eat mice at time *t*, but a temporal slice of a cat, Tabby-at-*t*, cannot eat mice anyhow." Geach then concludes that "temporal slices are merely 'dreams of our language.'" [121] Indeed, eating a mouse, or walking, or having a thought are processes, but instantaneous three-dimensional slices of a four-dimensional whole *ex hypothesis* are not capable of participating in such processes, no matter how short these processes might be. The objector might reply that even though instantaneous objects cannot participate in processes, a temporally ordered set of such objects can. Tabby at t_1 takes one bite, Tabby at t_2 takes another, and so on until the mouse is totally consumed. The problem with this ostensible way out is that since Tabby-at-*t* is an instantaneous entity, so there must be an infinite number of bites between the beginning and the end of the cat's meal. A mighty mouse this one must be for each bitten off morsel has a definite mass; it thus follows that the continuant the MOUSE has an infinite mass. A mighty mouse, indeed!

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[121] Peter Geach, "Some Problems about Time" in *Metaphysics: The Big Questions*, p.198.

An outsider to this metaphysical quandary might wonder why continuants must have an infinite number of temporally ordered parts.   The answer is that on object-eternalism, temporally ordered segments are instantaneous entities, thus, given that continuants are durative entities, between the beginning and end of a continuant's lifespan there lie an infinite number of its temporally ordered parts. "But why these temporally ordered parts must be instantaneous?" our philosophical novice might further inquire. Well, if they are not, then each part itself must be comprised of subparts. This means that temporally ordered parts are themselves continuants. The question, therefore, arises whether these subparts themselves are instantaneous entities and so *ad infinitum*. Apparently the object-eternalist assumes an atomistic conception of temporal order; temporal points are taken to be durationless analogously to metaphysical atoms being extensionless. Accordingly, temporally ordered segments of continuants which occupied the durationless temporal loci are themselves durationless.[122]

Let us now ask the following: Can a sentient part of a sentient continuant think; can it, for instance, say "I am thinking"? I do not see how this could the case. Each individual sentient part of this whole can possess only a minute fraction of this simple self-reflection. Indeed, to come up with even the simplest of thoughts there is required some sort of cognitive process which unfolds over a certain period of time. Apparently, an instantaneous part a sentient continuant is not capable of holding the simplest of thoughts. Being a fleeting entity, its momentary thought is just an

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[122] Though, strictly speaking, duration is an attribute of events not concrete objects. Hence, when the object-eternalist speaks of instantaneous temporal parts of a continuant he should mean that it is lifespans of these temporally ordered parts of continuants which are durationaless.

immeasurably short spark of consciousness not capable of even the most trivial inference (inferences after all are processes); and it can have only one such spark, not one at a time, but the only one, period; it has always had it and it will always have it and nothing else. Who does, then, do the thinking? It surely cannot be a continuant even though it has an infinite number of brains!

Let me elaborate a bit on this last point. The universe, says the object-eternalist, is "populated by spacetime worms, sums of instantaneous stages from different times."[123] Such temporally extended entities (*tempi res extensa*), Scholastics called *ens successivum*, things which are "comprised of many, all of which exist not together."[124] On this ontology, as we have seen, I, writing this passage, am not wholly present now; only an infinitely minute part of me is present here/now. The bulk of me is not here/now. Thus, it is only a part of me that is the author of this passage. In fact, since it takes some time to write this passage, there are many parts of me, which are authors of its corresponding parts. So, on this conception of reality, the present passage is being co-authored by an infinite number of authors; there are infinitely many authors claiming exclusive rights to separate parts of this passage. One says, "I have written this" and the other says, "And I am the author of this," and so forth. But there are an finite amount of words in this passage. Thus, it follows that each word is written by infinitely many parts of me. What is more, all these parts must somehow communicate; otherwise, there would not be any cohesiveness to the passage. "I

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[123] Ibid, p. 53.
[124] St. Augustine, *The Confessions,* Book. IV, Chapter 11. Quoted from Roderick Chisholm's "Identity through Time," in *Metaphysics* Kim J. and Sosa E. (eds.) (Oxford & Malden, Massachusetts: Blackwell Publishers, 1999), p 273-83.

write this and you write that," says one of my parts to another, and its spatiotemporal neighbor replies, "OK, but please give an argument why this should be so." But it takes time to converse. How much time? Well, infinitely many parts apparently converse for infinitely long time. Apparently, the object-eternalist's ontology not only violates Ockham's razor by populating the universe with too many entities;[125] it is nonsensical on its face; it, therefore, must be emphatically rejected.

It is such ontological implications of object-eternalism that I find particularly objectionable; indeed, bizarre in the extreme. I, however, do not object to object-eternalism on the ground of it being "a crazy metaphysic."[126] After all, some initially counterintuitive views about the structure of reality have turned out to be true. For instance, the idea that the earth is a sphere was in great conflict with the pre-scientific *Weltanschauung*. For many sagacious individuals of the day, it seemed an awfully strange idea that the antipodeans should walk upside-down. Yet, when the correct scientific perspective has been obtained, this portrait of the then known universe looked perfectly cogent. Let us also heed Frege's counsel and keep in mind that in theoretical investigations "the point is not whether they are natural, but whether they go to the root of the matter and are logically beyond criticism."[127] Is the object-eternalism logically beyond criticism? It completely fails in this respect. Owing to this and other inconsistencies, which cannot be extricated in principle from the conceptual edifice of object-eternalism, the hypothesis must be rejected.

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[125] Incidentally, it has always puzzled me that Quine, the self-proclaimed lover of barren landscapes, was a keen proponent of this lavish ontology.

[126] Sider (2001), Chapter 6, Section 3, entitled "A Crazy Metaphysic."

[127] G. Frege, *The Foundations of Arithmetic, a logico-mathematical enquiry into the concept of number*; second revised edition, J.L. Austin (tr.) (Evanston, Illinois: Northwestern University Press, 1980), p. xi.

3.2   The Argument against Event-Eternalism

3.2.1   When one upholds event-eternalism, the hypothesis that there exists the all-inclusive toset of events, then the following picture emerges. Each instant on B-time axis 'houses' a class of instantaneous events. Members of each such class, therefore, are aligned within a specific to it hyperplane of simultaneity. A serial set of all such classes would then constitute the totality of all past, present, and future events. Certainly, instantaneous "…events can be partitioned into equivalence classes of simultaneous events that then can be completely ordered by an asymmetric and transitive relation such as *is earlier than*."[128] Almost two centuries ago, Immanuel Kant considered a similar prospect of there existing such a temporal totality of all past, present, and future events:

> For if you were to represent time by a straight line produced to infinity, and simultaneous things at any point of time by lines drawn perpendicular to it, the surface generated will represent the *world of phenomena* [*mundum phaenomenon*], in respect both of substance and of accidents."[129]

> Figure 17 is a diagrammatic representation the temporal totality of events.

Doted vertical lines represent hyperplanes of simultaneity populated by endemic to

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[128] Steven Savitt, "On Absolute Becoming and the Myth of Passage" in *Time, Reality, & Experience*, Craig Callender (ed.) (Cambridge: Cambridge University Press, 2002), p.162. Whether in reality there exists such a toset of the equivalence classes of instantaneous events is, of course, altogether a different question. As I shall show in this section, existence of such a toset involves a certain contradiction.

[129] Immanuel Kant, *The Inaugural Dissertation*. Quoted from Alan Gabbey's "The Empirical Credentials of Absolute Space and some Puzzles about Simultaneity." The paper was presented at NYU 2006 *Conference on Issues in Modern Philosophy*, subtitled "Understanding Space and Time."
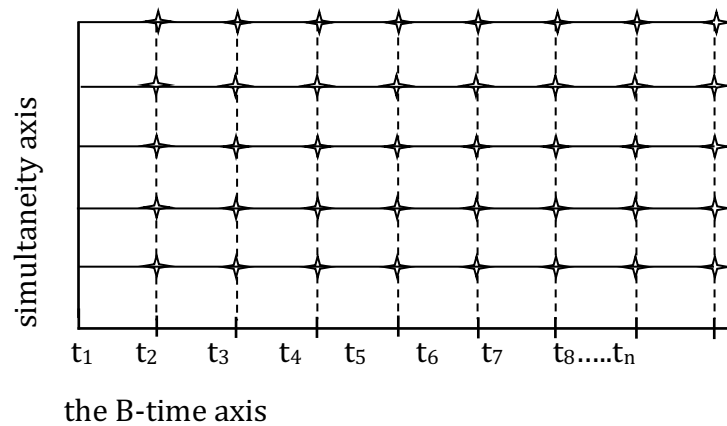
Fig. 17 The temporal totality of events.

them instantaneous events (these are represented by four-pointed stars). Each hyperplane of simultaneity, therefore, is a locus of a specific equivalence class of instantaneous events. These equivalence classes of instantaneous events, in turn, are ordered by the relation of earlier/later than. Accordingly, instantaneous events are atomic elements of durative events; paths of the latter are represented by horizontal solid lines running through the hyperplanes of simultaneity.

On the event-eternalist's hypothesis, while all equivalence classes of instantaneous events stand in the fixed relation of linear order, they are also all in existence; there are simply no such things as nonexistent equivalence classes of instantaneous events; all such classes are equally in existence. This, let us recall, is the ontological parity principle; it is the cornerstone of the eternalist's ontology. Nathan Oaklander expresses the principle vis-à-vis both instantaneous and durative events as follows: "an ontologically adequate representation of time will not contain expressions that reflect the coming into existence and ceasing to exist of events over and above their tenseless locations at different dates."[130]

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[130] Nathan Oaklander (2004), p. 40.

In section 3.1, I offered what might be called an existential argument for the ontological parity principle. There is, however, an additional argument for the ontological parity principle. The principle can be viewed as a direct consequence of the general fact that relations are existence entailing. Certainly, no relation obtains between an existent relatum and a nonexistent one or between nonexistent relata; all relata necessarily must exist for a relation to obtain. Let us express the principle of the existence entailment of relations as follows:

[EER] For any x and y, if x and y stand in a relation **R**, then x and y exist.

John Bigelow lays out the principle of the existence entailment of relations as follows:

It is; I maintain, an a priori truth that a two-place relation can only be manifested when it holds between two things, and in order for this to be so there must be two things which stand in the relation. And in saying 'there must be' two things which stand in the relation, one is really asserting that 'there must exist' two things – one is committed to the existence of those things. The principle of existence entailment of relations is an a priori truth.[131]

Therefore, on condition that all equivalence classes of instantaneous events stand in the fixed relation of linear order, all such classes are equally in existence. Expressed vis-à-vis equivalence classes of instantaneous events, the principle of the existence entailment of relations is as follows:

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[131] John Bigelow, "Presentism and Properties," in James E. Tomberlin (ed.), *Philosophical Perspectives* **10**: *Metaphysics*, (Cambridge, MA & Oxford: Blackwell, 1996), pp. 35-52, p 39.

[EER]* For any two equivalence classes of instantaneous events *X* and *Y*, if *X*

and *Y* stand in the precedence relation of earlier/later than, then *X* and *Y* exist.

Graham Priest disagrees with this line of reasoning; he argues that not all

relations are existence entailing, some instances of some intentional relations, he

holds, are not existence entailing. Priest gives the following example: it is quite

possible that *x* fearing *y* is not existence entailing, for *y*, which *x* fears, might not exist

at all. [132]   I believe this example is based on the failure to observe the distinction

between existence-in-intentional-realm and existence-in-concrete-realm. Even

though it might very well be that *y* which *x* fears does not exist in the concrete realm,

that which *x* fears *de facto* does exist in the intentional realm. Otherwise, what does *x*

fear? On the supposition that *x* fears *y*, *y* necessarily exists, albeit it exists in the

intentional realm.[133]

Intentional relations aside, all physical relations must be existence entailing

since there are no such things as nonexistent physical objects. Hence, it is an *a priori*

truth that all relata of physical relations exist. Provided that the relation of

earlier/later than is a physical relation, it follows that all relata which stand in this

relation, i.e., all equivalence classes of instantaneous events, are equally in existence.

We thus must conclude that the ontological parity principle is a direct consequence of

the principle of the existence entailment of relations.

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[132] Private correspondence.
[133] Similarly with fictional characters. Othello and Desdemona do not exist; yet, we say that they stand in the nuptial relation. Here, as with intentional entities, we have to distinguish between existences in the fictional and concrete realms.

Another support for the ontological parity principle can be drawn from the *immutability principle* for sets. The immutability principle can be stated as follows:

[IP] For any set X, X's membership is constant.

Apparently, the immutability principle is a direct consequence of the *axiom of extensionality* that provides a criterion of identity for sets:

[AE] $A=B$ *iff* $(\forall x)$ $(x{\in}A \equiv x{\in}B)$.

The immutability principle is more conspicuous when it is formulated for the simple binary set $\{x,y\}$, as follows:

[IP]* For any K, if K is $\{x,y\}$; $\{x,y\}$ *iff* both x and y are counted among the members of K and nothing else is.[134]

The immutability principle has an existential import. The existential facet of the principle comes in plain sight when the clause "*x* and *y are* counted among the members of $\{x,y\}$" is restated, without lost or any distortion of its meaning, as, "*x* and *y are* members of $\{x,y\}$." The conservation of the meaning is possible because 'counted among' does not refer to a psychological phenomenon, it simply denotes the fact that *x* and *y are* members of $\{x,y\}$. As such, "counted among" in "*x* and *y* are counted among the members of $\{x,y\}$" is redundant. In turn, the clause "*x* and *y* are members of $\{x,y\}$," can be rephrased to emphasize the existential import of the immutability

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[134] [IP]* can be proven as follows. Consider a set K such that K has just two members *x* and *y*. Suppose then that *x* is not counted among the members of K. Then, $K = \{y\}$. Therefore, on the *axiom of extensionality* that provides a criterion of identity for sets, $K \neq K$. Therefore, either both *x* and *y* are counted among the members of K, or $K \neq K$, but since in all situations, $K = K$, then also in all situations both *x* and *y* are counted among the members of K. Suppose next that *y* is not counted among the members of K. Then again, $K \neq K$. We then repeat the preceding proof. Therefore, both *x* and *y* are counted among the members of K. Suppose finally that a new member *z* is added to K. This supposition too entails that $K \neq K$. Therefore, *z* is *not* counted among the members of K. We thus conclude that no member of K can be subtracted from K and no new member can be added to K – *in all situations, the set-membership of K is constant.*

principle even more explicitly, though perhaps somewhat awkwardly, as, "*x* and *y*

exist as members of {*x*,*y*}." This, latter paraphrase is justified because "__ *is* a member

of __'" is equivalent to "__*exists* as a member of __."[135] On this latter paraphrase of the

clause, it becomes apparent that the immutability principle for sets entails the

ontological parity principle for sets, and, all things being equal, for the toset of the

equivalence classes of instantaneous events. Let us thus express the immutability

principle for sets as follows:

[IP]** For any *K*, if *K* is {*x*,*y*}; {*x*,*y*} *iff* exist (*x*,*y*).

This terse formulation brings out the fact that in the present context 'exist' acts like a

two-place existential relation __*E* __. Take now the same pair {*x*,*y*} and restate [IP]**

as follows:

[IP]*** For any *K*, if *K* is {*x*,*y*}; {*x*,*y*} *iff* co-exist (*x*,*y*).

Apparently, in [IP]*** "co-exist" too denotes a two-place existential relation: __

*E*__. There is an obvious difference between [IP]** and [IP]*** in prefixing. But even

a superficial excursion into the realm of English grammar reveals that within the

present context, the difference is purely orthographic. As far as the present context is

concerned, [IP]** and [IP]*** are semantically identical.

We thus have logical justification for interpreting the ontological parity

principle as the coexistence principle. Indeed, there is no logical distinction between

the two principles whatsoever because for *x* and *y* to be equally in existence is for *x*

and *y* to coexist. Both principles bring to the fore the same notion of the ontological

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[135] To exist, we might wish to say, is to be a member of a set. For surely anything that exists is a member of a set and that which does not exist is a member of no set, for there are no such sets as sets of nonexistent objects.

oneness of *x* and *y*. I, thus, surmise that the coexistence principle is an unalienable

constituent of the event-eternalist's ontology (of the eternalist's ontology in general).

On the event-eternalist's hypothesis, there exists the toset of the equivalence classes

of instantaneous events such that all members of this set *coexist*. Though this might

seem as a rather trivial conclusion, it, as shall be evident in the next subsection,

reveals an inherent contradiction in the event-eternalist's hypothesis, a contradiction

which cannot be extricated from its conceptual framework in principle.

3.2.2   On the event-eternalist's hypothesis, the relation of coexistence obtains both

between the members of the equivalence classes of instantaneous events and

between the equivalence classes themselves, because the ontological parity principle,

and thus the coexistence principle, holds true for both types of set. The event-

eternalist, however, claims that we are dealing here with two radically different types

of coexistence because on his view the one that obtains between the members the

equivalence classes involves simultaneity while the one that obtains between the

equivalence classes themselves, i.e., the *cross-temporal* coexistence, does not. This

ontological claim is graphically depicted in Figure 18.
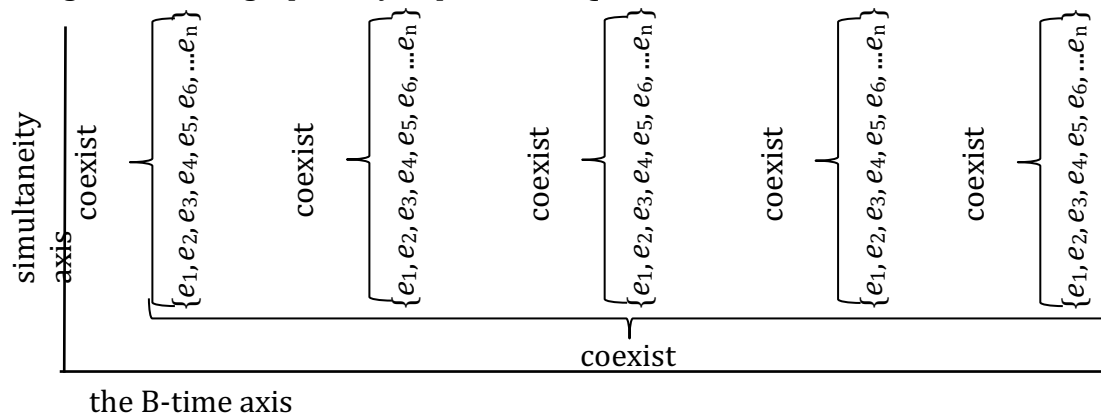

Fig. 18 The cross-temporal coexistence

What then is the event-eternalist's justification for positing these two markedly different types of coexistence? Specifically, why does the event-eternalist think that the cross-temporal coexistence, unlike the one that obtains within the equivalence classes of instantaneous events, does not involve simultaneity? As far as I know, the only recourse that is available to the event-eternalist to substantiate this claim is the B-temporal topology, that is, the topological premise that the equivalence classes of instantaneous events are temporally ordered and, therefore, are temporally differentiated entities. In other words, the event-eternalist's *raison d'être* for holding that the cross-temporal coexistence of the equivalence classes of instantaneous events does not involve simultaneity is that their temporal ordering explicitly entails that the equivalence classes are temporally separated, and thus, not simultaneous. From this it is concluded, rather with an easy heart, that in the E-universe there indeed obtains two types of coexistence, since one involves simultaneity and the other does not.

Apparently, the event-eternalist assumes that in the E-universe, assertions such as events *x* and *y exist* simultaneously/non-simultaneously can be shown to be true or false solely on the basis of topological assertions, such as *x* and *y* are members of an unordered/ordered set. If *x* and *y* are the members of an unordered set {*x,y,…,n*}, then it is said that *x* and *y* are simultaneous; if, on the other hand, *x* and *y* are members of an ordered set <*x,y,…n*>, then it is concluded that *x* and *y* are not simultaneous. This supposition, however, is incorrect because the issue of whether events are temporally ordered or not has no bearing on the issue of whether they exist simultaneously/non-simultaneously. The validity of this claim can be seen as

follows. Were the equivalence classes of instantaneous events ordered other than linearly, or not ordered at all, the question will still arise whether they exist simultaneously because they are members of a set and, as we have seen, coexist. Coexistence, at least commonsensically, does involve simultaneity.

Commonsensical considerations aside, coexistence in general (the cross-temporal coexistence in particular) and simultaneity, I maintain, are tightly interwoven in that *in all situations* they entail one another. Indeed, expressions employed to articulate cross-temporal coexistence vary widely. For instance, we could say that "the equivalence classes of instantaneous events exist in tandem" or we could say that "the equivalence classes of instantaneous events exist all together," and so on. Yet, throughout all these elocutionary transformations, the underlining idea remains the same – if the equivalence classes of instantaneous events cross-temporally coexist, then they exist simultaneously. But since on the event-eternalist's temporal topology the equivalence classes of instantaneous events are temporally separated, we have an outright contradiction – the equivalence classes of instantaneous events are temporally separated and also simultaneous entities. Hence, if I am right in my analysis, event-eternalism as a whole is a contradictory hypothesis.

To see more clearly why the equivalence classes of instantaneous events cannot coexist without also being simultaneous let us take by way of example two such classes *X* and *Y*. Suppose, as the event-eternalist does, that *X* and *Y* cross-temporally coexist but do not exist at once. From this supposition it then follows that

either *first X* exists and *then Y* exists or conversely.[136] *Prima facie*, this supposition

entails that *X* and *Y* do not coexist cross-temporally or in any other way, at least not

for a certain period of time. We thus have an outright contradiction – *X* and *Y* coexist

and do not coexist. What about the period for which *X* and *Y* do coexist cross-

temporally? Well, if *X* and *Y* do coexist cross-temporally, then they are simultaneous,

for once again, if they are not simultaneous, then first *X* exists and then why *Y* exists

or conversely, which, of course means, that *X* and *Y* do not coexist. Equally, suppose *X*

and *Y* are simultaneous, but do not coexist, then we have the same as before result –

either first *X* exists and then *Y* exists or conversely. Coexistence, therefore,

necessarily involves simultaneity and *vice versa*.

Undoubtedly, the event-eternalist will hotly contest this reasoning.

Specifically he might argue that I employ a strictly ontological notion of precedence,

whereas in the E-universe the phenomenon of precedence is purely topological. In

the E-universe, says the event-eternalist, there are no "coming into existence and

ceasing to exist of events over and above their tenseless locations at different

dates."[137] Accordingly, the event-eternalist might conclude that the argument is

invalid.

Let me accommodate the event-eternalist by looking at the same argument

from a different angle. Suppose the equivalence classes of instantaneous events *X* and

Y coexist cross-temporally. Coexistence, i.e., the ontological oneness of the

equivalence classes of instantaneous events, as I have suggested in the previous

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[136] Notice that I employ strictly ontological senses of "first" and "then," and assume with the event-eternalist that *X* and *Y* are ordered by the precedence relation of earlier/later than.
[137] Nathan Oaklander (2004), p. 40.

subsection, is an equivalence relation. *X* and *Y*, therefore, form an unordered pair

{*X*,*Y*}. On the event-eternalist's topology, *X* and *Y* stand in the precedence relation of

earlier/later than. They, therefore, form an ordered pair <*X*,*Y*>. But how is it possible

that the same two relata stand in mutually exclusive relations? Apparently, *X* and *Y*

cannot be both members of ordered and unordered pairs. Hence, either *X* and *Y*

coexist cross-temporally and are simultaneous or they are not simultaneous and do

not coexist cross-temporally. This shows that cross-temporal coexistence and

simultaneity necessitate one another; where there is the one there is always the

other. Notice that neither of the two alternatives is acceptable to the event-eternalist.

In the E-universe, *X* and *Y* coexist cross-temporally and are *not* simultaneous. But this

standpoint is inconsistent since it entails the contradictory result that *X* and *Y* are

both members of ordered and unordered pairs.

The onus, therefore, is on the event-eternalist to demonstrate that the cross-

temporal coexistence of the equivalence classes of instantaneous events does not

entail them being simultaneous. An appeal to temporal topology would not do in this

essentially ontological assertion. Besides, such an appeal is entirely unsatisfactory

because it simply amounts to the tautological assertion that the equivalence classes of

instantaneous events are not simultaneous because they are not simultaneous. This

tautology is not very illuminating, indeed. A full-blooded ontological argument is

required here. In the absence of such an ontological argument, it is only reasonable

to hold that the cross-temporal coexistence of the equivalence classes of

instantaneous events does entail them being simultaneous. Until and unless such an

ontological argument is offered, we are justified to hold that event-eternalism is a

self-contradictory hypothesis, for it inevitably runs into the contradictory assertion that the equivalence classes of instantaneous events are temporally separated entities which exist simultaneously, that is, they are and are not simultaneous.

There is another reason to think that the cross-temporal coexistence entails simultaneity. For if this were not so, then the cross-temporal coexistence would obtain between the equivalence classes of instantaneous events not instantaneously but successively. Yet, it is not at all clear what this successive coexistence might be. The event-eternalist might bite the bullet and reply that in the temporal realm, unlike in the spatial one, there indeed obtained two types of coexistence: one type obtains between the members of the equivalence classes of instantaneous events and occurs instantaneously; the other type obtains between the equivalence classes themselves and does not occur instantaneously; this would be his notorious cross-temporal coexistence. He might further argue that this conclusion follows from the very definition of "temporally separated." Indeed, there surely must be some distinction between the coexistence of temporally ordered equivalence classes of instantaneous events and the coexistence of temporally unordered members of the equivalence classes of instantaneous events. The event-eternalist, it seems, has a strong reason for believing in the reality of the two types of coexistence. Hence, the onus is on his opponent to demonstrate that the cross-temporal coexistence that obtains between the equivalence classes of instantaneous events does in fact entail their simultaneous existence.

Turning the table on his opponent, however, simply will not do. For the conception of non-instantaneous, i.e., successive coexistence of the equivalence

classes of instantaneous events is not only self-contradictory on its face; it is also

contrary to the ontological parity principle, which, as we have seen, is at the center of

the eternalist's metaphysics. Indeed, how should we conceive of this purported

successive coexistence? Should we say that an equivalence class of instantaneous

events X first coexists with an equivalence class of instantaneous events Y, then Y

coexists with an equivalence class of instantaneous events Z? If this were so, then at

one time X and Y would coexist and at another time Y and Z would coexist, that is, X, Y,

and Z would never coexist as a group. In addition, on the transitivity of coexistence,

successive coexistence is surely not allowed, for if X and Y coexist and Y and Z coexist,

then X, Y, and Z coexist all together. On the pain of inconsistency, therefore, the event-

eternalist should take the relation of cross-temporal coexistence to be instantaneous

since its contrary, viz. the successive cross-temporal coexistence is an unviable

proposition. But this outcome, as we have seen, is not acceptable because it leads to

the familiar contradiction.

The outcome of the foregoing analysis is that in the E-universe, two

incompatible types of relation obtain between the equivalence classes of

instantaneous events: one is the topological relation of linear ordering and the other

is the existential relation of cross-temporal coexistence. The two relations are at

variance with one another because given that the cross-temporal coexistence of

equivalence classes requires them being simultaneous entities, it is not possible for

them also to be temporally ordered entities. Conversely, if the temporal ordering is

preserved, then the cross-temporal coexistence must go. However, both relations are

essential to event-eternalism. Indeed, the existential relation of cross-temporal

coexistence that obtains between the equivalence classes of instantaneous events is what makes the alleged reality of the temporal totality possible, where the temporal ordering *ex hypothesi* is the required topological structure of this temporal totality.

We thus must conclude that the event-eternalist's ontology is in conflict with his topology. Specifically, the ontological parity principle entails simultaneous existence of the equivalence classes of instantaneous events, while the event-eternalist's temporal topology entails the contrary. Event-eternalism fails.[138]

3.2.3 The event-eternalist, I should think, would defend himself against the foregoing criticism by arguing that the cross-temporal coexistence of the equivalence classes of instantaneous events is in fact a *timeless* coexistence. I picture him saying that the equivalence classes of instantaneous events ARE in existence together, where "ARE" is a timeless designator. On this conception of cross-temporal coexistence, for instance, though the B-topologically consecutive outbreaks of World War I and World War II ensue together with one another and everything else, this togetherness, this *en bloc* existence, is not simultaneous; the two momentous events in the world history coexist *timelessly*. Yet, when pressed on the nature of this timeless coexistence, all that the event-eternalist does is to point at the B-temporal topology (as he also does in drawing the distinction between the two types of coexistence discussed in previous subsection). Events, says the event-eternalist, are eternally pegged to their respective temporal loci; they, therefore, "do not stand in temporal relations to each other (or

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[138] The argument from coexistence is *mutatis mutandis* is also an argument against object-eternalism.

anything else).... This aspect of the B theory can be summarized by the aphorism *Time is timeless*."[139]

This response, however, is inadequate because no explanation is given as to how exactly should we interpret this atemporal reading of "ARE" in such statements as "The outbreaks of World War I and World War II ARE in existence in tandem." Specifically, the event-eternalist does not offer us an explanation to what phenomenon this atemporal term exactly refers. Simply saying that it refers to the B-facts of the two occurrences existing in their respective B-loci is not at all sufficient because it is tantamount to the saying that the two events are there, in the two B-temporal locations, and not anywhere, or rather, anywhen else. Once again we have here an unworkable appeal to the B-temporal topology in a matter altogether ontological. A different response is needed here because the issue in hand is not topological, but all-and-all ontological in nature, for it deals with the question of how things *are* and not how they are ordered. Again, the atemporal ARE of the event-eternalist is a wholly ontological category. The event-eternalist, however, refuses to interpret his atemporal ARE as an ontological category. This is quite understandable because such a reading requires an answer to the question how things ARE timelessly, that is, how things *exist* timelessly. This notion of timeless existence, however, is altogether incongruous because it implies that things persist but their persistence does not occur in time, that it is not a temporally measurable phenomenon.[140]

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[139] Nathan Oaklander (2004), p. 311. In this passage Oaklander speaks about B-facts such x is at t_n. Apparently the statement *mutatis mutandis* is applicable to any B-entity, be it an event or an object.
[140] I will say more on this notion of atemporal persistence in section 3.5.

Furthermore, it is not at all clear how does this atemporal "ARE" differ from "at the same time," or "at once" or some other such expression. The notion apparently involves some sense of sameness and since it is asserted that it is not the sameness of time, the only other candidate, as far as I can tell, is the sameness of atemporal coexistence. So, what the event-eternalist should then say is that the equivalence classes of instantaneous events coexist atemporally. But this clarification is not particularly helpful because "atemporal," once again is not defined. There is, of course, a negative definition, that is, that it is neither the shortest possible period of time nor the longest possible one and none in between. But this negative definition surely cannot be acceptable to the event-eternalist because it implies there being some simultaneous super-moment which involves no period of time whatsoever but which nonetheless somehow encompasses all the equivalence classes of instantaneous events. Indeed, how this notion of atemporality is different from the notion of simultaneity? As far as I know, the event-eternalist does not have a coherent fully-developed notion of atemporality or timelessness or eternality and such. In fact, in his theory such notions are rudimentary at best. Until and unless the event-eternalist fully develops his theory of timelessness, he is not allowed to use it in his rejoinders to the questions concerning an atemporal reading of ARE. In fact he is not allowed to use this notion of atemporal ARE.

An additional problem that arises for the event-eternalist is that it is not at all clear how the equivalence classes of instantaneous events being wholly temporal entities, i.e., being temporally ordered entities, can enter into an essentially atemporal relation. It is an *a priori* truth, at least on two-valued logic, that nothing

can be both temporal and atemporal. The standard event-eternalist's reply to this and the like criticism is that the equivalence classes of instantaneous events exist temporally in their respective B-loci and also that they exist timelessly. We thus are dealing here with two types of existence: one type is temporal, and the other type is atemporal. Yet again the same problem arises – how the same entities can exist temporally and atemporally? Levin has a similar objection in mind when he writes that "the central tenet of B theory is that the occurrence of an event at a time is timeless."[141] It turns out that on the event-eternalist's hypothesis, the equivalence classes of instantaneous events are indeed both temporal and atemporal entities. But in what mysterious way is atemporality interwoven into an essentially temporal fabric of the E-universe? Since no explanation is forthcoming, all the event-eternalist says is that they coexist eternally, that they simply ARE, so the onus is on him to show that in the temporal realm there obtains an atemporal relation, that is, that the equivalence classes of instantaneous events are both temporal and atemporal entities. But I think we can safely surmise that the notion of something being both temporal and atemporal is a nonstarter on its face.[142]

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[141] M. Levin, "Compatibalism and Special Relativity," *Journal of Philosophy* **104**, pp.433-63, p.443.
[142] A. Prior tackles a similar problem. He held that events can indeed be very short and also have an indefinitely long history. Prior justifies this view by distinguishing between being a part of (whole) history and having a personal history, "between the history that an event *has*, and the bit of history that it *is*." A. Prior, *Papers on Time and Tense*, p. 10. Thus, an instantaneous event is an instantaneous part of the (whole) history of the universe, but it also has its private history, as it were, which might be indefinitely long. I find this essentially eternalist's reasoning incompatible with Prior's presentism. More importantly, it is self-contradictory on its face, for the history of the universe is comprised of temporally ordered instantaneous private histories. An instantaneous event has no other (indefinitely long) history apart from its instantaneity, its instantaneous history is a part of the history of the universe, but it itself has no parts. It, therefore, cannot have an indefinitely long history, for if it does have such a history, then this history must have parts. It follows then that these parts are not parts of the whole history of the universe, but in some inexplicable way are parts of an autonomous history.

The event-eternalist might argue that the equivalence classes of instantaneous events being B-ordered is not at all in conflict with them also existing atemporally because the former is a topological issue whereas the latter is an ontological one. By upholding the principle of topological/ontological autonomy, the event-eternalist meets my criticism half-way. I too think that topological and ontological matters should be addressed separately. Let us analyze this notion of atemporal cross-temporal coexistence irrespective of any topological consideration. Consider now the following:

(a)   The E-universe came into and eventually will go out of existence.[143]

From the conjunction of (a) and the ontological parity principle, we obtain the following corollary:

(b)   The equivalence classes of instantaneous events come into existence, are in existence, and go out of existence *concomitantly*.[144]

Within the conceptual framework of event-eternalism, we get the concomitance corollary as follows. Suppose (b) does not hold. Then the following is true:

(c)   The equivalence classes of instantaneous events come into existence, are in existence, and go out of existence *consecutively*.

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[143] No doubt, the event-eternalist will be quite uncomfortable with (a), since "came into existence" and "will go out of existence" are essentially tensed expressions. Be it as it may, there is nothing in his hypothesis that precludes him from holding that the universe is finite on both ends.

[144] Because there are three additional possibilities; namely, (i) the universe begins but does not end, (ii) it does not begin but ends, (iii) the universe is everlasting; there are four, in total, variants of the corollary. However, for present purposes, it is immaterial which of the four scenarios we take as case in point. Suppose the universe begins but does not end, then the segments come into existence and exist concomitantly. On the reverse scenario, the segments go out of existence concomitantly. And in the case of the everlasting universe, the segments are in existence concomitantly for all eternity. Accordingly, the concomitance claim stands, with minor elucidatory adjustments, in all four scenarios.

However, if (c) is true, then event-eternalism is false, for (c) entails a dynamic picture of temporality. Therefore, if event-eternalism is true, then so must be (b) – the E-universe is comprised of temporally separated, yet concomitantly existing equivalence classes of instantaneous events.

Is it then this concomitant existence of the equivalence classes of instantaneous events which the event-eternalist takes to be their eternal coexistence? Is this what is meant when it is sais that they eternally ARE? As far as I can tell, this is the only plausible interpretation of the event-eternalist's notion of "ARE." But, as I have pointed earlier, it is not at all clear how this notion of concomitant existence is different from the notion of their existing at once, i.e., simultaneously. Certainly, to exist concomitantly is to exist at once; and so the familiar contradiction arises again – the equivalence classes of instantaneous events are and are not simultaneous.

The event-eternalist, I suppose, will object to the concomitance corollary on the grounds that "equivalence classes X and Y exist concomitantly" is a time-referring expression semantically equivalent to "equivalence classes X and Y exist at the same time." Yet, he will argue, the claim that X and Y exist at the same time is contrary to his hypothesis, since on his theory, they coexist timelessly. To be sure, he might continue, on the ontological parity principle, the equivalence classes of instantaneous events do exist together, that is, they do coexist, but from this it does not follow that they all exist at the same time, for such expressions as "exist together," "exist in concert," "exist in tandem," and the like, when applied to the equivalence classes, do not imply the sameness of time because they are strictly ontological *not* topological assertions.

The event-eternalist may be surprised to learn that in (b), I do not take the clause "are in existence concomitantly" to do the job of a time-referring expression. I too interpret it time-neutrally. In particular, I take it as being equivalent to such expressions as "exist *en masse*," "exist *en bloc*," etc. So construed, (b) is indeed a wholly ontological conjecture; it is not concerned with a topological issue of temporal order; it is not time-referring. As such, the conjecture addresses the issue of how the equivalence classes of instantaneous events exist; namely, as a group, not how they are ordered, i.e., linearly. It is this, strictly ontological, sense of "concomitantly" that I employ in (b). For the sake of argument, let me accommodate the eternalist by rephrasing the concomitance corollary in time-neutral terms as follows:

(d)   The equivalence classes of instantaneous events come into existence, ARE in existence, and go out of existence *en masse* (where "ARE" is a time-neutral designator).

Now, assume that (d) does not hold, then it is never the case that the number of the equivalence classes is constant. In the beginning, there exists the first equivalence class of instantaneous events, then their number increases by one and so on. But on the ontological parity principle the number of equivalence classes of instantaneous events is constant.[145] Hence, either (d) holds or the ontological parity principle fails; and since the principle is essential to eternalism, the event-eternalist's hypothesis collapses, as well. The event-eternalist, therefore, ought to accept (d) as

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[145] This principle of the numerical constancy of the equivalence classes of instantaneous events is entailed by the immutability principle discussed in section 3.2.1.

an integral part of his theory. All things considered, this principle is what event-eternalism is all about, as opposed to the growing block theory and presentism.

Notice, however, that on this reading of ARE, although it is not straightforwardly equivalent to the simultaneity reading, it is still very problematic because on this reading, the equivalence classes of instantaneous events ARE in existence for a certain period of time, in fact for a very long period of time, the period equal to the lifespan of the E-universe. How is this reading then in rapport with the standard reading of atemporality which involves no notion of time whatsoever?

Let me make an additional comment on the topological/ontological distinction to which the event-eternalist often appeals. Specifically, it is often said that as the ontological oneness of spatial entities does not imply their topological oneness, i.e., their existing at the same spatial point, so, the ontological oneness of the equivalence classes of instantaneous events does not entail their simultaneity, i.e., their existing at the same time. This rejoinder, however, is based on the spatial simile, which is nothing but a metaphor that induces only psychological comfort. More importantly, what makes spatial points coexistent is precisely their being simultaneous; non-simultaneous spatial points, if there are such things, simply do not coexist. Therefore, if one insists on accepting the spatial simile as a legitimate theoretical tool, one must say that just as the coexistence of spatial points entails their being simultaneous, so the coexistence of the equivalence classes of instantaneous events entails their being simultaneous as well. Either the spatial analogy is conceptually useless, or it gets the eternalist into trouble.

The problem with conceiving the temporal order by analogy to the spatial order is that at first it is assumed that there are temporal distances which are very much like spatial distances and then it is concluded that since in space distant objects coexist (being trumps space), so in time, temporally separated equivalence classes of instantaneous events coexist, as well (being trumps time). It is then concluded that the cross-temporal coexistence of the equivalence classes of instantaneous events is not in variance with their being temporally ordered. But, as I have just pointed out, spatially distant points coexist precisely because they are simultaneous; non-simultaneous points do no coexist in space. So, if the spatial simile is apt, then the coexisting equivalence classes of instantaneous events should be deemed to exist simultaneously, which is again the contradiction we keep arriving at – the equivalence classes of instantaneous events are both temporally separated and simultaneous entities.

The crucial point that the event-eternalist systematically misses in utilizing the spatial simile, in employing the notion of spacious time in general, is that, unlike what is found in the temporal domain, in the spatial domain, ontological facts are not at variance with topological facts. Thus, if we carry the spatial simile all the way through, we ought to say that in the temporal domain, temporal separation of the equivalence classes of instantaneous events is in perfect harmony with their existing at once. Apparently, this is a patent contradiction – the equivalence classes of instantaneous events cannot be both temporally separated and simultaneous. The eternalist might grudgingly concede that the spatial simile goes only a certain

distance.[146] But how far should it go? Is the cross-temporal coexistence of the equivalence classes of instantaneous events analogous to the cross-spatial coexistence of spatially separated objects? The event-eternalist categorically says 'yes' – the equivalence classes of instantaneous events do coexist across time in the very same manner as spatially separated objects coexist across space. Let us thus see whether the spatial simile, which is at the center of the notion of spacious time, is at all a legitimate piece of reasoning.

3.3   The Notion of Temporal Dimension

3.3.1   Time, it is habitually said nowadays, is the fourth dimension of the universe. Philosophers largely upheld the reality of temporal dimension for two main reasons. On the one hand, the Special Theory of Relativity and Minkowski Spacetime offer strong scientific justifications for the this metaphysical picture of temporal reality.[147] On the other hand, McTaggart's A-time /B-time distinction and his proof of the unreality of A-time left the majority of analytical temporal theorists with a stark choice – either reject with McTaggart the reality of A-time but admit the reality of B-time, viz. the concept of spacious time, or reject both theories and thus admit that time, as it is conceived in philosophy, is unreal.[148] Apparently, the latter choice is not an option for the majority of analytical philosophers.

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[146] Alternatively, he might concede that the notion of spacious time is based more on a metaphor than on reason.

[147] D. C. Williams, for instance, deems this metaphysical picture of time to be "the very paradigm of philosophical understanding," "The Myth of Passage," *The Journal of Philosophy* **48** (1951), pp. 457-72.

[148] Many B-theorists are very doubtful about the logical validity of McTaggart's paradox; yet, given the scientific implausibly of the reality of A-time, they are forced to accept it, warts and all.

Regardless of an apparent scientific plausibility of the notion of temporal dimension and cogency of McTaggart's argument for the unreality of A-time, for some of us, the idea of temporal dimensionality is not an easy pill to swallow, for it is not without bizarre implications. One peculiar consequence of the notion of temporal dimension, for instance, is that by employing it metaphysicians are compelled to conceive temporal duration by analogy with spatial extension; time is literally taken to be a space-like phenomenon, the fabric of the universe is literally stretched in four directions – three spatial and one temporal; time and space, it is said, both have breadth. Let us label this view the *temporal dimensionality doctrine*.

The belief in the reality of temporal dimension is also reinforced by widespread use of the spatial simile. In some respect, the spatial simile is instrumental in buttressing the belief that there is "a common topological and metrical structure between any given spatial dimension and the temporal dimension."[149] Since it is firmly held that both the spatial and temporal fabrics of physical reality have breadth, the object eternalist is felt well-justified in holding that temporal expanses are occupied by temporally extended objects in the very same manner as spatial expanses are occupied by ordinary three-dimensional objects. An object is said to be spatially extended *iff* there are at least two distinct linearly ordered spatial points *x* and *y*, mapable onto its body; analogously, it is said, an object is temporally extended *iff* there are at least two distinct linearly ordered temporal points *x* and *y*, mapable onto its body.

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[149] T. Sider (2001), p.87.

Despite the scientific backing and initial philosophical plausibility of the temporal dimensionality doctrine, it is not a theoretically viable conjecture. The notion of spatial dimensionality is theoretically viable because it straightforwardly conforms to our sense-experience. In contrast, its temporal analog is not theoretically viable precisely because temporal expanses are not a part of our sense-experience. Unlike the fact of there existing spatial expanses, the existence of temporal expanses cannot be corroborated by our senses, because "no time is all at once present."[150] There are landscapes, which we all can observe at will, as, for instance, when sitting by the window of a railcar moving through a countryside we enjoy bucolic vistas unfolding before our eyes. But there are no timescapes which could be offered for our viewing in any manner whatsoever. There are simply no such vantage points, which could enable us to observe temporal vistas in their entirety.[151] Apparently, observation of timescapes, if there are such entities, requires an atemporal vantage point, a vantage point which is not within the universe.

But suppose there is such a vantage point, then it follows that at all, or least two, temporally separated segments of the E-universe are observed *at once*. But this oneness of observation, provided it is not an illusion, entails oneness of existence, viz. existence at once of all temporally separated segments of the E-universe, because the observe must be co-present with each observed segment, otherwise he cannot observe more than one segment at a time. This, of course, is a patent contradiction because temporally separated segments of the E-universe *ex hypothesi* are not

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[150] St. Augustine, *The Confessions, Book XI,* E. B. Pusey (tr.) (Random House: New York, 1949), p 251.
[151] Whether there exist an extrauniversal, and thus, atemporal vantage point is altogether a different question.

simultaneous. Let us look at the same argument in a slightly different way. Take two temporally separated entities and an atemporal observer O who observes them at once. Then, O is simultaneous with one at t_1 and with the other at t_2 because in order to observe an entity an observer must be co-present with this entity, be in phase with it.[152] Now, on condition that simultaneity is transitive, it follows that the two temporally separated entities exist simultaneously. In figure 19, the contradiction is depicted graphically: if the observer O and the entity at t_1 are simultaneous and also if O and the entity at t_2 are simultaneous, then, on the transitivity of simultaneity, it follows that the two temporally separated entities are simultaneous, which is an apparent contradiction.[153] Therefore, temporal vistas are not observable in principle.

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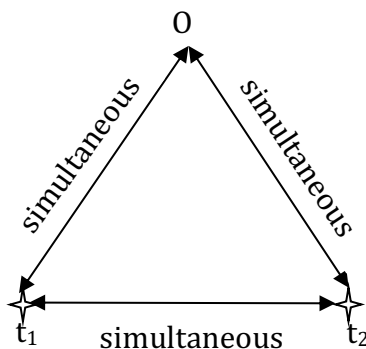simultaneous   simultaneous

t_1 simultaneous t_2

Fig. 19. Transitivity of simultaneity.

[152] It might be argued that just as in order to observe spatially distant vistas it is not necessary to be at those distant places, so in order to observe temporally separated entities, it is not necessary to be co-present with them. This reasoning is based on the spatial simile, the conjecture that itself is in need of being proven to be true. The thing to consider here is that observations of spatially distant entities are possible precisely because they are co-present with an observer; they are in phase with him. So, if one takes the spatial simile to be true, on the pain of inconsistency he ought to hold that observations of temporally distant entities too are possible *iff* these entities are co-present with an observer, that is, *iff* they are in phase with him.

[153] E. Stump and N. Kretzmann in their attempt to salvage the notion of atemporal omniscience, which this type of argument directly challenges, introduce a novel notion of simultaneity which they think obtains between an eternal being and temporal entities; they label it ET-simultaneity (eternal/temporal simultaneity). They argue that ET-simultaneity is not transitive and that, therefore, no contradiction arises. I believe their argument is fallacious, but its analysis would take us far a field. E. Stump and N. Kretzmann, "Eternity," *The Journal of Philosophy* **78** (1981), pp. 429-58.

It is a rather puzzling aspect of the human psyche that despite temporal extensions not being observable in principle, it tends to conceptualize time as being a fixed continuum of temporal points populated by objects/events, a real line stretched between the Before and After. Even though what we see with our eyes does not correspond with what we 'see' with the mind's eye, the majority of temporal theorists insist on the truth of the temporal dimensionality doctrine; they are adamant that time has breadth and that, therefore, there are real temporal distances which lie between temporal points/events/loci. This psychological propensity to overwrite empirical experience creates a severe theoretical tension. On the one hand, we conceptualize time as a continuum of points and on the other hand, we cannot experience time as we imagine it to be in principle. For, as I have argued, such an experience would certainly require the point of view of an atemporal being. Enter the spatial simile. It is called on precisely in order to compensate this tension; and, I must admit, it does its job well. By visualizing temporal expanses by analogy with spatial expanses, we can accept with a relative ease timescapes as legitimate constituents of physical reality. But what justifications (besides the psychological one) do we actually have in accepting the theoretical legitimacy of the spatial simile that props the temporal dimensionality doctrine? As far as I can see, we have none.[154]

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[154] The eternalist, of course, would have a slew of reasons as to why we should accept the temporal extensionality doctrine. See, for instance, chapters 4 and 5 of Sider (2001). All these reasons, however, fall short. The nature of this undertaking prevents me from addressing these reasons in detail, but I hope that the reader will find arguments which I offer in these pages against object-eternalism strong enough to conclude that eternalism in general, as well as four-dimensionalism, the block-universe hypothesis, and the rest of the bunch are philosophically unsustainable theories.

3.3.2   It is customary to symbolize positions in the four-dimensional manifold as

ordered quadruples of real numbers. Spacetime positions, therefore, are expressible

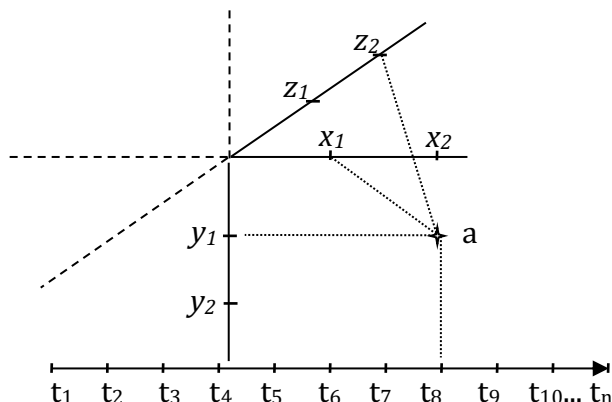algebraically in terms of Cartesian coordinates, as shown in Figure 20.

Fig. 20 Algebraic expression of spacetime positions.

The idea here, I take it, is that as the two-dimensional plane can be generalized

to a three-dimensional space by adding to variables x and y (in this case, denoting two

spatial dimensions of a plane) a third variable z, (a third coordinate denoting a third

spatial dimension), so the three-dimensional space can be generalized to a four-

dimensional manifold by adding a fourth variable t (the coordinate denoting the

fourth temporal dimension).[155] This technique of generating a graph representing

the four-dimensional manifold, is, no doubt, a useful illustrative tool. Indeed, visual

thinking plays an important role in mathematics. Still, in the matters of philosophical

reasoning, pictorial representations, when used injudiciously, can lead us astray, as, I

think, is unfortunately the case when we picture the four-dimensional manifold by

way of Cartesian coordinates. Because temporal magnitude is laid out along a spatial

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[155] This algebraic method of generating hyperspaces is called *generalization by addition* and is
unbounded. The number of dimensions that can be generated by the method, therefore, is unlimited.

axis, there arises a tendency to view temporal duration by analogy with spatial

extension. Such tendency must be resisted.

To see why this rather natural inclination must be resisted let us take a closer

look at the theoretical tools of Cartesian geometry. These tools are not limited to

expressions of spatial and temporal magnitudes; any physical magnitude whatsoever

is expressible by means of Cartesian coordinates. Take, for instance, physical

quantities of pitch, mass, and temperature. Suppose there is an object that emits a

certain pitch at a certain temperature when it attains a certain mass. This correlation

of the three physical quantities is expressible by a set of ordered triples of real

numbers <x,y,z>where, let us say, x denotes the set $\{x \mid Px\}$ of units of pitch

measurement, y denotes the set $\{x \mid Mx\}$ of units of mass measurement, and z denotes

the set $\{x \mid Tx\}$ of units of temperature measurement. We thus can articulate the

correlation in terms of Cartesian geometry by simply laying pitch, mass, and

temperature measurements along the three spatial axes, as in Figure 21:
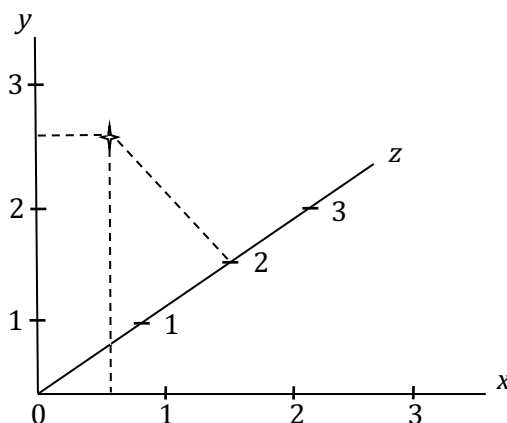

Fig. 21 Non-temporal of Cartesian geometry.

Evidently, in Figure 21, the dimensions x, y, z do not denote three space-like

dimensions; instead, they denote three abstract objects existing in the mathematical

space, viz. three sets of different units of measurement visually laid out along three spatial dimensions. As Descartes himself said, "All that I understand by dimension is the mode and aspect according to which something is considered to be measurable."[156] The Cartesian sense of 'dimension' is purely mathematical; the fact that this sense can be brought out through the visual apparatus of Cartesian graphs does not make it less mathematical let alone synonymous with the physical sense of 'dimension', which denotes a measurable physical quantity, whatever this quantity may be, pitch, length, mass, duration, temperature, etc.

Accordingly, when one uses 'temporal dimension' in the Cartesian sense, one ought to speak of an abstract object existing in the mathematical space, viz. the set of all possible temporal measurements, expressed in the appropriate units. Alternatively, when one uses 'temporal dimension' in the ontological sense, one ought to speak of a certain physical magnitude, something that is *measurable*, but itself is not "the mode and aspect" of measurement.[157] That is why, in the mathematical sense of 'temporal dimension', the statement "Time is the fourth dimension of the universe" means, "The fabric of the universe, in addition to being measurable in three spatial modes is also measurable in one temporal mode" and in its ontological sense, the very same statement means, "Time is a measurable physical phenomenon." Both readings are legitimate. There is, however, a third, confused sense of "temporal dimension," viz. "time is space-like extension." From the fact that temporal magnitude can be laid

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[156] R. Descartes, Rule No 14. Quoted from David L. Thompson's online paper entitled "Time in Physics."

[157] By the same token, 'spatial dimension' also could be interpreted dually: it could be taken to be an abstract mathematical object, but also, it could be taken to be an empirical phenomenon, i.e., that which is measurable but itself is not "the mode and aspect" of measurement.

out spatially along a Cartesian axis, friends of spacious time erroneously infer that time is a space-like expanse. This confusion, as Reichenbach points out has been detrimental to philosophy:

> Whereas the conception of space and time as a four-dimensional manifold has been very fruitful for mathematical physics, its effect in the field of epistemology has been only to confuse the issue. Calling time the fourth dimension gives it an air of mystery. One might think that time can now be conceived as a kind of space and try in vain to add visually a fourth dimension to the three dimensions of space…. Through the combination of space and time into a four-dimensional manifold we merely express the fact that it takes four numbers to determine a world event, namely three numbers for the spatial location and one for time. Such an ordering of elements, each of which is given by four conditions (coordinates) can always be conceived mathematically as a four-dimensional manifold. [158]

J. J. C. Smart also speaks of two fundamentally different senses "in which one might plausibly be said to be spatializing time. In one of these senses it is admittedly a reprehensible thing to do. In the other of these senses it is a thoroughly laudable thing to do."[159] Smart identifies the 'reprehensible' sense with explicating temporal duration by analogy with spatial extension and the 'laudable' sense with a Minkowski mathematical model of spacetime. What Reichenbach refers to as "misunderstanding

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[158] H. Reichenbach, *The Philosophy of Space & Time* (New York: Dover Publications, 1958), pp. 109-11.
[159] J. J. C. Smart, "Spatializing Time," *Mind* **64** (1955), pp. 239-41, p.239.

of mathematical concepts" and Smart labels as "reprehensible sense of spatialzing time," I have identified as the confused sense of "temporal dimension." Regrettably, it is this confused sense of temporal dimensions that the eternalist employs.

3.3.3   The eternalist, I have good reason to believe, would disagree with the foregoing analysis. Indeed, he would be affronted by my claim that he employs confused senses of 'temporal dimension', 'spacious time', and the like concepts. But by criticizing this philosopher for the confusion, I do not mean to imply his mathematical crudeness. On the whole, the eternalist is a good philosopher who is well-versed in mathematics and natural sciences. Setting aside his renowned scientific erudition and mathematical prowess, in practice, the eternalist does take time to be a space-like expanse; viz. a linearly ordered set of temporal points/loci. For him temporal distances do lie between temporal points/loci in the very same manner as spatial distances lie between spatial points/loci. The eternalist's time is not just like space; it is, at least as far as its alleged feature of dimensionality is concerned, a full-blooded space.[160] This eternalist's notion of spacious time, as I have previously argued, must be rejected as having no analog in reality.

Let us, however, grant the eternalist that the E-universe is extended in four directions, three spatial and one temporal. Does then the temporal dimensionality doctrine withstand the scrutiny of conceptual analysis on its own? I think not, and this is why. The doctrine brings to the fore (among many others) the following question: Does "dimension" in "The universe has three spatial dimensions" and "The

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[160] Consult, for instance, the section of Sider (2001) entitled "Space and Time are Analogous" pp. 87-92.

universe has one temporal dimension" denote the *same* phenomenon? This is a crucial question with which for the eternalist must grapple. To see why this is so let us consider the following rationale. On condition that

(i)   space has three dimensions,

(ii)   time has one dimension,

(iii)   "dimension" in "spatial dimension" and "temporal dimension" denotes the same phenomenon,

it then follows that

(iv)   "spatial" and "temporal" in "spatial dimension" and "temporal dimension" are domain modifiers; they 'place' the same phenomenon called "dimension" within the context of a relative domain.

Accordingly, if "dimension" indeed denotes the *same* phenomenon in both cases, the distinction between spatial and temporal dimensions is never substantial, but solely domain-relevant. Dimension is a dimension in the spatial domain and it is a dimension in the temporal domain. In other words, intrinsically, spatial and temporal dimensions are indistinguishable – dimension is a dimension is a dimension.

Schlesinger, I believe, thinks along the same lines when he speaks of "The Doctrine of the Similarity of Space and Time." The doctrine is metaphysically feasible, says Schlesinger, only if the term "dimension" in both "spatial dimension" and "temporal dimension" bears exactly the same meaning.[161] Accordingly, if "dimension" in both "spatial dimension" and "temporal dimension" refers to the same

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[161] G. Schlesinger, *Aspects of Time*, p. 6.

phenomenon, then, on the principle of indiscernibility of identicals whatever is true
of one is necessarily true of the other.

> The Doctrine of the Similarity of Space and Time, if it is to be
>
> maintained at all, can only be done so with respect to the necessary
>
> features of space and time. The Doctrine would then amount to saying:
>
> if we have a statement about space that is necessarily true or
>
> necessarily false, then the temporal counterpart of that statement must
>
> also be necessarily true or false, respectively. [162]

What are these "necessary features of space and time"? Well, on the
eternalist's account, both are linearly ordered sets of points/loci.[163] Let us recall, this
is the topological facet of eternalism. Furthermore, just as all spatially separated
points/loci are equally real, so all temporally separated points/loci are equally real as
well. This is the ontological facet of eternalism. On the eternalist's account, therefore,
time is a linear ordering on a conglomerate of equally real points/loci; it is essentially
a spacious phenomenon. Yet, as I have argued earlier, linearly ordered groups of
temporall loci (whether ontologically empty or not) are simply not given to us
empirically; there are simply no observable timescapes; we in principle cannot
observe temporally separated and equally existent objects/moments/loci. The
temporal dimensionality doctrine, therefore, cannot be upheld on empirical grounds.
Hence, the existence of temporal expanses must be considered ontologically vacuous.

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[162] Ibid, p. 6.
[163] I believe it is this idea of time being a linearly ordered set of points/loci that is behind the following,
characteristically unapologetic, object-eternalist's statement: "The temporal procession of temporal
parts is analogous to the spatial procession of spatial parts." Sider (2001), p. 217.

Besides, spatial distances are measurable by means of measuring tapes and other such devises. Here is a measuring tape; it is functional in spatial measurements. On the temporal dimensionality doctrine it, therefore, must lend a hand in temporal measurements. Patently, this is an absurd conclusion. To measure temporal magnitudes, we need clocks, not tapes. By their design, there is an unbridgeable gap between spacemeters and chronometers. Were temporal expanses the same phenomenon as spatial expanses, time would be measurable not in seconds, minutes etc., but in centimeters, meters, etc., or, conversely, spatial distances would be measurable not in in centimeters, meters, etc., but in in seconds, minutes etc. This is obviously an incongruous conclusion.

The eternalist might reply that temporal distances are not exactly the same phenomena as spatial distances, that is, that we are dealing here with *similar* but not identical phenomena. Accordingly, one would have reason to believe that what is true about temporal expanses is not necessarily true about temporal expanses. To this objection, I simply reply that if this is so, then it, of course, means that space and time do not have in common this alleged feature of having breadth – the temporal dimensionality doctrine completely fails.

Conceivably, the temporal dimensionality doctrine is not integral to eternalism. Yet, there is another, on the face of it unassailable, and thus even more entrenched idea that gives initial credence to this theory; namely, it is said that sets of spatial and temporal points/loci are both linearly ordered. Just as there exists the spatial continuum, so it is held by the eternalist, there exists the temporal

continuum.[164] A salient ontological implication of modeling time on the continuum is that since the real line is the totality of real numbers, the temporal line must be the totality of instants. This entrenched view is at the center of time-eternalism which, in turn, is an essential theoretical component of both object-and event-eternalism.

3.4   The Argument against Eternalism from Change

3.4.1   The eternalist's picture is incompatible with our everyday experience because it entails an unchanging reality. Change, it is resolutely maintained by the eternalist, is an illusion. Providing an explanation of the manifest phenomenon of change, therefore, often leads the eternalist to implausible conjectures such as the following one: "The objective world simply is, it does not *happen*. Only to the gaze of my consciousness, crawling upward along the life-line of my body, does a section of this world come to life as a fleeting image in space which continuously changes in time."[165]

On the eternalist's account of reality, the E-universe is an absolutely static entity; it does not grow old, for it never was young to begin with, it came into existence as one immutable whole with all its temporally ordered segment/events already in existence – the Big Bang, the Big Crunch, and everything else in between – it is *continually* in existence as one immutable whole, and it will go out of existence the very same entity it came into being. It is the central tenet of the eternalist's picture of reality that the E-universe never was small, dense, and hot, it never

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[164] A scientifically informed eternalist usually speaks of the spacetime continuum. For present purposes, however, this nuance is immaterial.
[165] Hermann Weyl, *Philosophy of Mathematics and Natural Science* (Princeton: Princeton University Press, 1949), p. 116.

expanded into what it is now, and it will never collapse into singularity; it has always

been the same temporally extended object with all its temporally ordered

instantaneous segments existing *en bloc*. Only its temporally ordered segments are

small, large, hot, cold, etc. In the beginning, i.e., at the first B-temporal location, (the

first B-time), the first temporally ordered segment of the E-universe is small, dense,

and hot; in the in-between B-temporal locations (B-times), there are segments which

are characterized by vast expanses populated by celestial bodies, and at the end, there

again exists the small, dense, and hot last segment of the E-universe (consult Figure

16). It is these qualitative differences between the E-universe's temporally ordered

segments, which the eternalist believes constitute change; change, says the eternalist,

is "qualitative variation between the distinct temporal parts of an object."[166]

On the eternalist's account, therefore, change is essentially both a *qualitative*

and *relational* phenomenon; it occurs inasmuch as one object (one temporally

ordered part of a continuant) is qualitatively different in relation to another object

(another temporally ordered part of a continuant). On this view, one and the same

object, be it a continuant or its temporally ordered part, never changes *intrinsically*

because it does *not* instantiate different sets of properties at different times. A

temporally ordered part of a continuant, which occupies one and the same

momentary B-locus or the continuant itself, which occupies more than one but also

the same B-loci, have the same set of properties for all eternity. This qualitative

immutability is the essential character of all perduring objects as opposed to the

enduring objects of the A/B-theorist, the objects which do change their properties

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[166] Theodor Sider (2001), p.212.

over time by occupying one momentary B-locus at an A-time. This

perduring/enduring distinction is graphically depicted in Figure 22.

perduring object

$t_1 \quad t_2 \quad t_3 \quad t_4 \quad t_5 \quad t_6 \quad t_7 \quad t_8 \ldots\ldots t_n$

the B-time axis

enduring object

$t_1 \quad t_2 \quad t_3 \quad t_4 \quad t_5 \quad t_6 \quad t_7 \quad t_8 \ldots\ldots t_n$
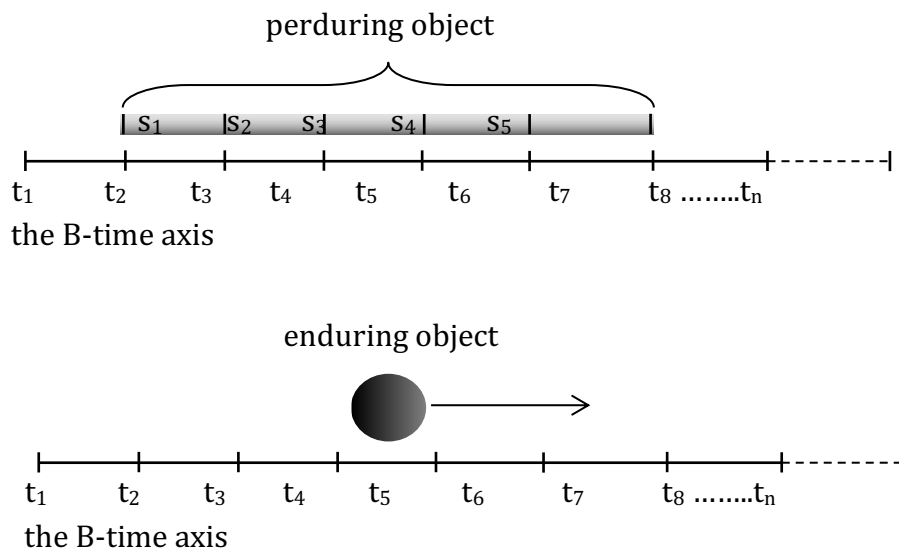
the B-time axis

Fig. 22 The perduring/enduring distinction.

It, therefore, is only natural that the eternalist conceives of qualitative change

over time by analogy to change across space. Indeed, on his view, "spatial variation *is*

in many ways analogous to temporal change."[167] Specifically, it is believed that

perduring objects change over time in the very same manner as, say, changes occur in

the elevation of landscapes – at one spatial location the land is hilly, in the next one it

is characterized by a flat surface, and so on. "The landscape is changing," we

commonsensically say, when traveling through such diverse landscapes. In the very

same manner, insists the eternalist, changes occur over time. At one temporal

location, a perduring object has one set of properties and at another it has a different

set of properties. On the eternalist's hypothesis, it is this qualitative difference

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[167] Theodor Sider (2001), p.216.

between temporally ordered parts of a perduring object which constitutes qualitative change *per se*.

Evidently, the spatial simile is at work in this conception of qualitative change. I have dealt into the issue of the spatial simile in section 3.3, but did not address the matter pertaining to the alleged similarity between qualitative change over B-time and qualitative change across space. I now shall do so.

3.4.2   Change, says the eternalist "*does* occur in virtue of unchanging facts about temporal parts. There are no good arguments to the contrary."[168] I beg to differ. The ostensible static spatial change/ static temporal change similarity is based on the unjustified conflation of the notion of *qualitative change within* objects with the notion of *qualitative difference between* objects. Qualitative difference between two distinct spatially separated objects *x* and *y* is *not* a genuine qualitative change; in fact, it is not a qualitative change at all; it is just that – qualitative difference between two distinct objects. If, as the eternalist claims, space and time are in fact similar in that both are static expanses populated by objects/events, then, as in the spatial case, so in the temporal one, we would have a mere qualitative difference between distinct linearly ordered objects/events, not a genuine change. Such object-to-object variations are governed by Leibnitz's Law of Identity that only marginally concerns the problem of identity over time. There is a distinctive set of laws which governs qualitative change over time, the change that always takes place *within* the self-same object.[169] Surely,

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[168] Ibid., p.214.
[169] To be sure identity does play a role in the law(s) that governs change over time, since we are dealing here with self-same objects, but it is not sufficient to give us a consistent picture of how the

just because $x \neq y$, it does not follow that somehow x changes into y or that "$\neq$" denotes an occurrence of qualitative change. Something else must take place in the fact that $x \neq y$ in order for the fact to claim the mantel of qualitative change; namely, that x and y have to be the same object, which is a patent contradiction.

This condition for self-sameness of qualitative change over time is an integral part of both the eternalist's and his opponent's conceptual frameworks because continuants very much like enduring objects are too self-same objects and both types of objects qualitatively change over time. Indeed, not even the eternalist can deny the fact that in order for there to transpire an instance of qualitative change over time there must be a self-same object that *first* instantiates one set of properties and *then* it instantiates another set of properties. How perduring and enduring objects change their properties over time, of course, is the point on which the eternalist sharply disagrees with his opponent. In the E-universe, unlike in the ordinary universe, intrinsic qualitative change which continuants undergo depends on extrinsic, i.e., relational qualitative differences between its temporally ordered parts. The eternalist gives us rather a cumbersome picture of how this esoteric dependency occurs:

> The analogy between spatial variation and genuine change becomes
>
> even closer if temporal parts are brought into the picture. A poker that

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self-same object preserves its identity through temporal permutations. In fact, by itself, Leibnitz's Law is utterly useless in the matters concerning change over time. Some B-theorists, however, attempt to apply Leibnitz's Law in their dealings with the problem of identity over time. This is a mistake because the Law, as it usually formulated says that if objects x and y instantiate the same set of properties, then x and y are the same object: $\forall F (Fx \equiv Fy) \supset x=y$. But no object instantiates the same set of properties over time because there are no such things as absolutely unchangeable objects, for if there were such objects and if the B theory were true, then it would follow that Leibnitz's Law is violated in the E-universe. There is, of course, much to be said about identity over time; this, however, would take as far a field.

is hot at one end and cold at another has a hot spatial part and a cold

spatial part; the temporal parts theorist says that the poker changes by

having a hot temporal part and a cold temporal part. The difference

between merely spatial variation and four-dimensional change,

according to the argument, is vanishingly small.[170]

So we have two distinct full-blooded temporally separated objects: a poker

"that venerable philosophical weapon"[171] that is hot at one end and cold at another

and another poker that is cold on both ends. It is precisely this qualitative relational

difference between these two objects that, on the eternalist's account, brings about

intrinsic qualitative change in the third object, the POKER, i.e., the continuant which is

comprised of (at least) these two distinct objects. Should we accept this ungainly

picture of reality? I do not think we should, and this is why. A continuant, in our case

the POKER, does not instantiate any one property at any one time (a B-point) because

it is simply *not* at any one time; *ex hypothesi*, it is a temporally extended object. So, if

the POKER does not instantiate the property being hot at one end at t_1 and it also does

not instantiate the property of being cold on both ends at t_2, how then could it

instantiate both properties? If we take eternalism seriously, we should say that either

the POKER does not instantiate any property at all, for to instantiate a property an

object has to be at any one time, or that it instantiates all (or at least two) properties

at once. In the former case, we have a propertyless entity and in the latter case we

have a contradictory entity.[172]

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[170] Theodor Sider (2001), p.214.
[171] D. H. Mellor (2001), p. 46.
[172] A similar argument appears in D.H. Mellor (1998), Chapter 4, section 4.

Once one posits the reality of space-like time populated by continuants, entities which whose parts exist together but not at the same time, one is free to hold that variation over time is very much like variation across space. There is an intrinsic contradiction in this picture of reality. I just outlined this contradiction. Let me elaborate a bit. No continuant instantiates any one property at any one B-time, viz. at any one B-temporal point, because continuants are not instantaneous entities. It cannot be said about a continuant C that it instantiates F at t_1 and $\neg F$ at t_2, because *ex hypothesi* it is not at either of these B-times, it is in both of them. It is temporal parts of continuants x and y which do the job of instantiating of properties for the continuants. At t_1 x is F and at t_2 y is $\neg F$. It follows then that either continuants do not instantiate any property whatsoever, or they instantiate all of them including incompatible ones. In other words, the continuant C does not instantiate F at one time and $\neg F$ at another time; it either instantiates one or both of them. In the E-universe, there are no disjunctive instantiations, but only conjunctive ones. We can look at the same argument form a slightly different angle. Continuants are objects. As all objects, they must be self-identical. Their self-identity consists in what any self-identity consists – in the sameness of properties. It then follows that continuants instantiate one and only one set of properties, this sameness is their passport to self-identity. Hence, continuants are contradictory objects; they instantiate contradictory properties. There is no way for the eternalist to avoid the consequence of his picture of reality.

The eternalist willingly neglects such consequences of his theory because he thinks he has sufficient reason to override them; namely, he thinks that eternalism

offers answers to philosophical puzzles to which its opponents do not.[173] One of those puzzles is the problem of temporal intrinsics.[174] Positing B-changes, it is claimed, does solve the problem. Let us see whether this indeed does solve the problem. The problem is this. An object o instantiates a property F at one time and $\neg F$ at another. Assuming that $o = o$, it follows that oF and $o\neg F$ (though it is not entirely clear what this negative property could possibly be). Hence, we have a contradiction. The alleged eternalist's solution to this problem is that objects have temporal parts. Thus, it is argued, it is not the same object o that instantiates two contradictory properties, but two different parts of the same objects x and y which are situated at different time, i.e., x at t_1 is F and y at t_2 is $\neg F$. The problem solved. Or is it? Surely different objects can instantiate different sets of properties, in fact, they always do, otherwise they would be the same object. This rejoinder, however, is not sufficient because there exists a continent which is a temporally extend object such that it is comprised of the two objects x at t_1 and y at t_2; the continuant, therefore, instantiates both contrary properties albeit at different times. Indeed, it is irrelevant that F and $\neg F$ are instantiated by the continuant at different times. For as long as x at t_1 and y at t_2 are *equally* real parts of the continuant, it instantiates both F and $\neg F$. The problem of temporal intrinsics, therefore, appears in a different disguise.

The eternalist, of course, would appeal once again to the alleged similarity between variation across space and variation over time. I presume he would argue that as a poker can be hot at one end and cold at another, so continuants can

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[173] T. Sider (2001). Also consult famous Russell's statement that "a logical theory may be tested by its capacity for dealing with puzzles." "On Denoting" *Mind* **14** (1905), p. 484.
[174] David Lewis, *On the Plurality of Worlds* (Oxford: Blackwell, 1986), pp.202-03.

instantiate property F at one time and $\neg F$ at another time. The problem with this rejoinder from the spatial simile is that although positing distinct objects which instantiate contrary properties at different times does evade the problem of temporal intrinsics, since, as I have argued earlier, all temporally ordered parts of continuants exist at once, it follows that continuants instantiate contrary properties at once.

3.4.3   Qualitative change over time, says the eternalist, is nothing but a qualitative difference between temporally ordered parts of a continuant.[175] Take for instance a simple continuant C comprised just of two temporally ordered parts x and y. On the eternalist's picture its intrinsic qualitative change consists in mere qualitative difference between it temporally ordered parts x and y. In the E-universe, therefore, intrinsic qualitative change is reducible to the binary relation $x \neq y$. Yet, the eternalist's reason for this reductionist account of qualitative change is unsatisfactory. In fact, as far as the ontology of temporally ordered parts is concerned, the eternalist does not distinguish between the two phenomena at all. On his theory, we have one and the same phenomenon; qualitative variation between temporally ordered parts of a continuant is what an intrinsic qualitative change of the continuant is taken to be. Such a radical departure from the accepted conceptual norm of what intrinsic qualitative change of an object and what extrinsic qualitative difference between objects are surely needs a very strong overriding justification.

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[175] The term 'qualitative change', when it is applied to temporally ordered objects, is somewhat redundant because in the E-universe, there is simply no such phenomenon as non-qualitative change; things do not move the E-universe temporally in relation to each other; in fact, they do not move at all. Be it as it may, I will continue to use the term for the sake of clarity of presentation.

The conceptual norm in question is that intrinsic qualitative change over time unlike relational qualitative difference across space, or for that matter across space-like time, transpires *iff the same* object *first* instantiates one set of properties and *then* it instantiates another set of properties. This is what normally is taken to qualify as qualitative change over time; it is an intrinsic qualitative transformation of the *same* object, "we only call a difference in properties a change if there is a single thing – the thing that changes – which has the different and incompatible properties."[176] The self-sameness of an object is a necessary condition for a qualitative change to take place. This doctrine is so manifestly self-evident that even such a harden eternalist as Sider subscribes to it as the following passage attests "Change *just* is variation in the (intrinsic) properties of a thing between one time and another."[177] Apparently, "a thing" here implies "a self-same thing." Indeed, the phenomenon of qualitative change, as its name implies, is a change in the quality of something and not in relation of something to something. This is the conceptual norm the eternalist blatantly disregards. What then is his justification for this barefaced contempt of the norm? Does he have any? Let us see.

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[176] D. H. Mellor (2001), p. 54.

[177] T. Sider (2001), p.214. Though perhaps this passage might be considered as a Freudian slip of a sort, for it entails that in the E-universe, after all, objects do change their intrinsic properties. But what objects are these? Temporally ordered parts of continuants do not change their intrinsic properties, nor do continuants themselves because the set of properties a continuant instantiates is immutable. In the E-universe, therefore, there exists an additional type of objects which are neither temporally ordered parts of continuants nor the continuants themselves and which change their intrinsic properties over time. This conclusion, however, is contrary to the eternalist's hypothesis. Furthermore, if qualitative change of a continuant is for the continuant to instantiate different properties at different B-times, then from this it follows that it is the continuant itself, not its parts, that has to be at each of those times. Yet, this definition of qualitative change cannot be acceptable to the eternalist because it implies that continuants are perduring objects, which first instantiate a certain set of properties at one B-time then another set of properties at another B-time, and so on (consult the second diagram of Figure 22).

It must be pointed out, however, that the eternalist is right in that changeability of the self-identical object is philosophically a problematic concept. I assume it is primarily this fact, though perhaps not exclusively this one, that he takes to be sufficient reason for overriding the conceptual norm. Yet, his 'solution' is even more problematic than the problem it is designed to avoid, for it is a nonstarter on its face. The cure is worse than disease, indeed.[178]

I assume even the eternalist would agree that qualitative changes, unlike relational changes, necessary occur *within* one and the same object – a leaf is first green and then the *very same* leaf is yellow. The eternalist, however, would say that in the present example, qualitative change consists in that the temporally ordered segment (the green leaf) of the continuant the LEAF is qualitatively different from an adjacent temporally ordered segment (the yellow leaf) of the same continuant. There are not two but three objects: the green leaf, the yellow leaf, and the LEAF. It is this third object, the LEAF, that intrinsically changes.

Is this a consistent picture? Well, if we accept, if only for the sake of argument, that that there are such things as continuants and their temporally ordered parts, then we indeed do have space-like variation in the temporal realm. But is this a description of a qualitative change? Not by a long shot! This is merely an account of a qualitative *difference* between two distinct objects, the green leaf and the yellow leaf. Yet, an account of qualitative change does not involve multiple objects; it *necessarily* involves only one object, it is the object itself that changes. Even if we grant to the

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[178] I believe that a theory of non-temporality, which could be motivated by the arguments I present in these pages, can meet all the difficulties associated with the problem of identity over time. The limited goal of the thesis, however, prevents me from developing or even outlining such a theory.

eternalist that there are such entities as temporally ordered parts of continuants, this still would not justify construing qualitative change within the same object as qualitative difference between two objects. There is an in-built and rather manifest contradiction in such construal of qualitative change. Surely, two distinct objects cannot be one and the same object, nor one and the same object can be two objects. And surely difference between two objects is not change within one self-same object.

The eternalist, nonetheless, when it comes to temporally ordered parts of continuants, does feel being justified to override the norm and takes qualitative difference between objects to be the same phenomenon as qualitative change within one and the same object. But for two objects being qualitatively different does not give us change in a third object, the object that supposedly undergoes an intrinsic qualitative change. Why the qualitative differences between two temporally ordered parts of a continuant should constitute qualitative change in the continuant? Difference of opinion between two individuals, for instance, is not a qualitative change in a third man; yet, when such difference takes places in the mind of the same individual, we have genuine qualitative change. Difference in the height of two adjacent trees is not change by any measure, but when one and the same tree grows taller or is pruned short, then we have a qualitative change proper. Expressions of the type "x is F and y is G" do not denote change in the same thing, but only difference between things. This seems all too obvious. Yet, when it comes to temporally ordered parts, the eternalist categorically denies this indisputable truth. On his view, "x is F and y is G" does denote qualitative change in the same object which is neither x nor y, provided that x and y are temporally ordered parts of the same continuant.

The eternalist might retort that all that changes in the LEAF, all that qualitative change is, is the variation in intrinsic qualities from x to y. This reply is unsatisfactory because, as I keep pointing out, the conceptual norm is that qualitative difference between distinct objects is not the same phenomenon as qualitative difference within a self-same object. In the absence of an overriding argument against the norm, the eternalist's opponent is fully justified in rejecting the eternalist's tenet.

Now, our dynamic reality is teeming with pure relational changes such as first x is to the left of y and then x is to the right of y. These relational changes are essentially non-qualitative phenomena.[179] There are also qualitative relational differences between objects, such as x is taller than y. One might be tempted to call these qualitative relational changes. This temptation must be resisted because in reality there are qualitative relational changes, such as first x is taller than y and then x is shorter than y. These latter changes are brought about by qualitative non-relational changes within objects and ought to be distinguished from qualitative relational differences. We thus have four district phenomena:

    (i) non-qualitative relational change,

    (ii) qualitative relational differences,

    (iii) qualitative relational change,

    (iv) qualitative intrinsic change.

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[179] It is, of course, true that relational changes can cause intrinsic changes. For example, when something becomes closer to a source of heat, it changes intrinsically by becoming hotter. The converse facts obtain too; intrinsic changes can cause extrinsic changes, as, for instance, when x is first larger than y and then it is smaller than y. But these are altogether different issues.

What the eternalist has in mind, however, when he speaks of qualitative changes taking place within a continuant is a radically different phenomenon. On his hypothesis, B-changes are both intrinsically qualitative, in that they take place within a self-same temporally extended continuant, but they are also qualitative relational differences in that they are like spatial qualitative variations between spatially separated objects. Positing this fifth exotic species of change requires very strong philosophical justification. As far as I know the eternalist does not have such a justification; he simply posits B-changes out of convenience because it fits well within his schema of things.

Suppose we accept the eternalist conjecture that continuants change in virtue of qualitative differences of their immutable parts. Still, continuants, being comprised of immutable parts, must too be immutable entities. Indeed, their having temporally contiguous and qualitatively different parts is no more undergoing change than for a spatially extended object, say, a poker, being at the one end hot and at another cold constitutes it undergoing change.[180] The eternalist readily admits that such

> McTaggartian arguments contain no subtle fallacy, no hidden technical
> mistake, and there is no reply making use of elaborate distinctions of
> theory. The objections may simply be met head-on. Change is
> analogous to spatial variation. Change does occur in virtue of
> unchanging facts about temporal parts.[181]

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[180] Consult McTaggart's argument in *NE* § 315.
[181] T. Sider (2001), p. 214.

This head-on reasoning, however, befits a ram not a philosopher. First, to satisfy the demands of his temporal ontology, the eternalist posits temporally ordered parts, then facing the no-change objection, he slides in his mind from one temporally ordered part of a continuant to another thus generating change in the E-universe. This might very well be what change is in the E-universe; it, however, is not what change is in the universe, i.e., permutation within self-same entities. Change cannot be reduced to mere difference between distinct entities; there can be no valid argument for this reductionist analysis of the nature of change.

3.5 The Argument against Eternalism From Persistence

3.5.1   The eternalist posits the reality of the E-universe, the largest possible four-dimensional aggregate of temporally ordered objects/events. The E-universe, therefore, as a *whole* persists. The entire structure of the E-universe, as depicted in Figure 16, is *continually* in existence. However, the existential claim "the E-universe persists" presents the eternalist with a certain predicament, for any persistence, including that of the E-universe, is necessarily a process, and processes, as we all know, unfold in time. Hence, first the E-universe exists at t_1, then it exists at t_2, and so on. Yet, this time over which the E-universe persists apparently cannot be the familiar B-time of eternalism, because, as we have seen, on a consistent eternalist's hypothesis, B-time is no more and no less than the E-universe's *internal* topological structure.

The E-universe carries B-time within, as it were; there is no B-time outside the E-universe over which it can persist as a whole.[182]

This internal time/external time distinction can be seen more clearly upon the following reflection. Consider the central tenet of eternalism: in the beginning of the E-universe there were the first, the last, and all intermediary B-segments. Apparently, the clause "in the beginning" cannot refer to the first moment in the B-series because *ex hypothesi* the whole E-universe with its first, last, and all the intermediary parts/events is not at the first B-moment, only a minute part of it is; the bulk of it is spread along the entire length of the B-time axis (consult Figure 16). The only consistent conclusion then is that when the E-universe, the whole E-universe that is, with all its B-temporally ordered parts/events, has the moment of its beginning, this moment cannot be identified with the first moment of B-time. Therefore, there must be a moment of a higher-order time that is the first moment of the existence of the entire structure of the E-universe. The eternalist thus is presented with the following dilemma: either the E-universe does not persist at all, which of course means that it does not exist, or there exists a higher-order time over which the E-universe as a whole does persist.

The eternalist, I believe, will contend that the idea of the E-universe persisting as a whole does not inevitably entail it persisting over a second-order time. The E-universe, he will argue, persists over the first-order B-time by simply being 'stretched'

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[182] The argument from persistence is directed primarily against object-eternalism. But, it seems to me, *mutatis mutandis* it can be successfully applied to event-eternalism. For instance, if we take events to be entities, then the E-universe would be a continually existing conglomerate of temporally separated entities, that is, it would persist over time in the same very manner as the E-universe of object eternalism.

along the B-time axis. The idea of the E-universe being laid out along the B-time axis, the eternalist will say, is all that there is to the idea of it persisting over time. This is another instance of the eternalist's head-on reasoning. This essentially *topological* notion of persistence is not what we commonly take persistence to be; persistence has nothing to do with topology, it is solely an ontological notion. An entity is said to persist *iff* it comes into existence, is continually in existence for a certain period of time, and goes out of existence, or it is perpetually in existence. A consistent eternalist, therefore, should hold that the E-universe as a whole, with all its temporally ordered parts/events came into existence, it is continually in existence, and it will go out of existence.

For that reason, at the very first moment of the E-universe's existence there exist all B-times populated by its segments/events. The first B-moment, the last B-moment, and all the B-moments in between are literary present at the very first moment of the E-universe's existence. It is quite apparent that this moment is the moment of a higher-order time, for if it is not, then the entire set of B-moments populated by temporally ordered parts/events is at the first B-moment. This is patently a nonsensical proposition. The same of course goes for the second moment of the E-universe's existence and all other such moments. The entire set of the first-order B-moments, together with all temporally ordered parts/events populating them is at the second B-moment and so on. But how the last B-moment and all the intermediate B-moments between it and the first B-moment can be at any B-moment? This is surely a nonsensical proposition! This is why on a consistent eternalist's account, the persistence of the E-universe entails a higher-order time. On the pain of

inconsistency, therefore, the eternalist must admit that "the E-universe persists" entails that it persists over a higher-order time and *not* that it is spread over the entire length of the B-time axis.

Perhaps, at least initially, the lifespan of a temporally extended object can be conceived as running the length of the corresponding stretch on the B-time axis, as depicted in the first diagram of Figure 22. By the same token, the existence of the E-universe itself might be conceived as running the entire length of the B-time axis, as depicted in Figure 16. Then again, the initial plausibility of this conception of persistence dissipates the very same moment we realize that it entails a contradictory picture. Beginnings and ends of temporally extended objects are demarcated by corresponding points on the B-time axis; and yet, these objects, being interminable parts of the E-universe, persist as long as the E-universe itself persists. But, as I have argued earlier in this Chapter, it surely cannot be both that a temporally extended object has the lifespan of a certain length and also that its lifespan is equal to that of the lifespan of the E-universe. As for the E-universe itself, were this topological conception of persistence true, then, as I pointed out in the preceding two paragraphs, it would follow that the first and the last and the all intermediate moments of the E-universe's existence exist at the first moment and then they exist at the second B-moment and so on. *Prima facie* this is an absurd conclusion. That is why the persistence of the E-universe cannot be its being spread over the length of the B-time axis. If the E-universe persists, then there ineluctably must be a time *outside* the E-universe's boundaries, the time over which it persists, the time at which it came into

existence, continually exists, and will go out of existence. Again, this time cannot be the B-temporal order, the time that is *within* the E-universe.

3.5.2   In addition to the idea of the E-universe persisting over a higher-order time, there are two additional options available to the eternalist in interpreting "the E-universe persists." It could either be said that the E-universe persists *timelessly*, or it could be said that it persists *simpliciter*. Let us now consider all three case-scenarios in that order.

What could be said about the E-universe persisting over a higher-order time? Since the eternalist is a B-theorist, this higher-order time should be understood as a B-time. The claim therefore would be that the E-universe persists over a higher-order B-time. This claim, however, is in conflict with Leibnitz's Law. To see why this is so consider an immutable object; say a metallic sphere at the temperature of absolute zero. Assume that the sphere persists over B-time. Since the sphere is unchangeable, all of its B-ordered segments are identical in all respects, save them being temporally differentiated, as depicted in Figure 23. Apparently, the existence of such a conglomerate of identical spheres is not permissible on Leibnitz's Law, for no two objects are distinct *solo numero*.
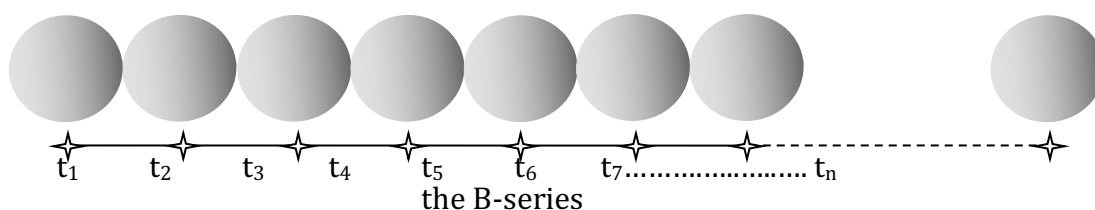

Fig. 23 Violation of Leibnitz's Law.

Now, one of the fundamental tenets of eternalism is that the E-universe is an immutable object; nothing can be added to or subtracted from it, nothing can be rearranged within it, and nothing can change its monadic or polyadic properties; it is an island of absolute stability in the ocean of eternity. Since the E-universe is an immutable entity, the idea of it persisting over a higher-order B-time implies that there exist as many identical E-universes as there are t-points in this higher-order B-series. Evidently, this picture of reality too is not permissible on Leibnitz's Law. Moreover, what we have here is a second-order E-universe comprised of an infinite number of first-order E-universes (this order of things as depicted in Figure 24). On condition that the second-order E-universe is too a persisting object, the existence of a third-order E-universe persisting over a third-order B-time must be postulated and so *ad infinitum*. We thus have a case of vicious infinite regress.
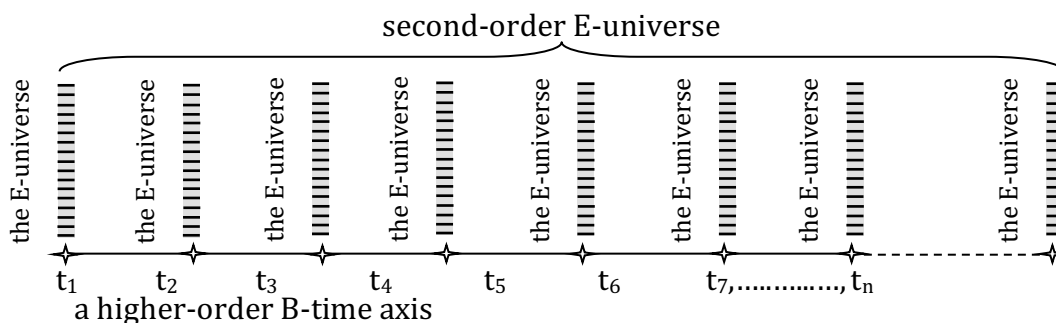

Fig. 24. Vicious infinite regress.

Additionally, as I have previously argued, as all segments/events of the first-order E-universe exist at once, so by the same token, the temporal parts of the second-order E-universe, i.e., the infinite number of first-order E-universes, are simultaneous entities as well. The same, of course goes for the segments of the third-order E-universes and the rest. This order of things involves a contradiction because it entails

simultaneity of temporally separated entities. We thus must conclude that the notion

of the E-universe persisting over a second-order B-time must be rejected because it

(a) violates Leibnitz's Law, (b) generates a vicious infinite regress, (c) is contradictory.

3.5.3   I should think that the eternalist will object to the foregoing analysis on the

grounds that on his view the "E-universe persists" should not be taken to imply

temporality. Instead, he would argue, "The E-universe persists" should be construed

atemporally. Let us, therefore, first consider the eternalist's account of atemporality

and then see whether or not "the E-universe persists atemporally" makes any sense.

The following I take to be a representative account of the eternalist's notion of

atemporality:

> … a four-dimensionalist will say that my current temporal part is
>
> atemporally, sitting, 69 inches tall, and wearing a (temporal part of a)
>
> hat. Likewise, the four-dimensionalist will say that my current
>
> temporal part is, atemporally, part of the larger spacetime worm that is
>
> me…. We can think of the four-dimensionalist's notions of atemporal
>
> parthood, and atemporal exemplification in general, as being those we
>
> employ when we take an 'atemporal perspective' and contemplate the
>
> whole of time.[183]

We have been told by the eternalist that the idea of atemporal parthood stems

from a certain atemporal perspective, from a contemplation of "the whole of time."

But what exactly is this atemporal perspective? Why should this relation between

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[183] T. Sider (2001), p.56.

temporally ordered parts of the E-universe be taken to be atemporal? Take, for instance, such vastly temporally separated entities as dinosaurs and personal computers. In statements like "there are dinosaurs and personal computers," the eternalist claims that he employs an atemporal usage of the verb "to be." Dinosaurs and personal computers ARE atemporally, or eternally (hence the name "eternalism") temporally ordered parts of the E-universe. This is what atemporal parthood is supposed to be. Yet, this notion of atemporal parthood is inconsistent because we have perfectly temporal, i.e., temporally ordered entities existing at t_n and at t_m which stand in an essentially atemporal relation. Apparently, this inconsistent account of the eternalist's notion of atemporality cannot be the alleged B-atemporality.

What then about this atemporal perspective, this contemplation of "the whole of time" from which this puzzling notion of atemporal parthood stems? As I see it, the most plausible construal of the eternalist's notion of atemporality is that the eternalist distinguishes between B-time and B-existence, i.e., between the B-topology and the B-ontology. When the eternalist speaks of temporality, he speaks of B-topology, whereas when he speaks of atemporality, he speaks of B-ontology. On the B-topology, the B-segments are temporal entities insofar as they are temporally ordered. On the B-ontology, on the other hand, the B-segments enter into an atemporal relation of being equally real constituents of the E-universe. On this view, therefore, B-time plays no role in the temporally ordered segments being parts of the E-universe; they are non-temporally parts of it. On the eternalist's account, therefore, the B-segments, taken as temporally ordered entities, are *bona-fide* temporal entities; (this is the eternalist's temporal perspective, i.e., the B-topological perspective); yet,

taken as the elements of the temporal totality, they are atemporal entities (this is the eternalist's atemporal perspective, i.e., the B-ontological perspective). Thus, the temporally ordered entities partake in the atemporal existence by way of being equally real parts of reality; they atemporally are temporally ordered parts of it; their participation in the atemporal parthood, viz. their ontological oneness is what B-atemporality comes to. We, therefore, should take the eternalist's "atemporal perspective" to be the B-ontological perspective, no more and no less.

Let us now grant to the eternalist that "the E-universe persists" does not imply temporal persistence; it persists atemporally in the sense specified above. But it is not at all clear how this notion of atemporal parthood can be applied to the E-universe as a whole. Specifically, it is not at all clear what this atemporal persistence of the E-universe could possibly be because it does not stand in the relation of atemporal parthood to anything else; there is, after all, only one E-universe. The notion of atemporal perspective the eternalist advocates makes at least a tenuous sense when it is construed as the ontological oneness of the B-segments, but it makes no sense at all when it is applied to the E-universe as a whole.

Since the eternalist does not provide us with any other atemporal reading of "the E-universe persists," we have to try to fill the gap ourselves. Following the long-standing philosophical tradition of distinguishing between two types of timelessness, namely sempiternity and eternity proper,[184] let us distinguish accordingly between

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[184] Boethius' *Consolation of Philosophy, Book V, Section 6* is one of the most explicit sources of this tradition. However, the distinction is articulated in St. Augustine's *De Civ. Dei. XI 6 XII 16* and goes back as far as the Hellenistic philosophy, most notably, Plotinus' *Inneads* III, 7, and, to some extent, Plato himself. On this subject, see, for instance, E. Stump's and N. Kretzmann's (1981) informative discussion.

two such readings of "the E-universe persists timelessly." On the sempiternal reading, the timeless existence of the E-universe means that it exists everlastingly. On the eternity proper reading, the E-universe does not exist in time at all. This latter sense of atemporal existence is what the theologians call the eternal Now or Present of God, a zero-duration point that neither begins nor ends, nor is it an element of any temporal series.[185]

Now, the sempiternal reading of "the E-universe persists timelessly" implies existence over time, an everlasting time, to be sure; yet, time nonetheless. This sempiternal reading, therefore, is susceptible to the criticism I have leveled in subsection 3.5.2. Consider now the eternity proper reading. The E-universe exists at zero-duration t-point such that this t-point is not an element of any temporal series. *Prima facie*, the notion of the E-universe existing at zero-duration t-point implies absence of temporal duration of however short length. On this reading, however, the essentially temporal flesh of the E-universe floats in timeless ether, as it were. But the E-universe, as we have seen, is comprised of bona-fide temporal objects, viz. the B-segments/events. We thus are dealing here with temporal entities persisting atemporally; the B-segments/events, therefore, are both temporal and atemporal entities. We thus have an outright contradiction. Perhaps we could attribute to God this eternal existence at zero-duration t-point, God after all is an eternal entity, but no temporal entity could be said to exist eternally in this, or for that matter, any other

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[185] This notion of eternal Now is beset with many inconsistencies and outright contractions. The limited goal of present undertaking, however, prevents me from addressing the issue. For illuminating discussion of the issue see, for instance, William Lane Craig's "The Eternal Present and Stump-Kretzmann Eternity." The article is published online.

sense. Hence, neither the sempiternal nor eternal reading of "the E-universe persists atemporally" can be acceptable.

Finally, what could be said about the simpliciter reading of "the E-universe persists"? This reading is elliptical; it, therefore, is opened to numerous, often mutually exclusive, interpretations. For instance, on some accounts, "simpliciter" means atemporally, as in the following: "I sit in a chair at one time but not another because my earlier temporal part sits (*simpliciter*, atemporally) in a temporal part of the chair whereas my later temporal parts fail to sit in the corresponding later temporal parts of the chair."[186] This notion of atemporal existence, as we have seen, is contradictory. What other readings of "the E-universe persists *simpliciter*" can there be? Well, 'simpliciter' means 'without further qualification'. Should it then be said that the E-universe just persists, period? This is surely not a very illuminating stance. Besides, "the E-universe persists" could only mean that it persists either atemporally or temporally; there surely is no state in between, but none of these mutually exclusive readings, as we have seen, withstands scrutiny.

Another thing to consider about the idea of the E-universe persisting simpliciter is this. Temporal considerations intricately intertwine with the notion of persistence. As "things which exist are somewhere (the non-existent is nowhere – where is the goat-stag or the sphinx?),"[187] so too things which persist are somewhen. "*X* persists simpliciter" inevitably carries either temporal or eternal implication. To state that "*x* persists simpliciter" is either to imply that it persists over a certain

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[186] T. Sider (2001), p.56.

[187] Aristotle, *Physics, Book IV*, 1:30, *The Complete Works of Aristotle*, J. Barnes (ed.) (Princeton, New Jersey: Princeton University Press, 1984).

period of time or that it persists eternally. But neither temporal nor eternal sense of "The E-universe persists", as we have seen, is satisfactory. The simpliciter reading, theretofore, too must be deemed as philosophically inadequate because none of its interpretation is adequate.

I, thus, conclude that none of the three readings of "the E-universe persists" i.e., temporal, atemporal, and simpliciter withstands scrutiny. For this, and all other reasons discussed in this Chapter, eternalism must be rejected as a philosophically inept hypothesis.

Afterword

I began this study with an examination of McTaggart's argument for the unreality of temporal passage, which is at the center of his argument for the unreality of time *per se*. Since our metaphysical conception of temporality is exhausted by the concepts of fluid and static time, separate arguments against the reality of both times are required to give us an argument for the unreality of time. McTaggart has an argument against the reality of the A-series, but he does not have one against the reality of the B-series. His program, therefore, is incomplete. In the second chapter, additional arguments against the reality of the A-series were presented along with the arguments against the reality of hybrid A/B series. In the third chapter, the B theory of time was taken up exclusively. It was argued that the B theory of time is as inadequate as its counterpart, the A theory, is. It appears that neither the A model, nor the B model, and by extension, none of hybrid A/B models of time, are adequate to give us a satisfactory *philosophical* account of the nature of time. This outcome leaves us with the following predicament. On the one hand, we cannot deny the indispensability of either A or B models of time. On the other hand, neither model is adequate to give us a coherent metaphysical theory of time. Time, *as it is conceived by philosophers*, therefore, must be deemed to be unreal. The question whether there can be constructed a non-philosophical theory of time that does not rely on the two models lies beyond the scope of the present thesis.

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