

Time, Objects, and Identity



Ian Gibson
Exeter College
University of Oxford

A thesis submitted for the degree of
Doctor of Philosophy
Trinity 2007

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Abstract

The first third of this thesis argues for a B-theoretic conception of time according to which all times exist equally and the present is in no way privileged. I distinguish “ontological” A-theories from “non-ontological” ones, arguing that the latter are experientially unmotivated and barely coherent. With regard to the former, I focus mainly on presentism. After some remarks on how to formulate this (and eternalism) non-trivially, I review the non-relativistic case against presentism. I then consider the impact of Special Relativity on the debate, and attempt to deepen this impact by supplying a modal variation on the standard arguments.

The middle third of the thesis investigates persistence, contending that both endurance and perdurance are consonant with the eternalism already endorsed. After introducing these theories of persistence, and discussing in particular how best to formulate an eternalist endurance, I proceed to defend the coherence of this combination. The Problem of Change is addressed here. I then respond in some detail to recent allegations of relativistic threats to endurance.

The final third of the thesis questions the validity of the endurantist-perdurantist dispute. I criticize two recently proposed translation schemes that aim to show this dispute to be non-substantive. However, the second scheme suggests a doctrine of “Ontological Equivalence” which I develop and consider. I then address the Rotating Discs Argument, using this to launch a discussion of identity, genidentity, and the relationship between them.

Acknowledgements

First and foremost I must thank my supervisors, Adrian Moore and Oliver Pooley, for their help, encouragement and ideas throughout this project.

I am particularly indebted to Oliver Pooley, as our collaborative work on Gibson & Pooley (2006) laid the foundations for most of Chapter Five.

I have also received helpful feedback on parts of this thesis from Dorothy Edgington, John Hawthorne and Hugh Rice; and from Oxford audiences at the First Year Graduate Seminar, the Graduate Conference 2005, and the Philosophy of Physics discussion group.

To institutions: I thank Corpus Christi College for providing a welcome back to Oxford, and Exeter College for providing a subsequent (and extremely pleasant) home. I must also thank the Arts and Humanities Research Council for providing financial support.

The reader may disagree, but I think I submit this thesis with my sanity largely intact. For this I must thank Xavier Iles, Rachel Zammett, and the game of squash.

Ian Gibson
June 2007

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Introduction

This thesis has three main components. The first argues for a B-theoretic understanding of time according to which the present is in no way privileged. The second addresses persistence, contending that both endurance and perdurance are compatible with this theory of time. The third component asks whether the debate between endurantist and perdurantist might be less than substantive.

Now for a little more detail. I start in Chapter One by distinguishing between “ontological” and “non-ontological” A-theories: the former assert the present to be *existentially* privileged; the latter that the present is privileged in some other way. Non-ontological A-theories are soon rejected; I argue that they are experientially unmotivated and of doubtful coherence. The focus then shifts to ontological A-theories, and in particular presentism: the view that only the present exists. This I contrast with eternalism, which holds that all times exist equally. After discussing how best to formulate the debate between these theories, I rehearse three weighty objections to presentism. I then consider and reject various presentist responses, before suggesting that eternalism fares well in comparison. Next I give brief consideration to two further ontological A-theories: McCall’s “branching future” model and (what I call) “past-and-presentism”. Although my rejection of these is less firm than with presentism, I nonetheless regard them as somewhat unappealing.

Their lack of appeal arises in part due to relativistic complications. In Chapter Two I bolster the assault on the various A-theories by considering the lessons of Special Relativity (SR). Here presentism ‘goes proxy’ for A-theories more gener-

ally; I discuss the difficulties in formulating presentism in the absence of an absolute simultaneity. Might SR simply fail to acknowledge a *hidden* absolute simultaneity though—and one that *would* allow presentism to be formulated without difficulty? In the second half of Chapter Two I contend that the presentist must claim more than this. I argue that their doctrine is necessarily true if true at all, and thus even the *possibility* of SR should unnerve them. I further argue that it is implausible to regard SR as not just false, but even *impossible*. I thus conclude my case against presentism and the A-theory in general.

Chapter Three introduces two theories of persistence: endurance and perdurance. As I shall understand it, the latter takes objects to be temporally extended, with “genidentical” temporal parts for each sub-division of their duration. Endurance, by contrast, is supposed to replicate our natural conception of persistence. In rough terms it holds that objects are “wholly present” whenever they exist; but smoothing out this roughness is the major task for the chapter.

Perdurance and eternalism make for easy bedfellows. Eternalist endurance, by contrast, has attracted accusations of paradox and an inability to cope with change. These accusations are considered and rejected in Chapter Four, with particular attention being paid to the “Problem of Change”. In fact I fail to locate a difficulty worthy of this name.

Several recent articles have tried to argue from SR to the falsity of endurance. In Chapter Five I further the defence of (eternalist) endurance by disarming these various arguments.

In Chapter Six I change tack once more. By this stage I have endorsed eternalism but remained neutral between endurance and perdurance. Might these ‘theories’ of persistence in fact be one and the same though? Or might they be distinct, yet with no ‘fact of the matter’ to decide between them? After a brief sketch of this last view, I examine two recent translation schemes that have been suggested with the aim

of establishing equivalence between endurance and perdurance. I have reservations about each of these schemes, but go on to develop one of them in a different guise: *Ontological Equivalence* (OE) holds that endurantist and perdurantist countenance the very same entities, but merely label these differently. I consider how best to motivate and support OE, and also some (serious) objections to it.

According to endurance, something three dimensional existing at one time is identical to something three dimensional existing at another. This is false of the three-dimensional entities countenanced by the perdurantist; instantaneous temporal parts at different times may be “genidentical”, but they are nonetheless distinct. In Chapter Seven I consider identity and genidentity in more detail, beginning with the Rotating Discs Argument (RDA). What determines the state of rotation of a symmetric, homogeneous disc? Not lines of spatiotemporal continuity or qualitative similarity running through the disc over time; such continuities would run ‘every which way’. The RDA is standardly thought to be a perdurantist problem; and one solution is to posit brute relations that hold between segments of (the temporal parts of) the disc at different times. If these relations trace out straight lines the disc does not rotate; if helices, it does. Nonetheless, I argue against these brute relations; and I then repeat these arguments against a primitivism about *identity*. As to how we should understand identity, I contend it reduces to its apparent criteria; there is no “further fact” here beyond the holding of those criteria. This brings identity closer to genidentity, and at this point I reconsider the idea that endurance and perdurance might be alternative yet equally *correct* ways to describe the world. Finally, I turn to certain ‘puzzle cases’ that involve (what would ordinarily be thought of as) identity over time. I ask to what extent the endurantist might mimic the perdurantist’s solutions here, and what they need embrace in order to do so. As with much of the chapter, this enquiry is clearly relevant to anyone sceptical about the distinctness of endurance and perdurance. But I intend my conclusions here to be of broader interest as well.

Chapter 1

Against The A-Theory

1.1 Introduction

Is the present privileged? The *A-theorist* says that it is. Such privilege may take different forms though. Perhaps the present is a boundary of all that exists. Or perhaps the present *is* all that exists (it is privileged in a rather trivial way). Then again, perhaps all times exist, rather as all places do, but the present is nonetheless privileged in some other way.

These possibilities are not exhaustive, but they suggest an exhaustive partition. *Ontological* A-theories privilege the present in an existential manner, for example by asserting that only the present is real or exists. *Non-ontological* A-theories may yet make existential claims, for example that all times exist equally, but the point is that according to these A-theories the present, whilst privileged, is not *existentially* privileged.

I am not an A-theorist of either stripe. Instead I am a *B-theorist*, believing the present to be in no way privileged. That entails (*inter alia*) that it possesses no special, transient, property; that it is not related to any special, transient, entity; and that it is not all, or even the edge, of what exists. The present is only privileged insofar as it is where we happen to be—which is to say it is not privileged at all.

My B-theoretic views also commit me to a rejection of *tense*. We make very many tensed assertions, for example that “Jim *was* bearded but *is now* clean shaven”.

How should we understand these? It is nowadays agreed that (tokens of) tensed propositions are not translatable into tenseless ones, but perhaps they may be given tenseless truth conditions. The *detenser* thinks they can: an utterance u at time t of “It is now raining” is (tenselessly) true iff (i) it (tenselessly) rains simultaneously with u , or (ii) it (tenselessly) rains at t .¹ The *tenser*, on the other hand, thinks that u ’s putative truth derives from the privilege that then accords to (events at) t . For example, the rain-event in question might then possess the irreducible, transitory property of *being present*. Alternatively, for a tensor who holds that only the present exists, u would be true iff reality then contains a rain-event.²

It is arguable that one could be an A-theorist and detenser.³ But if the present is not privileged then clearly tensed assertions cannot be true in virtue of this privilege. Thus the B-theorist is also a detenser, and in arguing against the A-theory I argue *eo ipso* against tense.

In what follows I discuss: non-ontological A-theories (§1.2); the formulation of ontological A-theories (§1.3); and the problems associated with ontological A-theories (§1.4).

1.2 Non-Ontological A-Theories

My rejection of non-ontological A-theories involves two explicit components and a third, less explicit, one. The first component (which follows in §1.2.1) contends that the properties or relations countenanced by the non-ontological A-theorist make no difference whatsoever to our experience; they are empirically undetectable. I take it that this is a significant conclusion, since experiential factors are generally reckoned to support non-ontological A-theories. In §1.2.2 I go on to argue that such theories

¹Mellor (1998:*xi–xii*, 31–34) has switched allegiance from (i) to (ii) here. The shift is in response to criticisms of (i) by *e.g.* Smith (1993:67–93).

²Or at least this is a natural analysis. Tooley (1997) is a detenser who believes that only past and present exist; perhaps one could similarly be a detenser whilst taking only the present to exist.

³See previous footnote.

are barely even coherent. I think the arguments of these two sections suffice to render non-ontological A-theories deeply unattractive. In addition, I will discuss in Chapter Two the relativistic difficulties that beset a particular ontological A-theory. This focus should not disguise the fact that relativity is no less of a worry for *non*-ontological A-theories.

1.2.1 Arguments From Experience

What *is* a non-ontological A-Theory? It holds the present to be privileged, but not in an existential way. How much more can be said? Perhaps little, if the privilege in question is brute. But an analogy (from Broad) may at least help us to get our bearings:

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 a policeman's bull's-eye traversing the fronts of the houses in a street. What is illuminated is the present, what has been illuminated is the past, and what has not yet been illuminated is the future.

(1923:59)⁴

The question for this section is whether the 'illumination' of the present is in any way detectable. In other words: are there experiential reasons to believe in non-ontological A-theories?⁵

The first thing to say is that (a quality of) presentness is not directly experienced. It is surely not heard, smelt, touched or tasted. Nor, despite Broad's metaphor of

⁴Note that Broad is merely explicating the view in question; he does not endorse it.

⁵In answering this question I write for the most part as if the (non-ontological) A-theorist believes in just one irreducible *A-property*, namely that of *presentness*. Variations are possible though. The A-theorist might also believe in irreducible properties of *pastness* and *futurity*, even though these could seemingly be reduced to just presentness and the B-relations of 'earlier/later than'. Alternatively they might believe that presentness is not a monadic property at all, but rather a relation to some (presumably extra-temporal) entity. (See McTaggart (1927:19–20).) My comments in what follows apply *mutatis mutandis* to these variations.

a spotlight, is it obviously visible: an artist depicting the scene before me need not consider how best to exhibit its presentness. Mellor notes that

We cannot [...] refute someone who claims to see the future in a crystal ball by pointing to the visible pastness of the scene it shows, since there is no such thing. Whether it is past or future, the scene will *look* the same.

(1998:5)

Here we might add that the scene would look no different were it *present*. In addition I take it that the A-theorist cannot simply hold presentness to be just intuited, plain and simple, by some extra-sensory mechanism. This is both implausible and obscure.

The unobservability of presentness means that its constant transition from event to event cannot account in any *direct* way for our constantly changing experience. This threatens to deprive the A-theorist of a potential argument for their thesis. However, presentness might have indirect experiential effects. At least initially, we might think that although we *directly* encounter no quality of presentness, we do experience *what* is present—and *only* what is present.

The latter part of this intuition might be vindicated by either a Berkeleian idealism or an indirect realism according to which we *strictly* perceive only sense data or mental ‘images’. But the A-theory as standardly formulated is very much a realist position, attributing presentness to objects and events far beyond the purely mental; and I take it that A-theorist claims about the ‘presence of experience’, whilst perhaps a little vague, are not meant to invoke the representative theory of perception. With these misunderstandings set aside, we may observe that in fact we do *not* experience what is (then) present: consider the stars at night, or the faraway thunder. Nor do we (now) experience distant entities that *are* (now) present. Perceptual processes take time.

Indeed, consideration of perceptual processes explains precisely which entities we perceive, and when we perceive them, without recourse to a property of presentness.

Consider an event E which we could potentially perceive *via* a certain causal process P . P ‘travels’ at a particular speed, S_P (*e.g.* when P involves vision and E is very distant, S_P is roughly the speed of light). A P -based perception that occurs at the origin of a set of spacetime axes will then be of E only if E lies at a spacetime point (x, t) such that $x/t = S_P$ (give or take a minus sign). To repeat: presentness features nowhere in this account. The reason for our non-perception, at a particular time, of very many objects and events is not that these objects and events lack some privileged property. It is rather that they are at spacetime locations inappropriate to perception at that time.

There is also the potential here for a B-theoretic account of our changing experience. At any given time we perceive only those objects and events that are, or were, at spacetime locations separated from us by a distance appropriate to the perceptual mechanism in question. *What* we experience changes from moment to moment, but the B-theorist should expect this: the happenings at locations such that they are perceived at (x, t) are distinct from those at locations appropriate to perception at $(x + \delta x, t + \delta t)$.⁶

Permit the A-theorist a final experiential sally. Consider some of our emotions and attitudes towards the world: relief, fear, regret, *etc.* Building on Prior’s (1959) suggestion, we might say “Thank goodness that’s over” at the end of a painful experience such as a headache. In so saying, we can hardly be thanking goodness that

⁶Note, however, that this explains the *succession of experiences*, rather than any apparent *experience of succession*. The latter might simply refer to perceptions of the form *that a follows b*. But an “experience of succession” might also suggest an experience of *transience*. Thus it is held by some that even in a single perception we experience an object *as moving*; that we hear *the very continuity* of a sustained bell-chime; and that there is more generally a kind of ‘felt progression’ to our experience. (It is hard to capture the precise phenomenology, but I sympathize with the attempt.) I think a definitive B-theoretic treatment of these topics is yet to emerge. Mellor (1998:122–123) tries to explain our perception *that a follows b* in terms of lingering traces or memories; and Dainton (2001:102–106) posits a succession of partly overlapping and temporally extended acts of awareness to ground the apparent perception of flow. (It may also be that each of these accounts could in fact address the other *datum*.) However, the crucial point for our purposes is that it is not at all obvious how an *A-theoretic* explanation would proceed here—especially given the seeming unobservability of any property of presentness.

the headache ended at 10:39 on the 19th February 2007. That in itself is a strange thing to feel thankful about, but moreover for the B-theorist it is in some sense ‘ever true’ that the headache ends at that time. Why, then, thank goodness only *after* the event?⁷

At some level the A-theorist doubtless grounds our relief in the fact that the headache is (by then) past. Yet the B-theorist can parrot this, at least initially, since they also regard “the headache is past” as true after (and only after) its terminus. Where the B-theorist cannot follow is into the territory of irreducible properties: the A-theorist thinks that once it is over the headache possesses just such a property (namely, *pastness*).⁸ But now we can mount a *tu quoque* against the A-theorist, for it is hardly plausible that what we thank goodness for is the headache’s possessing some irreducible, undetectable and rather mysterious property. Mimicking Prior: “Why should anyone thank goodness for that?” (1959:17).

It is similar with respect to the *timing* of our gratitude. The initial A-theorist thought is surely that it is appropriate to thank goodness only after the headache’s end because only then is the headache *past*. But if this just means that only then does the headache possess the irreducible property of pastness, it seems odd that we should be so thankful. Why not be similarly thankful—rather than apprehensive—when a headache possesses the irreducible property of *futurity*? What is there about these irreducible properties that grounds our differential reactions?

It is no help to say that past headaches are not painful. Future headaches are presumably no more painful, yet we feel no sense of relief with regard to these. Nor would it clarify matters to reply that future headaches *will* be painful; one could analogously reply that past headaches *were* painful.⁹

⁷For B-theorist responses, see Mellor (1981b) along with MacBeath’s (1983) reply (which Mellor (1983) then endorsed). In what follows I am influenced by Garrett (1988).

⁸Or they think that it is earlier than certain events which themselves possess the irreducible property of *presentness*. See fn.5.

⁹An ontological A-theorist—in particular one such as Prior who grants reality only to the present—might attempt to ground our relief in the fact that past headaches *do not exist*. This

Clearly there is a past-future asymmetry in our attitudes. With regard to unpleasant experiences, we are apprehensive before they occur, and relieved afterwards. Both A-theorist and B-theorist agree that we feel relief when and only when the headache is past, but on neither account does what grounds this pastness also ground our relief. Alternative explanatory avenues might involve the direction of causation (and hence effective action), adrenal/hormonal considerations, or perhaps a mixture of factors. But the important moral for our purposes is that when it comes to those emotional reactions that are alleged to support the A-theory, on closer examination the support proves insubstantial.

1.2.2 A Charge Of Incoherence

It seems, then, that there is little if anything in our experience to recommend a non-ontological A-theory. I now focus briefly on these theories in themselves, asking whether they are even coherent. Much of this is familiar territory, well trodden by Broad (1938:277–279) and many others since.¹⁰

Our initial question is not *how* times or events may be privileged, but rather *when* they are supposed to be privileged. The quick answer is: when they are present. But when is this? Time t is of course present *at* t ; t' is present *at* t' ; and so on. Does this allow for *any* real privilege though? Every time is at that time ‘special’, but this seems more suggestive of parity than privilege. After all, consider what appears to be a spatial analogy: in Oxford, Oxford is doubtless ‘special’ in some sense; whereas in Slough, it is Slough that is ‘distinguished’. These facts suggest no privileged property or relation that varies over space; instead they signify just spatial equality.

In reply an A-theorist might reject as inappropriate the very question as to *when* manoeuvre also fails to establish an asymmetry though: on the view in question, *future* headaches are equally non-existent.

¹⁰However, I shall not comment on one particularly well-trodden patch: I remain unconvinced by McTaggart’s (1908; 1927:9–22) arguments against the A-theory, but will not add to this (enormous) literature.

a particular time is privileged. Perhaps we can ask temporal questions of objects *in* time, but not of times themselves. What would become of the A-theorist’s central thesis though? If they abjure the view that a particular time is privileged *at some particular time*, what can they say instead? Not that *one* time is privileged *full stop*; that would hardly be a dynamic view. Nor, on pain of embracing parity once more, can it be said that *all* times are privileged *simpliciter*. Then again, perhaps we are dealing with an A-theorist who thinks rather that it is objects and events that are privileged. However, they would surely believe that simultaneous objects and events are privileged at one and only one time, and so we seem perfectly entitled to ask when this is. Once more we find that t_1 -located objects and events are privileged *at t_1* , t_2 -located objects and events *at t_2* , and so on. Once more we should question whether there is any real privilege here. Varying the analogy somewhat, it sounds like a view according to which I am ‘special’ *for me*, you are ‘special’ *for you*, *etc.* The reality is that this makes none of us particularly special.¹¹

The A-theorist could retort that there is simply a fundamental difference between time (on the one hand) and space or personhood (on the other). Brute posits will hardly endear their theory to us though; ideally they could amplify a little. A temptation is to do so using the familiar metaphor of *flow*.¹² The difficulty is that the metaphor crumbles on but a little examination. Movement is change in *spatial* position *with respect to time*, and indeed we can seemingly ask of any type of change, whether movement or otherwise, how fast it proceeds. It is at best trivial and at worst nonsensical to answer, as Prior does, that the present flows at “an hour per hour, a second per second” (1968:2–3). Should these units not be ‘cancelled top and

¹¹Here we might follow Savitt (2000:S568) in borrowing a line from Gilbert and Sullivan’s *The Gondoliers*:

“When every one is somebodee,
Then no one’s anybody!”

¹²Recall from §1.2.1 both Broad’s ‘spotlight’ analogy and my remarks on the “experience of succession” (fn.6).

bottom’, only to reveal that time actually flows *at one* (whatever *that* means)? Or alternatively, if we retain the “second per second” *etc.*, then as Price (1996:13) observes, “[w]e might as well say that the ratio of the circumference of a circle to its diameter flows at π seconds per second!” (since π is similarly dimensionless).

But in fact there is a respectable precedent for the employment of phrases such as “an hour per hour, a second per second”. The gradient of a hill might be ‘one in ten’, indicating that the hill rises one *metre* for every ten *metres*; and indeed the gradient might even be ‘one in *one*’. Note, however, that this involves two distinct scales: a vertical distance and a horizontal one. In a similar vein, the A-theorist might resort to a *meta*-time when confronted with embarrassing questions as to how fast time flows. But in fact this manoeuvre only heightens the embarrassment. No empirical evidence supports the posit of a meta-time, and it is unclear even what *could* support it. In addition, the meta-time fails to solve the initial problem. Denoting standard times in lower case and meta-times in upper case, suppose that t_n is present at T_m , t_{n+1} at T_{m+1} , *etc.* Perhaps presentness then flows at one second per *meta*-second; but this answer seems to depend solely—and rather worryingly—on how one calibrates the meta-time. One second per *meta-minute* is just as valid an answer. As to privilege, perhaps it *is* more informative to learn that t_n is privileged at T_m *etc.* than that, for all n , t_n is privileged at t_n . But it remains the case that *each* (standard) time is privileged at one (and presumably only one) moment of meta-time; so parity rules once more. Unless, that is, we can be convinced that a particular moment of *meta*-time is privileged. But if meta-times are privileged then we might ask when *they* are privileged, in which case a regress seems likely. And if we had the tools to exhibit genuine privilege within the meta-time series, why would we not have employed these with respect to standard time in the first place—thus obviating the need for the meta-time?

Doubtless a die-hard non-ontological A-theorist will not just roll over. However,

I think our discussion licences at least the tentative conclusion that non-ontological A-theories are on shaky ground. In §1.2.1 I argued that no property of presentness is revealed by experience, whether directly or indirectly. In this section I have argued that the ‘movement’ of such a property is an embarrassment to the A-theorist, and that the ‘privilege’ it accords to various times is in fact no privilege at all. To these objections Chapter Two will add relativistic complications that worsen the prospects for non-ontological A-theories still further. I therefore think it reasonable to disregard such theories, and I turn instead to their ontological brethren.

1.3 Ontological A-Theories: Formulation

1.3.1 The Initial Problem

Ontological A-theories hold that the present is existentially privileged. *Presentism* is the most popular such theory; it holds, roughly, that only present things exist.¹³ A denial of presentism that is nonetheless an ontological A-theory is what I shall call *past-and-presentism*. Predictably enough, this holds that only past and present exist; the future remains unreal.¹⁴ A further variation is McCall’s (1976, 1994) ‘branching future’ model which takes the future to consist of many real but as-yet-unactualized possibilities.

Opposed to these A-theories is *eternalism*. This is the view that all objects, or perhaps all times, exist equally; the present is not ontologically privileged.¹⁵ For the

¹³This phrasing is from Crisp (2004:15) and Keller (2004:84). For alternative formulations see §2.5.1; but no presentist (that I know of) explicitly accepts one formulation whilst rejecting others.

¹⁴Past-and-presentism is also known as “possibilism” or the “growing block theory”. Versions of this theory have been held by Broad (1923:65–70) and more recently Tooley (1997).

¹⁵Lest it be thought otherwise, it is worth pointing out explicitly that on my terminology the eternalist need not be a B-theorist. One might espouse eternalism (*i.e.* believe that all times exist equally) and yet maintain that a particular time is *non*-ontologically privileged; indeed such theories were the very subject of §§1.2.1 and 1.2.2 (albeit with the eternalism more muted). For further explication (though not a defence) of such views see Broad (1923:59–60, 1938:277–280) and McTaggart (1927:13).

most part I shall follow recent fashion in regarding the debate as between eternalists and *presentists*; but I will also discuss McCall’s theory along with past-and-presentism in §1.4.4.

The debate between presentist and eternalist has become a ‘hot topic’ in metaphysics.¹⁶ Nonetheless, various sceptics allege that there is no substantive disagreement here, but rather just equivocation over meanings.¹⁷ The precise complaint begins with the presentist’s claim that

Only present things exist. (Pr)

This “exist” might have either of two meanings, resulting in two disambiguations:¹⁸

Only present things *exist now*. (Pr_a)

Only present things *existed, exist, or will exist*. (Pr_b)

(Pr_a) appears to be true, and trivially so. This resonates with some comments by Zimmerman (himself a presentist); he writes that the presentist thinks that “‘*x* exists’ is trivially equivalent to ‘*x* exists at present’” (1996:117). The suspicion that this renders the presentist thesis trivially true is confirmed by Zimmerman’s analogy with the actualist who, at least according to him, “*wants* her thesis to be ‘trivially true’” (1996:17).¹⁹

The trivial truth of (Pr_a) might seem to secure the presentist’s thesis, but a twofold problem arises. First, the *eternalist* will also assert that only present things exist *now*,

¹⁶The tip of the recent iceberg includes Bigelow (1996), Callender (2000), Crisp (2003, 2004), Davidson (2003), Hinchliff (1996, 2000), Keller (2004), Lewis (2004), Markosian (2004a), Merricks (1999), Meyer (2005), Rea (2003), Saunders (2002), Savitt (2000), Sider (1999, 2006), Smith (2002) and Zimmerman (1996, 1998a).

¹⁷This worry was initially raised by Lombard (1999:254–255); it receives fuller attention in Crisp (2003, 2004), Meyer (2005) and Sider (2006).

¹⁸I continue to borrow (most of) Crisp’s (2004:16) phrasing and labels (but I differ over the italics).

¹⁹Rea (2003:253) is close to (and acknowledges) Zimmerman here. But I am not entirely sure of Zimmerman’s view. In a later article he repudiates the thought that presentism might be “a pointless tautology”, claiming instead that “it is a substantive thesis” (1998a:209). How can something be both trivially true and a substantive thesis?

in which case no disagreement is apparent. Secondly, the nature of their dispute, at least as usually pursued, is paradigmatically philosophical: the disputants trade intuitions, implications, denials, counter-assertions, *etc.* None of this is appropriate if the view in question is supposed to be analytically true. Adopting (Pr_a) would mean that presentists and eternalists are radically confused about their own doctrines.

We turn to (Pr_b) then. It seems obviously false; as Crisp observes, “the Roman Empire existed but isn’t a present thing” (2004:16). But what does this really show? Crisp takes this to be an apparent problem *for presentism* (albeit one he thinks he can deflate); and Meyer (2005) believes it insurmountable. Consider also Callender’s confession:

Above I wrote as if it is clear exactly what the difference is between eternalism and presentism. But [...] I find it surprisingly difficult to understand exactly what *presentism* amounts to. It’s not obvious that the two views differ over much. Clearly distinguishing presentism from eternalism is our first challenge *for presentism*.
(2000:S588; my italics)

What justifies these sentiments? Why is this any more problematic for presentism than eternalism? After all, the eternalist plausibly asserts that

Past, present and future objects exist.²⁰ (Et)

Here once more we may disambiguate (Et) into a present-tensed and a disjunctively tensed statement. One of these will be trivially true, and the other trivially false. The difficulties here are not just difficulties for presentism; they threaten the entire debate.

1.3.2 The Quantificational Approach

Perhaps there is safety in numbers. Merricks writes that “the best evidence that presentism is controversial is the fact that some philosophers explicitly reject it”

²⁰Which I take to mean that *all* such objects exist.

(1999:425 fn.5). He also draws attention to the “extensive literature” on presentism and Special Relativity (see Chapter Two), observing that “[t]he very existence of this literature supports the claim that presentism is neither trivial nor uncontroversial” (1999:425 fn.5). Sider makes a similar point (1999:327 fn.4).

It would be easy just to side with the majority here. But since Chapters Six and Seven will question the validity of the (apparent) disagreement between endurantists and perdurantists, I am under more pressure than most to explain why I think that the presentist-eternalist debate *is* valid. One way I could do so is to adopt the quantificational justification that several recent writers have offered.²¹ Unfortunately I have reservations about this line of thought, as I will now discuss. In the following section I consider what I think is a superior approach.

So, having outlined the problem, Crisp responds as follows. He thinks that (Pr_b) is not *obviously* false after all, and attempts to show this by a series of transformations. First he observes that “to say that only F s are G s is to say that, for every x , if x is a G , then x is an F ” (2004:17). It follows, he claims, that (Pr_b) can be restated:

For every x , if x existed, exists, or will exist, then x is a present thing.²² (Pr'_b)

Next Crisp points out that instead of dealing with “our most inclusive domain of quantification”, as does (Pr'_b) ,

we can state the same thing differently by shifting to a restricted quantifier, one whose domain is restricted to the class of all things in time, the class of all things that existed, exist now, or will exist.

(2004:18)

²¹Crisp (2003, 2004) defends this at length, but see also Zimmerman (1996:117–118), Hinchliff (2000:S576), Lewis (2004:3), Markosian (2004a:47–48) and Sider (2006).

²²A worry that I bypass for now: whilst “is a present thing” is an acceptable substitution for “is an F ”, “existed, exists, or will exist” is at least superficially different from “is a G ”. It might be thought that to preserve the structure “is a G ”, we should rather substitute “*is a thing that* existed, exists, or will exist”. This gives us an extra verb form—the “is”—which would also have to be disambiguated. A similar worry develops later in this section.

This then yields

For every x , x is a present thing (Pr''_b)

in which the “every” is explicitly understood to “quantify restrictedly over the domain of things in time—henceforth, D_t ” (2004:18).

Crisp thinks that (Pr''_b) is not obviously false, since it is not obviously true “that D_t includes something identical with the Roman Empire which existed and is no longer present” (2004:18). Why not? We must distinguish two versions of the claim that the Roman Empire existed but is not present (one of which uses “ t_α ” to name the present time):

(RE₁) *WAS*: (for some x , x is the Roman Empire and x will not exist in t_α);

(RE₂) For some x , x was the Roman Empire and x is no longer present.

Of these, RE₁ is clearly a true *de dicto* claim. However,

RE₂ is a *de re* claim to the effect that the open sentence “ x was the Roman Empire and x is no longer present” is satisfied by some *res* in D_t .

(2004:18)

It is RE₂ that is held to be of relevance to the truth or falsity of (Pr''_b). Moreover, Crisp thinks the truth of RE₂ is *not* obvious, since it is not obvious “that the domain of temporal things is still populated with something non-present and identical with the Roman Empire” (2004:18–19). If it *were* the case that “our most inclusive domain of quantification includes past, present, and future entities [...] it would be a [...] fact that D_t includes the Roman Empire” (2004:19). But he thinks it controversial whether our most inclusive domain does include such entities; hence RE₂ is controversial, and so, he concludes, is (Pr''_b).

A query: how is it an open question whether the Roman Empire falsifies (Pr_b'') , given that earlier it *did* falsify the allegedly equivalent (Pr_b) ? I suspect Crisp's reply is that the Roman Empire did *not* falsify (Pr_b) after all. This may have initially been a tempting thought, but (Pr_b) is itself ambiguous. "Only present things *existed, exist, or will exist*" might mean either of (deep breath!):

(Pr_{b1}) $[\neg WAS: (\text{for some } x, x \text{ will not exist in } t_\alpha)] \wedge [\neg(\text{for some } x, x \text{ does not exist in } t_\alpha)] \wedge [\neg WILL: (\text{for some } x, x \text{ did not exist in } t_\alpha)]$;

(It has never been the case that there was some x such that it was not going to exist in the present; it is not the case there is some x such that it does not exist in the present; and it never will be the case that there is some x such that it has not existed in the present.)

(Pr_{b2}) There is no x such that x existed, exists now or will exist, and is not present.

(Pr_{b1}) is a *de dicto* claim, and a false one at that. (Pr_{b2}) is a *de re* assertion which Crisp would regard as more disputable.

Still, I do not think that Crisp's proposal works. RE_2 and (Pr_{b2}) are no improvement on what has gone before. This is particularly obvious with (Pr_{b2}) , which contains two ambiguous occurrences of "is". "There is no x " could potentially mean either "There is *now* no x " or alternatively "There neither was, is, nor will be an x "; and similarly for "is not present". This gives four potential disambiguations of (Pr_{b2}) , of which the first two are trivially true, and the latter two obviously false:

There is *now* no x such that x existed, exists now or will exist, and is not *now* present.

There is *now* no x such that x existed, exists now or will exist, and neither was, is, nor will be present.

There neither was, is, nor will be an x such that x existed, exists now or will exist, and is not *now* present.

There neither was, is, nor will be an x such that x existed, exists now or will exist, and neither was, is, nor will be present.

Similarly with Crisp's RE₂. This is a *quasi*-formal rendering of a marginally more grammatical claim: “*There is an x such that x was the Roman Empire and x is no longer present*”.²³ This time we are faced with obvious *truth* and trivial *falsity*:

There *was, is, or will be* an x such that x was the Roman Empire and x is no longer present.²⁴

There is *now* an x such that x was the Roman Empire and x is no longer present.

Our supposed objects of genuine disagreement between presentist and eternalist therefore seem no more contentious than the original (Pr).

Perhaps it is not surprising that we have come full circle. What is meant by “the domain of our most unrestricted quantifiers”? Surely not some strongly anthropocentric notion according to which x lies in the relevant domain iff *we* quantify over x . After all, presentism is not the doctrine that *we* quantify only over present entities; it is true or false independently of our practice. Instead then, I take it that we are discussing the domain of *the* most unrestricted quantifiers, or perhaps what a ‘true and complete’ theory would quantify over—*notions that are independent of our de facto* quantificational habits. All well and good; but the only way I can understand these concepts—as opposed to the concept of what we *do* quantify over—is in terms of existence itself. That is, x is in the domain of *the* most unrestricted quantifier iff

²³One could strengthen the thesis that no real progress has occurred by instead using “*There exists an x such that...*”.

²⁴A dissimilarity with (Pr_{b2}): the final claim of RE₂—that “ x is no longer present”—is to my mind unambiguous in its assertion that x is not *now* present. Hence RE₂ generates only two disambiguations.

x exists (and similarly for “a true theory would quantify over x ”). Since I have no independent understanding of what it is for x to be in this domain, there is nothing I can do with this concept that I could not do with that of existence. And so to say that there are only present entities in the most unrestricted domain of quantification is no more helpful, and no less ambiguous, than to say that only present entities exist.

1.3.3 A Third Sense Of “Exists”

I have claimed that statements such as (Pr_{b2}) and RE_2 are no advance on (Pr) . (Pr_{b2}) contained a “There is” that was as ambiguous as anything we had seen before. RE_2 was implicitly guilty, featuring a “For some $x\dots$ ” which merely disguised the sentiment that “There is an x such that...”. My feeling is that this is typical: quantification just hides these problematic verb forms behind either the somewhat idiomatic “For some x ” (as in RE_2), or behind the still more technical “ $\exists x$ ”.

As a first step towards a resolution, we might consider whether quantificational phrases are open to a *third* interpretation that is neither “there is now an x ” nor “there was, is, or will be an x ”. This *is* a step in the right direction. But really, all it reveals is that the quantificational route should never have been taken, since it could presumably have been asserted, of (Pr) itself, that it employs “exist” in the relevant third sense.

What *is* the third sense though? Many of us think that numbers, properties, propositions and other abstract objects *exist*. Moreover, the assertion that the number seven exists means not that it exists *now*, nor that it existed, exists and-or will exist. Rather, we think that abstract objects exist *outside* of (space and) time.²⁵

²⁵Frustrated reader: “*Asserting* that there are numbers *etc.* amounts to no more than *quantifying* over them! That there is a third sense of “exists”, and one that is highlighted by quantificational practice, is just what the quantificational view was all about!” Perhaps quantification does employ a third sense of “exists”; this much I concede. But quantificational symbolism can hardly provide its own interpretation. *If* we acknowledge a third sense of “exists”, *then* we might (try to) interpret quantification in the light of this. But if one is not antecedently convinced that there is a third sense of “exists”, the existential quantifier as applied to temporal entities will more naturally be

Now the eternalist does not want to assert that past and future objects exist outside of (space and) time. But both eternalist and presentist can take heart from the fact that existence *simpliciter* does not directly imply existence *now*. Of course it does not follow that *spatiotemporal* entities can exist without existing *now*, but it equally does not follow that they cannot. That is what makes room for a debate. The presentist and eternalist have at least a foothold against the sceptic.

There is more to say. We think that spatial location has no bearing on existence; Oxford, Cambridge and Slough all exist ‘equally’. The eternalist claims an analogy here: an object’s *temporal* location is similarly irrelevant to its existence; thus yesterday, today and tomorrow all exist ‘equally’. In a sense the analogy is useful only to the eternalist—since the presentist takes time to be *unlike* space in this respect—but it is no disaster for the presentist that the eternalist can make out their thesis. At least there is then a substantive doctrine for them to deny.

In addition there is a modal analogy.²⁶ Actualists believe that all that exists is actual.²⁷ Modal realists, by contrast, think that (mere) *possibilia* exist but are not actual. The presentist is like the actualist, except that instead of restricting existence to the actual, they restrict it to the present. Similarly, the eternalist’s ‘temporal realism’ has strong resonances with modal realism. Crucially though, the consensus in the literature is that the debate between actualists and modal realists *is* genuine. This bodes well for presentism and eternalism.

In addition to analogy, presentist and eternalist might attempt to show what they earlier struggled to say. Consider a spacetime diagram of the universe with two spatial dimensions suppressed. The presentist points to a thin sliver parallel to the spatial

understood, once again, in terms of “exists now” or “existed, exists now, or will exist”. In other words, there is nothing within quantification itself that will induce the uninitiated to acknowledge a third sense of “exists”.

²⁶See Sider (1999:326–327), Rea (2003:253–254) and Davidson (2003:77) (along with many others). Sider (2001:17) also mentions a third, partially analogous, case: the debate between Platonist and nominalist.

²⁷I keep open the possibility the actualist believes in possible worlds, but takes these to be maximally consistent propositions or some other abstract (and actual) entities.

axis, and asserts that *that* is what exists. The eternalist, by contrast, gestures towards the entire contents of the diagram; they tell us that *that* is what exists. What they are saying seems entirely clear. It is true that the sceptic could pipe up once more and ask whether they mean “exists *now*” or “existed, exists, or will exist”. But by this stage I think the sceptic is being deliberately obtuse. We have made out a third sense of “exists” with tolerable clarity (and henceforth I subscript this sense so as to speak of *existence*₃).²⁸ We encountered an analogy with modality, where there appears to be a genuine dispute. And we made particular headway with the (eternalist) claim that, at least with respect to ontology, time is no different to space. The debate is substantive; now it must be resolved.

1.4 Ontological A-Theories: Assessment

The most popular ontological A-theory is presentism, and hence it is this that I am most concerned to refute. In §1.4.1 I outline certain problems for presentism, and in §1.4.2 I consider various responses. These topics could form a thesis in themselves, and so my treatment will of necessity be somewhat brief.

Before considering certain other ontological A-theories in §1.4.4, in §1.4.3 I exhibit for comparison the eternalist treatment of the difficulties that attend presentism. I take the opportunity to discuss some alleged advantages of presentism, particularly those that purport to manifest a superiority over eternalism. But here at the outset I should mention three more alleged virtues of the doctrine.

First, it is sometimes claimed that presentism is the intuitive view of the ‘man in the street’.²⁹ In response I concede that said man plausibly *does* think, or could easily be brought to think, that “only present things exist”. However, I suggest that

²⁸I would have no objections to talk of *tenseless* existence instead, except insofar as this *could* be confused with the sense of “exists” corresponding to “existed, exists or will exist”. (I would describe the latter as *disjunctively tensed* rather than tenseless.)

²⁹See *e.g.* Putnam (1967:240), Lewis (2004:7), and Markosian (2004a:48) (although the former two are not in fact presentists).

this might be no more than the tautology to which eternalists also subscribe. Does our man really possess a considered concept of existence₃, and does he moreover think that it applies only to present objects?

Secondly, it is notable that Prior was both a presentist and the originator of the ‘thank goodness’ argument considered in §1.2.1. But as I argued in that section (see fn.9 in particular), on reflection this argument does not obviously support the presentist.

A third alleged virtue brings us towards the criticisms of the next section. Although we shall have reason to question this in due course, the presentist ontology does initially appear somewhat sparse. Ontological parsimony is generally thought desirable, and so this should endear presentism to us. But an ontology should not be so sparse as to be dysfunctional. The discussion of §§1.4.1–1.4.2 will suggest that this is precisely the problem with presentism.

1.4.1 Problems For Presentism

There are four main areas to consider here:

1. *Relativistic Considerations.* These are the subject of the next chapter.
2. *Past truth.* We think, for example, that Napoleon invaded Russia. It is extremely plausible that such truths require a truthmaker.³⁰ But if Napoleon does not even exist₃, what makes it (now) true that he invaded Russia? Surely not the extant *evidence* that he did. This doubtless grounds our beliefs about Napoleon, but not the historical fact of his invasion. Indeed we can (just about) envisage a situation in which the evidence is exactly as it is, but Napoleon invaded Australia instead.

³⁰Truthmakers for negative existential claims are harder to locate. Perhaps the overall position should be that *truth supervenes on being*: see *e.g.* Bigelow (1996:38) and Keller (2004:85–86).

3. *Reference to past objects.* In saying that Napoleon invaded Russia, I apparently refer to Napoleon. Indeed even if I had (falsely) claimed that Napoleon invaded Australia, I would still have referred to Napoleon. How can I refer to what does not exist₃?

The problem goes deeper. One might think that the *proposition* that Napoleon invaded Russia exists₃—whether or not anyone asserts it. One might further believe that such propositions in some sense ‘refer to’ or ‘involve’ their subjects; or at least that they require the existence₃ of their subjects. Call such propositions “singular”. The presentist must apparently hold that there are no singular propositions about past entities.³¹

4. *Relations to past objects.* I may not only refer to Napoleon, but also stand in other relations to him. I am taller than him, and perhaps admire him. We would ordinarily expect *relata* to have the decency to exist₃; but on presentism, past and future ones do not. A particularly disturbing development arises insofar as most or all causes precede their effects. According to presentism then, most or all causal relations ‘involve’ at least one non-existent₃ *relatum*. Again we may ask: how is this possible?

1.4.2 Presentist Responses

In response the presentist might employ tactics involving any of the following: present entities, paraphrase, denial, and *abstracta*. I consider these options in turn.

Present Entities

Perhaps non-existent₃ objects can bear properties, be referred to, and function as *relata*.³² Such a view would immediately dissolve the difficulties of §1.4.1. Against

³¹See Sider (1999:327–328) and Markosian (2004a:49).

³²See Hinchliff (1996:124–125).

this view I have no very sophisticated arguments. I simply find it incomprehensible how something that does not even exist₃ could bear properties, *etc.*³³

The presentist could try to enlighten me by analogy though. Does not Sherlock Holmes possess the property of being a detective? Did I not just refer to him? And is he not taller than Dr. Watson? Perhaps the interlocutor genuinely believes that these non-existent₃ entities can bear properties, *etc.* If so then I merely repeat my former bewilderment. But in fact the fictional parallel might shift the debate somewhat, highlighting an alternative option for the presentist. We can and plausibly should ground fictional ‘truths’ in actuality: in actual writings, thoughts, utterances, *etc.* These give a derivative sense in which Sherlock Holmes ‘is a detective’: this is true *according to the writings of Conan Doyle*. This is the extent to which fictional non-existent₃ may ‘bear properties’. Is there a similar sense for past entities?

One difficulty is that our belief that Napoleon invaded Russia amounts to more than that he did so *according to historical sources*; we think he *really did* invade Russia. This historical fact potentially transcends all that is present in a way that fictional claims do *not* transcend all that is actual. Thus we can countenance the (remote) possibility that, despite *all* extant evidence, Napoleon in fact invaded Australia and not Russia. By contrast we would not countenance the possibility that Conan Doyle got it wrong and Sherlock Holmes was really a stockbroker.

The reply may come that the presentist will hardly confine themselves to historical sources or “evidence” in some strong sense. Provided Napoleon’s invasion of Russia left *some* extant traces, then whether or not these be salient or detectable, the past fact of his invasion would be grounded in the present.

It is tempting to counter that there cannot possibly be traces of *every* past event. Consider the leaf that fell from a particular tree just over 10,000 years ago. Milliseconds later a volcano erupted and obliterated the tree, leaf, and surrounding area.

³³Markosian (2004a:51–52) and Keller (2004:89–91) agree.

Must we nonetheless maintain that even today there is a ‘record’ of the fact that the leaf fell—and at the particular time and in the very manner that it did? Such intuitions notwithstanding, the presentist can maintain that *given determinism* there is indeed a ‘record’ of even the most trivial past occurrences. The world today would have been different had they not occurred. Past facts *are* encoded in the present.

Perhaps there is some mileage for the presentist in this response. It faces a number of difficulties though.³⁴ First of all it regards the world as deterministic. In fact there are good grounds to doubt this; certainly Quantum Mechanics is naturally interpreted as an indeterministic theory. The presentist may be thinking of a more ‘established’ (some would say *outdated*) theory though: Classical Mechanics. Unfortunately, Classical Mechanics is not deterministic either (although instances of indeterminism within the theory are admittedly somewhat *recherché*).³⁵ The second point is that even if the world were deterministic, it could surely have been otherwise. Would presentism then be false of such a world? Or would it still be true, but with far fewer past facts? It seems imprudent to rest the truth of past facts on something as contingent as determinism.

A third difficulty is more technical. Suppose for convenience a particulate ontology. Dynamics is (or at least appears to be) *second order*: the state of the world at one time depends on the positions *and velocities* of its constituent particles at another. And how do we understand velocities? Usually as quotient limits: distance travelled over time taken (as the latter tends to zero). But that is to say that the velocity of a particle depends upon facts about where it was (and when). These are past facts; they are exactly what the presentist is trying to ground. It seems that the

³⁴One difficulty is complex, and I so mention it only briefly: how does the presentist regard the laws of nature? If they take a Humean stance, is the present sufficiently ‘detailed’ to ground such laws? Or must the presentist consider past facts also—in which case it seems circular to use such laws to ground those same past facts? Alternatively, if the presentist takes laws to be necessitation relations between universals, would it be problematic if such universals are not presently instantiated? Bourne (2006a:7–8) addresses these issues (and makes these very points).

³⁵See Earman (1986:23–54), Laraudogoitia (1996), and Norton (2003:8–12).

explanation is circular then: unless some past facts are *already* grounded, nothing determines the velocities that the presentist requires in order for the physical laws to ground past facts. At the very least then, the presentist (who pins their hopes on determinism) must adopt a heterodox account of velocity.³⁶

Finally, the presentist must say *something* about the Russellian thought that the world was created but five minutes ago—replete with *apparent* traces of past facts. Continuing with the particulate supposition, such a world might consist of particles with exactly the same positions and velocities as those of the actual world. Would that make all sorts of past facts ‘true’ of the Russellian world—even though it did not then exist?³⁷ Perhaps it will be replied that such a world would have different *laws* to ours. But how plausible is this? Intuitively one would think that, at least after its incipience, the Russellian world could be governed by the very same laws that govern our own.³⁸

Paraphrase

In response to the idea that Napoleon’s existence₃ is implied either by the existence₃ of propositions about him, or by our successfully referring to him, the presentist may turn to paraphrase. Thus “Napoleon invaded Russia” might be parsed in such a way that this apparently singular proposition does not require the existence₃ of Napoleon after all:

WAS: $\exists x (x \text{ is named "Napoleon"} \wedge x \text{ invades Russia}).$

³⁶See §7.2.2 for (brief) details of Tooley’s (1988) proposal.

³⁷See Bourne (2006a:8–9).

³⁸It is worth mentioning at this point two presentists who would *deny* that a world could be identical to how ours is now, even though its past were different. Thus Bigelow proposes that “[i]t is a present property of the world, that it is a world in which [...] the Trojans were conquered” (1996:46); and similarly Chisholm suggests that “the property blue [...] once was such that there is a philosopher who is drinking hemlock (1990:554). Such attempts at grounding past facts doubtless ‘work’, but they seem disturbingly *ad hoc*. In addition, the relevant historical properties are intuitively such that their possession by “the world” or “the property blue” should not just be basic (as these theories take it to be); and yet on presentism it is hard to find anything on which they may supervene. See Sider (2001:39–41) for further discussion.

Whether this is an appropriate analysis of the original claim is of course open to debate. In particular it involves a controversial analysis of “Napoleon” as an abbreviated description, something of which we should be wary at least.³⁹

It is also unclear how far the paraphrastic strategy will carry. How can the presentist understand “Stanley was my great-great-grandfather” so as to avoid a commitment to a relation between individuals who never coexisted (and hence, for the presentist, never coexisted₃)? Perhaps by equating it to a *succession* of relations between individuals who did coexist (and coexist₃):

John is my father;

WAS: William is John’s father;

WAS: Archibald is William’s father;

WAS: Stanley is Archibald’s father.

However, as Sider (2001:25–26) notes, there are no plausible intermediates for claims such as

Some philosopher admires some French Emperor. (*)

Using “ Axy ” for “ x admires y ”, the obvious attempts at paraphrase are:

(a) $\exists x \exists y (x \text{ is a philosopher} \wedge y \text{ is a French Emperor} \wedge Axy)$;

(b) $\exists x (x \text{ is a philosopher} \wedge \text{WAS: } (\exists y y \text{ is a French Emperor} \wedge Axy))$;

(c) $\text{WAS: } (\exists x \exists y (x \text{ is a philosopher} \wedge y \text{ is a French Emperor} \wedge Axy))$.

But (a) and (c) require that the philosopher in question coexists at some time with a French Emperor that they admire. On the face of it this is quite unnecessary for

³⁹See Sider (1999:327–328) with reference to Kripke (1980). This paraphrase *does* require the existence₃ of Russia; had we focussed instead on the USSR, this would have necessitated further paraphrase. Indeed the presentist might offer a paraphrastic analysis even for names of existent (and thus existent₃) entities such as Russia. This would allow for a unitary treatment of names, *i.e.* one independent of the named entities’ status.

the truth of (*). Meanwhile (b) and (c) mistakenly locate the admiration in the past. Again this is not required by (*).

It is not just singular propositions and cross-time relations that test the presentist's ingenuity; Lewis (2004) argues that cross-time counting is similarly troublesome. After one or two epicycles, he suggests that the presentist can parse "There have been two Kings called Charles" as

WAS: (there is a King called Charles \wedge *WAS*: (there is a distinct King called Charles)).⁴⁰

"There have been over fifty Kings" can be dealt with similarly, but the analysis will be somewhat lengthy. And as Lewis notes, if we dealt with entities that could be both instantaneous and simultaneous, rather than Kings, we would require extra disjuncts to cover this eventuality. Finally, the analysis lengthens further if we unpack "There have been *about* fifty Kings" in terms of a disjunction of the analyses for fifty Kings, fifty-one Kings, forty-nine Kings, *etc.*

Lewis' point here is not that the presentist *cannot* analyse such assertions. It is rather that the sheer intricacy of the analyses undermines presentism's claim to be "the view of the common man, uncorrupted by philosophy" (2004:7). On presentism, certain everyday utterances possess very complex logical structures. Again this makes the doctrine seem implausible.

Denial

Another tactic that belies presentism's status as capturing our intuitions is that of brute denial. The idea here is that, ordinary beliefs and utterances notwithstanding, we cannot refer to past entities (since they do not exist₃). More surprisingly still,

⁴⁰Even this may be troublesome though. Can the presentist analyse the "distinct" here? The difficulty is how to evaluate " $\neg x = y$ " in " $\exists x (Px \wedge \text{WAS}: [\exists y (Py \wedge \neg x = y)])$ " when x and y never coexist₃.

there are no past facts, and also no relations between entities at different times—and hence no (non-simultaneous) causation.

We would need excellent reasons to accept these radical theses, yet it is doubtful whether presentism can provide such reasons. A presentism that regards so many everyday intuitions as false purchases ontological economy at far too high a price.

However, the position can be made more moderate. Perhaps certain truths about Napoleon, whilst literally false, are nonetheless *quasi-true*. The suggestion is by Sider, although he is not himself a presentist. He explains the notion as follows:

The working idea of a quasi-true sentence is one that, *philosophical niceties aside*, is true. Put a second way, a sentence is quasi true if the world is *similar enough* to the way it would have to be for the sentence to be genuinely true.

(1999:332)

The “philosophical niceties” relevant to our case concern the truth of eternalism. In more detail: suppose that, for a given sentence S , there is a true proposition P which, *given eternalism*, would entail the truth of S . In that case S is *quasi-true* even if it is literally false (due to the falsity of eternalism). For example, the presentist holds it to be strictly false that “Napoleon invaded Russia”, since this singular proposition mistakenly commits to the existence₃ of Napoleon. However, suppose that presentists can justify the claim that

$WAS: (\exists x \text{ “Napoleon” refers to } x \wedge x \text{ invades Russia}).^{41}$ (†)

In that case, Sider suggests that there is a sufficient “supervenience base” to render “Napoleon invaded Russia” *quasi-true*.

It might be objected that *quasi-truth* is not enough. I feel committed to the truth—that is, the *literal* truth—of “Napoleon invaded Russia”, in which case it counts against presentism that it regards such utterances as strictly false (even if

⁴¹Perhaps the presentist must also justify the first conjunct in terms of past facts that underlie the putative reference (whether these be descriptivist or otherwise).

quasi-true). In addition though, Sider’s proposals are only intended to provide the near-truth of singular propositions and those asserting cross-time relations.⁴² His presentist *relies upon* the truth of past facts such as (†) to provide the necessary “supervenience base” for the *quasi-true* claims. For an explanation of what grounds *these* past facts, we must search elsewhere.

Abstracta

Two accounts based upon abstract objects purport to do just this. The first involves *haecceities*, and the second *abstract times*.

According to Adams, a *haecceity* is

the property of being identical with a certain particular individual [... *e.g.*]
my property of being identical with me, your property of being identical
with you, *etc.*

(1979:6)

Such properties might be primitive (as Adams believes), but they might alternatively be reducible to other, qualitative, properties (*e.g.* having been born at a certain time to such-and-such parents, having been the first man to climb Everest, *etc.*).

The presentist hopes to utilize *haecceities* as proxies for past (and perhaps future) entities.⁴³ This move is controversial: many will reject *haecceities*, especially ones that are non-qualitative *à la* Adams (1979). Such *haecceities* would also deprive presentism of one of its main attractions: it mutates from an austere, existentially₃-streamlined theory, into a bloated ontology instead. One might also question how, on presentism, Napoleon’s *haecceity* manages to pertain *to Napoleon* (rather than to Rembrandt or Einstein, for example). Which is to say: what individuates *haecceities*? Part of the

⁴²Although they could also be applied to Lewis’ subsequent (2004) concerns about cross-time counting.

⁴³This is not Adams’ intention; he is “inclined to reject presentism” (1986:321-322). Lewis (2004:7–9), Markosian (2004a:54–56) and Keller (2004:96–99) all explicitly reject *haecceitist* presentism. Zimmerman comes closest to backing it: he thinks the presentist might regard claims about a past or future person as involving “an individual essence not now exemplified that was once exemplified, and was then the essence of a person” (1998a:211).

original difficulty was that *we* cannot refer or relate to what does not exist₃. So how does Napoleon's *haecceity* connect with him?

It is also unclear to what extent *haecceities* help the presentist. I am not taller than Napoleon's *haecceity*, nor is it this that I (might) admire. And does my talk of Napoleon in fact refer only to an abstract property?⁴⁴ As to past truth, the mere existence₃ of Napoleon's uninstantiated *haecceity* cannot ground the fact that he invaded Russia. Granted: perhaps his *haecceity* is such that it *was once instantiated* by one who invaded Russia. But then this is also a past fact, and is therefore in just as much need of a truthmaker as the original claim that Napoleon invaded Russia. Alternatively, the presentist might ground Napoleon's invasion of Russia in the fact that his *haecceity* stands in a *quasi-invading* relation to Russia's own *haecceity*. But really Napoleon's *haecceity* must *quasi-invade* Russia's with respect to the *haecceity* of 1812, 'through' the *haecceity* of (modern) Poland, and along with some 700,000 further personal *haecceities*. These are just empty words. We have no grasp whatsoever on how one property can *quasi-invade* another, let alone do so *via* a third, and in tandem with so many others.⁴⁵

I turn instead to *abstract times*: abstract representations of times other than the present, rather as one might think of possible worlds. Just as such possible worlds (allegedly) ground modal truth, so too do abstract times ground past (and perhaps future) truth.⁴⁶

A first thought is that the move to abstract times might render presentism ontologically otiose (as with the espousal of primitive *haecceities*). We would presumably

⁴⁴Perhaps *haecceitist* presentism might employ paraphrase or *quasi-truth* in addition here. This seems to me to only double their difficulties.

⁴⁵I also note an epistemological curiosity (that pertains in addition to the abstract times view and the proposals considered in fn.38). Our *knowledge* of the past fact that *p* is presumably reliant on some sort of causal chain running from *p* to the present. The presentist must find a way to ground these (past) causal facts, but my current point is rather that our knowledge that *p* would ideally have something to do with the *truthmaker* for *p*. If truthmakers are abstract, then it is hard to see how they might figure in the relevant causal story; and hard, indeed, to see how we might connect with them at all.

⁴⁶Crisp (2003:240–242) and Bourne (2006a) have recently presented such theories.

need an abstract time not just for 1066, 2007, *etc.*, but for every picosecond and beyond—and that is an awful lot of abstract times. Ultimately though, the issue depends on how abstract times should be conceived, and what one already countenances. Thus it may be that abstract times are no more than sets of consistent propositions. Many would countenance such sets irrespective of whether they are employed as abstract times.

In fact if parsimony is a concern then the abstract times presentist might take there to be more than just an analogy with the modal case. That is, they might *equate* abstract times with (simultaneity slices of) possible worlds, thereby killing two birds with one ontological stone. But whilst every possible world is a way that the world could have been, not every ‘possible present’ is a way that the world has been or will be.⁴⁷ One would therefore require *some* (slices of) possible worlds to have ‘special status’. In avoiding commitment to a new type of entity, the presentist is driven to commit to (what I assume is) a new primitive instead.

In addition the abstract times need to be ordered. Otherwise the fact that it is ϕ according to one representation and ψ according to another leaves it undetermined whether it was ϕ before ψ , or *vice versa*.⁴⁸ Is the ordering just basic as well? Crisp thinks so: the presentist requires a “primitive temporal ordering relation” (2003:242). And Bourne’s abstract times come already bearing dates (2006a:11–12)—apparently with no more to be said. The alternative, of course, is that abstract times might be ordered on the basis of their intrinsic features, *i.e.* such that there is continuity between successive times. This proposal works better for some worlds than for others.⁴⁹

⁴⁷See Meyer (2005:220).

⁴⁸And if ϕ were present, this would leave it undetermined whether ψ represents past or future facts.

⁴⁹For one thing it clearly assumes that the world in question evolves smoothly. Are there more chaotic worlds where, roughly speaking, ‘anything follows anything’? Or worlds that are indeterministic and such that they may return to an earlier state? The history of such a world might be represented as *ABACA* (where *A*, *B* and *C* are abstract times). How could the intrinsic features of *A*, *B* and *C* determine this history to have occurred, rather than *ACABA*? Cyclic worlds would also be a worry. How might the intrinsics of *D*, *E* and *F* account for both the ‘once-through’ temporal sequence *DEF*, and also the cyclic variant *DEFDEFDEF...*?

And the ordering does require a sense or direction, which for any world with time-reversible dynamics would not emerge from consideration of the abstract times. In such a world the intrinsics (together with a continuity assumption) might tell us that ϕ occurs between the present and ψ ; but it must be determined in addition whether ϕ and ψ occur before or after the present.

Aside from these teething troubles, we might doubt the *relevance* of abstract times. I care little whether there exists₃ some abstract story (perhaps with some funny ‘special status’) according to which Napoleon invaded Russia. What I care about is whether *Napoleon invaded Russia*. Nor would I be overly concerned if these abstract representations were ordered very differently to how we generally think that history unfolded. So much the worse for them, I would say. They would have no bearing on what actually occurred.⁵⁰

Nor, we should note, do abstract times obviously solve the problem of reference, or how we may be related more generally to past objects. There may be ‘stories’ about Napoleon on the abstract times view; but still, he himself does not exist₃.⁵¹

Finally, the status of the future is also a cause for concern. Is there ‘already’ an abstract time for 3000 *A.D.*? Perhaps the presentist denies this, relishing the freedom that an ‘open’ future brings with it (see §1.4.3). If so, it seems that abstract times are progressively *generated*: as t becomes present, there appears ‘in Platonic heaven’ an abstract representation of t . *Prima facie* it might be better to hold that the relevant abstract time is not generated, but rather was ‘there all along’. This view can also accommodate an open future by maintaining that only at t does the abstract time in question come to represent an *actual* time; prior to that it represents merely a

⁵⁰Hinchliff, though himself a presentist, rejects abstract times for roughly these reasons (1996:124). But are we just begging the question here against one who thinks that abstract times *do* ground past (or future) truth? I prefer to regard the response as articulating a gut reaction (which should carry at least *some* weight): abstract times are simply not the right ‘kind of thing’ to ground past truth.

⁵¹In which case the relevant stories cannot involve *singular* propositions about him. As with *haecceitist* presentism (recall fn.44), abstract times presentism might require some further strategy to deal with problems of reference and cross-time relations. See *e.g.* Crisp (2003:225–232).

possible future.⁵² Either option requires some kind of *change* within the abstract realm though. I do not see how this is possible. At the very least it sits uneasily with the view that abstract objects lie beyond both space *and* time.

1.4.3 How Fares Eternalism?

I hope that some or even many of the recent objections militate strongly against the relevant presentist options. I do not pretend that each of these options is completely without merit however. As ever, the question is whether the particular price is worth paying, and what the alternatives are. I reject presentism partly because I think there is a cheap and effective alternative. That alternative is eternalism.

Consider my referring to or admiring Napoleon. For the eternalist this is no different from my referring to or admiring Clinton. Both are existent₃ yet distant from me; the only difference is that Clinton is spatially distant, whereas Napoleon is temporally distant. Past facts also glide smoothly out of eternalism. Napoleon's invasion of Russia is as much a part of reality as Clinton's (now) eating a sandwich.

That is not to say that eternalism is without difficulty. The presentist might urge that the eternalist can give no satisfactory account of change, or that they are committed to an implausible doctrine of persistence (namely, perdurance). The presentist might add that *their* doctrine avoids such difficulties, and that is (partly) why they hold it. I try to refute these charges in Chapter Four and thus issue a promissory note at this stage: the working out of a coherent eternalist metaphysics will form a retrospective part of the case against presentism.

However, there is one area where I admit that presentism has an advantage over eternalism. On the latter, future times exist₃ just as much as present and past ones, and hence there appear to be facts about our future choices and actions. We may not *know* how we will choose or act, but nonetheless on eternalism we seem to be in

⁵²This seems to be the view of Bourne (2006a:11–16).

some sense ‘already out there’, making those choices and performing those actions. This certainly *threatens* the belief that we are free agents.

In responding to that threat, we should distinguish between the future’s being *determined by* the present, and its being *determinate as of* the present. Only the latter is guaranteed by eternalism, and to my mind this permits us freedom enough. If one disagrees though, I would ask whence the conviction arises that we are ‘free’ in some stronger sense. Our deliberations and decisions would surely *seem* no less genuine were their outcomes determinate but unknown to us. And perhaps we simply are *not* ‘free’ in any sense stronger than that provided by indeterminism. Some might find this depressing (though personally I do not); but an inference from “*p* is depressing” to “*p* is false” would be highly unpersuasive.

1.4.4 Past-and-Presentism, And The Branching Future

Ideally we could combine this minor presentist victory with the eternalist virtues that arose in connection with past facts, relations to past entities, *etc.* Past-and-presentism promises just this, as does McCall’s ‘branching future’ theory. On these theories Napoleon is as existent₃ as on eternalism, and the future as indeterminate as on presentism.⁵³ Of course this is a *disadvantage* if one thinks there are future truths, singular propositions about future entities, *etc.*; but we are probably far less committed to these than to their past analogues.

Past-and-presentism was introduced by Broad (1923:65–70), only to be resurrected and developed in detail by Tooley (1997). In Broad’s words, the theory

accepts the reality of the present and the past, but holds that the future is 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 sum total of existence is always increasing, and it

⁵³Or rather on McCall’s theory it is indeterminate *which* of the (fully determinate) possible futures will be actual.

is this which gives the time-series a sense as well as an order.

(1923:66–67)

For obvious reasons, this is often known as the *growing block theory*.

By contrast, McCall (1976, 1994) holds the future to be very much real. In fact *all* currently possible futures are real; it is just that they are not yet actual. Reality is ‘tree-shaped’, with the trunk of the tree representing the past up to the present (these categories between them exhausting *actuality*), and the various possible futures branching and sub-branching off above the trunk. The present is located at the very first fork; it advances inexorably up one of the branches, eliminating those other future possibilities that are not actualized.

To some extent I should be less concerned to demonstrate the falsity of these two theories than I am with presentism. Their commitment to the existence₃ of the past (and multiple futures, in McCall’s case) means that they face very similar persistence-related issues to those I consider in later chapters within the context of eternalism. Most of that discussion assumes the existence₃ of times other than the present—an assumption that does not strictly require the truth of eternalism.

Nonetheless I do think that these two theories are false. For one thing, the doubts of §1.2.2 surface anew. When something grows, we can usually ask how rapidly it grows. The past-and-presentist must either deny that we can ask this of the universe itself, or borrow from Prior with “an hour per hour, a second per second” (1968:2–3). Either option is at least a little embarrassing.⁵⁴ And *mutatis mutandis* for McCall: how fast does the present climb the tree?

In addition there is a *temptation* towards a meta-time. For both the past-and-presentist and McCall, what is actual at one time is different to what is actual at

⁵⁴Broad himself thought this not just embarrassing but even “fatal” to the non-ontological A-theorist’s moving present (1938:277). To my knowledge he does not comment on the apparent parallel for his own theory.

another.⁵⁵ This seems straightforward when applied to everyday objects, but less so when it comes to times themselves. Can we allow that every second, *that very second* becomes actual? Times are steadily being actualized, but also appear to be the external measure with *respect* to which they are actualized. They seem to be somehow both ‘within’ and ‘outside of’ actuality.

McCall replies to this (and to some extent the previous) criticism that

the universe tree, though it changes, does not change *in* time. Rather, its change constitutes the flow of time. Branch attrition, in the model, is what time flow *is*. Therefore branch attrition cannot take place in time, any more than time flow can take place in time. To suppose that it can would be to allow that the question, how fast does time flow, makes sense.

(1994:30–31)

Perhaps the very nature of these enquiries mean that our ordinary concepts must stretch somewhat; but the idea of changes happening outside of time is simply too much for me (unless one posits a meta-time).

A third worry concerns the dynamism that is heralded as integral to these theories. At t everything up to t is actual; at t' everything up to t' is actual; and so on. Are these claims not ‘eternally’ true, rather like the claims that the poker is hot at t_1 but cold at t_2 ? Recall McTaggart’s (1927:14–15) complaint: since these claims about the poker are ‘ever true’, in themselves they permit *no* real change. Why is the same not true of actuality?⁵⁶

Finally, I think that most A-theorists believes themselves to be *present*. They do so not in the merely indexical sense with respect to which everyone who believes themselves present does so truly, but rather in some more absolute, and indeed more

⁵⁵The theories agree on actuality, but disagree about *reality*: the past-and-presentist thinks these co-extensive; McCall thinks the future real but not yet actual.

⁵⁶Smart (1980) illustrates McCall’s theory by analogy with a pack of cards; each card displays the ‘reality-tree’ at a different time, so that the card for T depicts reality as having no branches before T and very many after. My current point is that a mere stack of cards provides no *dynamic* element at all. Should there not be some further, *moving*, entity that picks out *one* of the cards as privileged? Of course we would then have to ask: with respect to what does this entity *move*?

privileged, sense of “present”. Put in terms of our two current theories, the A-theorist believes themselves to be at the very edge of actuality. Now it is true that when an A-theorist utters at t the thought “I am present” (in this privileged sense of “present”) then, according to the theories in question, their utterance is true. This is simply because, again according to those theories, at t actuality extends only up to t itself. But as time ticks by, all that ‘happens’ to events at t is that they acquire successors; in themselves they change not at all. In *some* sense then, even when actuality has grown so as to include everything up to the later time t' , our A-theorist is ‘still’ there at t believing that they are at the edge of actuality. Is this A-theorist right or wrong? Their belief is surely not true *at* t' , since t is not, by then, the border of the actual. But if the A-theorist’s belief is *false* at times later than t , a pessimistic conclusion beckons. There must be very many past individuals (‘still’) believing—and believing *falsely*—that they are present, when in fact the edge of reality lies far ahead of them. How do we know that *we* are not in precisely the same situation?

The obvious reply is that the beliefs in question occur at particular times; that they occur *only* at those times; that they are *true* at those times; and that they should not even be evaluated at other times. There is no sense, then, in which an A-theorist in 2007 will *still* be believing themselves present even in 3000 *A.D.* Nor should we say that their earlier belief is *then* false; all that we can say is that it was true when believed. Nonetheless, even if the A-theorist does not continue evermore to believe himself present, he and his 2007 belief-state continue to exist₃. I still think the A-theorist should worry that, on the current theories, *the past* is chock full of individuals believing themselves present.⁵⁷

However, there is doubtless more that could be said here, and hence I am happy to make a concession: that whilst I ultimately reject both past-and-presentism and the branching future model, the arguments given so far do not compel a rejection.

⁵⁷For further discussion, see Dainton (2001:79), Bourne (2002), Braddon-Mitchell (2004) and Button (2006).

What needs to be added, in my opinion, are certain relativistic considerations. To these we now turn.

Chapter 2

Special Relativity And Presentism

2.1 Introduction

I now seek to further the argument against the various A-theories by considering certain objections that arise in connection with Special Relativity (SR). In §§2.2 and 2.3 I discuss how the absence of an absolute simultaneity troubles the A-theorist; I conclude that this is indeed a serious problem. In §§2.4 and 2.5 I ask whether the A-theorist might therefore *deny* SR; and also—what might initially seem a strange question—whether this would really allow the A-theorist to evade relativistic difficulties.

However, it is important to note that I shall argue only vicariously against A-theories in general; my particular focus is on presentism. This is not because I believe SR more hostile to presentism than to other A-theories. In fact I do not. It is rather that (1) as remarked in §1.4.4, the remainder of my project makes me more concerned to rebut the presentist than the past-and-presentist or ‘branching futurist’ (and I already regard non-ontological A-theories as seriously troubled); and (2) presentism’s status as a ‘hot topic’ means that there is far more literature here with which to engage.

2.2 The Threat

In the hackneyed example, I am sitting on a platform in the station. A train travels past, and when I am directly opposite its midpoint, small explosives detonate at the front and rear of the train—or at least this is how we initially describe things. Apart from damaging the train, the explosions mark the adjacent track. Light from the explosions reaches me simultaneously, slightly after they occur.

Atop the train and at its midpoint sits Jim. The two flashes emanate from points equidistant to Jim's location at (what I believe is) the common time of detonation. However, Jim is moving relative to these points and thus does not remain equidistant from them. The train's motion takes him closer to the origin of the front explosion, and hence the light from this reaches him ahead of that from the rear.

Jim knows a bit about relativity. *He* thinks of himself and the train as stationary whilst the countryside rushes by. Surveying the damage to the front and rear of the train, he reasons that the explosions occurred equidistant from where he now sits (and previously sat). He also realizes that it matters not whether the detonated packages were stationary relative to him or to the station, since the speed of light is independent of the speed of the source. From all this together with the (universally agreed-upon) fact that the light from the front reached him before that from that rear, Jim deduces that the explosions cannot have occurred simultaneously.

The popular moral of this popular exposition is the *relativity of simultaneity*: events simultaneous in one frame of reference are not simultaneous in another. If SR tells the whole story, then there simply is no relation of absolute simultaneity. That means we must abandon the classical understanding of the present as (at least) a set of simultaneous events. And that in turn means we lose our grip on the claim that the present is in some way privileged.

In response the A-theorist might deny SR, or at least deny that SR is the whole story; or alternatively they might seek to identify a surrogate 'simultaneity' relation

that is more at home in the relativistic world. I consider the former option in §§2.4 and 2.5, and the latter in §2.3.¹

2.3 Beyond Absolute Simultaneity

What is it for a relation to be “at home in the relativistic world”? First we must introduce some terminology. An *inertial frame* is a reference frame in which force-free particles move in straight lines, and with respect to which the laws of physics assume the same (canonical) form. Spatiotemporal co-ordinates can be associated with such frames in a number of a (fairly) straightforward ways.²

According to SR, certain quantities that are naturally thought of as absolute turn out to be frame relative instead. In particular, the difference in spatial co-ordinates between distinct events varies from one inertial frame to the next, and the temporal interval between such events behaves similarly (the latter is just the relativity of simultaneity once more). What does *not* vary between inertial frames is the *interval* or *separation* between events. For two points with standard, (spatially) Cartesian co-ordinates in a given inertial frame (x, y, z, t) and (x', y', z', t') , their separation is given by $\sqrt{|(x - x')^2 + (y - y')^2 + (z - z')^2 - (t - t')^2|}$ (just as, in Euclidean space, the distance between two points with co-ordinates (x, y, z) and (x', y', z') is given by $\sqrt{(x - x')^2 + (y - y')^2 + (z - z')^2}$). To repeat: this quantity is an invariant; it

¹Note, however, that I will not dwell on *one* sense in which SR is not the whole story: it does not even purport to be a ‘theory of everything’. General Relativity (GR) is at least of wider scope, and some presentists hope that GR may resurrect the absolute simultaneity that SR apparently kills off. In fact some models of GR are particularly inhospitable to absolute simultaneity, since they are not foliable. However, the presentist replies that at suitably large (*i.e. enormous*) scales our universe approximates to those models in which we may define a ‘cosmic’ time relative to global symmetries in the matter distribution. I find it odd to think that, according to such a presentist, the only objects that exist₃ are simultaneous with respect to this rather contingent feature of spacetime. In addition, the simultaneity in question is disturbingly fragile. What if the matter distribution ceased to be, or had never been, globally homogeneous? All in all I do not see that GR offers much hope to the presentist. For further discussion see Craig (2001:195–241) and Balashov and Janssen (2003:342–343).

²*E.g.* distant simultaneity can be established by ‘slow clock transport’ or by a ‘light-synchrony method’. See Janis (2006) for details, including a discussion of whether there is a conventional element to these procedures.

has the same numerical value even when the points are re-described (that is, re-‘coordinatized’) with respect to a different inertial frame.

We can translate this talk into talk of spacetime instead. In a *Newtonian* spacetime, for every two events there is a fact of the matter as to the magnitudes of both their spatial separation and the temporal interval between them. In a *neo-Newtonian* or *Galilean* spacetime, there is a determinate temporal interval between any two events and, if they are simultaneous, a determinate distance also. But there is no standard of absolute rest in such a spacetime, and hence no fact of the matter as to whether events at different times are co-located, 10 metres apart, or 10 light-years apart. When it comes to SR, the appropriate spacetime is *Minkowskian*. Just as the temporal interval and spatial distance between distinct events are frame relative in SR, so too in Minkowski spacetime is there no fact of the matter concerning (the magnitude of) these quantities. But Minkowski spacetime *does* respect what emerges from SR as absolute: there *is* a fact of the matter regarding the *separation* of any two events.

This separation allows us to decompose Minkowski spacetime relative to each and every spacetime point. If $(x - x')^2 + (y - y')^2 + (z - z')^2 - (t - t')^2 > 0$ our two points are *spacelike related* (*i.e.* they are some spatial distance apart). If $(x - x')^2 + (y - y')^2 + (z - z')^2 - (t - t')^2 < 0$ they are *timelike related* (*i.e.* they are some temporal distance apart). If $(x - x')^2 + (y - y')^2 + (z - z')^2 - (t - t')^2 = 0$ the points, assuming they are distinct, are *lightlike related* (*i.e.* they are connectable by a light signal). Because separation is an invariant, all observers agree as to whether two points are spacelike, timelike, or lightlike related.

Points that are lightlike related to p and with temporal co-ordinates (that in every frame are) later than p comprise p 's *future light-cone*. Points *within* this cone are future relative to p and timelike related to it. Together these timelike and lightlike future points comprise p 's *absolute future*; events at these points may be causally

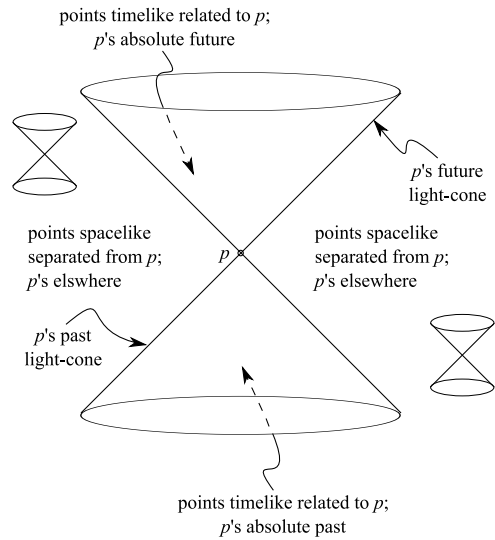


Figure 2.1

influenced by those at p .³ Analogous definitions can be given for p 's *past light-cone* and *absolute past*; the latter corresponds to those points at which events may causally influence those at p . Finally, points spacelike related to p comprise p 's *elsewhere*; events in this region are causally isolated from those at p . These distinctions are illustrated in Fig.2.1.

Armed with this terminology we may consider whether the presentist can construct a satisfactory relativistic surrogate for the classical present. The emphasis here is on “satisfactory”: of course the presentist can pick out a relation intrinsic to Minkowski spacetime and *label* it as a “simultaneity” or “co-presence” relation. The question is whether that relation has features sufficiently close to its classical predecessor to merit its title; and indeed whether the relation allows for a viable relativistic form of *presentism*.

The approaches I shall consider are four. They are based on (i) a relativized simultaneity; (ii) the idea of a ‘point’ present; (iii) interpreting simultaneity in terms of the past light-cone; and (iv) interpreting it in terms of the elsewhere. All of these

³Assuming as is customary that causal influence travels no faster than light.

proposals have already been discussed and criticized in the literature on relativistic presentism, and thus my treatment will remain somewhat brief.

2.3.1 Relative Simultaneity

One *can* define a simultaneity relation with respect to an inertial reference frame (recall fn.2). Could this be used to formulate a relativistic presentism?

First, a point in favour of this proposal. The classical simultaneity relation is an equivalence relation. Provided we restrict ourselves to just one reference frame, relative simultaneity is similarly reflexive, symmetric and transitive.

Suppose, then, that Jim clicks his fingers. In his inertial reference frame, that finger-click might occur simultaneously with the explosion of a distant star. Relative to a passer-by though, the finger-click precedes the explosion. And to someone walking the other way, the explosion precedes the finger-click.⁴ All this sounds odd to pre-relativistic ears, but it is just the relativity of simultaneity writ large. The difficulty for the presentist latching onto relative simultaneity is that *existence₃ itself* appears destined to be relativized. What exists₃ for me would be very different to what exists₃ for those walking past me. This sounds like a ridiculous conclusion.⁵

Now it might be replied that, for the presentist, existence₃ has *always* been relative. After all, what exists₃ relative to 2007 differs greatly from that which existed₃ relative to 1066. But even if we accept this, the radical dependence of existence₃ on velocity remains problematic. Altering one's velocity obliterates and generates very many distant bodies. Indeed, for anyone pacing back and forth, distant stars first exist₃, then do not exist₃, then exist₃ once more. Existence₃ should not be quite so fickle.

⁴At least this is the rough story. A (serious) complication is that in special relativity the rest frame of an extended object is not well defined. See Gibson and Pooley (2006:172).

⁵Another ridiculous conclusion would be that what exists₃ is *conventional*. This would seem to follow if one believed that the definition of relative simultaneity is itself conventional; see fn.2.

2.3.2 Point Presents

In response to arguments by Rietdijk (1966) and Putnam (1967) from SR to eternalism, Stein (1968, 1991) provides two suggestions of interest to the A-theorist.⁶ The first is a relativistically defensible analysis of “is determinate for”: x is determinate for y iff x lies in the absolute past of y .⁷ This relation is transitive and asymmetric, which is what we intuitively expect of a determinacy relation.⁸

More could undoubtedly be said, but our primary interest is in the consequences this has for the relativistic present. One natural thought is that the present is the edge of all that is determinate. This could be understood in terms of the past light-cone itself; we will consider this proposal shortly. Alternatively one might regard the very tip of the light-cone as the relativistic present, burrowing its way ever further into the future. This is Stein’s second conclusion: “in Einstein-Minkowski space-time *an event’s present is constituted by itself alone*” (1968:15). It follows if one thinks that (i) for two events to be mutually present, each must be determinate (or in Stein’s language, must have “already become”) for the other; and (ii) an event x is determinate for y iff x is in the absolute past of y . Because the latter relation is asymmetric, the only point which stands in a relation of mutual determinacy with x is x itself.⁹

Another interesting way to arrive at this ‘point’ presentism is to focus on the intuitive characteristics of “is real for”. Putnam (1967:240–243) required that this relation be transitive.¹⁰ But as Saunders (2000:S602) notes, it is very plausibly sym-

⁶For further discussion, see Maxwell (1985, 1993), Savitt (2000), Hinchliff (2000), Callender (2000) and Saunders (2000, 2002).

⁷An important caveat for what follows: Stein’s literal proposal is that x must lie in the “topological closure of the past” of y , which region he takes to *include y itself* (1968:14).

⁸This determinacy relation is I think the best relativistic option for the past-and-presentist; they could claim that x *exists*₃ for y iff x is in y ’s absolute past. However the final criticism of this section will apply not just to ‘point’ presentism but also to a past-and-presentism remodelled along these lines; and the remarks of §2.3.5 will also apply.

⁹Recall the caveat of fn.7.

¹⁰He required this under the spurious guise of a “No Privileged Observers” principle. Doubtless there is a genuine relativistic principle which might bear this name; but its connection to the

metric also. Reflexivity follows from this and is in any case desirable, meaning that we would ideally find a relativistic surrogate for “is real for” that is an *equivalence* relation. Now we return to Stein though, who writes (correctly) that in

Einstein-Minkowski space-time [...] *there are no intrinsic geometrical partitions into equivalence classes at all, besides the two trivial ones: that into just one class (all of space-time), and that into classes each consisting of a single point.*

(1968:19)

The eternalist will gladly agree, going on to deny that reality for each point could consist of that very point alone. Merely stating this view amounts to a *reductio*, they will argue: it is an extreme form of (spatiotemporal) solipsism. You are not real for me, and indeed no-one else is. Nor am I, or is anyone else, real for you.¹¹ We have lost the essential, *inter-subjective*, strand to our concept of reality.

In addition we may note a further, curious consequence: that almost none of an individual’s past has ever been present (for them).¹² Yesterday’s parade is past (and determinate) for me (say), lying as it does in my absolute past. Yet since I was not at the very spatiotemporal point where the parade occurred (I am idealizing somewhat here), for me it was never present. The same is true for almost all of my past.

2.3.3 The Past Light-Cone

Hinchliff (2000) develops and even endorses the other suggestion that tentatively emerged in discussion of Stein. In fact the idea was first backed by Godfrey-Smith, who suggested that “the present be identified with the class of events which are ‘seen now’ by an observer” (1979:240). In other words it is events situated on the past light-cone that are held to be present.

transitivity of “is real for” is tenuous at best.

¹¹At least these are natural conclusions. On the current proposal it is not completely obvious *what* is real for a spatially extended entity. Still, their distinct locations mean that no part of you is real for any part of me (and *vice versa*), in which case it seems right to say that *we* are not real *for one another*.

¹²See Putnam (1967:246), Hinchliff (2000:S579) and Callender (2000:S594).

Since the light-cone structure is invariant, on this proposal all observers agree as to what is present for an event E . Less encouragingly, these ‘present’ events are also *past* in every inertial reference frame: the temporal co-ordinates assigned to events on E ’s past light-cone are such that these events occur *before* E .¹³

This is not the half of it. The proposed relation is non-transitive: x can be present for y , and y for z , even while x is in the absolute past of z . The relation is also asymmetric: if x lies on y ’s past light-cone, y does not lie on x ’s. Hence if x is present for y then y is not present for x .

All this is repugnant enough in an analysis of “is present for”. It is still less attractive once we tether existence₃ to presence. If Jim at x exists₃ for Joe at y then Joe at y does not exist₃ for Jim at x . And Jim’s existing₃ for you together with your existing₃ for me does not entail his existing₃ for me.

2.3.4 The Elsewhere

Pre-relativistically, E ’s present is composed of those events that are neither past nor future relative to E . Needless to say, these are also the events simultaneous with E . In Minkowski spacetime, it is the ‘elsewhere’ that separates (absolute) past and future. It is therefore worth asking whether the elsewhere could play the role of surrogate present, and whether spacelike separation could ground a relativistic simultaneity.

Weingard believes that it can. He notes first (and we may agree) that temporal determinations would ideally be relativistically invariant, “so that the past, present and future for an event at P are the same in every frame of reference” (1972:120). This obtains on the proposal in question; the light-cone structure is frame independent. The proposal also has the advantage that past, present and future exhaust the sum of reality. And finally, the suggested underpinning for “is present for”—*i.e.* “is spacelike

¹³And in some frames *well* before. Savitt (2000:S566) observes that we generally talk of the Cosmic Microwave Background Radiation (CMBR) as having been emitted some fifteen billion years ago. On the current proposal, the emission of CMBR is *present*.

separated from”—is also symmetric.

Once again though, the proposed relation is not transitive. This in itself makes spacelike separation an unfortunate candidate for the simultaneity relation.¹⁴ But things appear more serious once we realize that timelike-separated events will *all* be present for any event spacelike separated from each of them. Thus my birth and death are simultaneous with distant Derek’s sudden sneeze. And although he lives for *thousands* of Earth years, his birth and death are both present for me-now. We can accept changes to our notion of simultaneity and the present, but there is a point at which these notions just do not apply.

In addition (although we get rather ahead of ourselves here) one *might* become a presentist to avoid the Problem of Change (§4.4). I am sceptical about this problem as usually formulated, but on ‘elsewhere’ presentism contradictory states of affairs will be *simultaneously* present for an observer at a spacetime point. This appears to be a sharpened, more serious, difficulty.

In conclusion we should reconsider an additional factor sometimes alleged to support presentism. I think there is little in experience that on reflection supports the presentist (as with non-ontological A-theories: see §1.2.1), but I take it that many presentists maintain experience to be *somehow* tied in with what is present. Quite the opposite is true on the current theory though: the present is precisely what we *cannot* experience. Sklar puts the protest rather well:

Having dismissed as unreal things whose only deficiency is the fact that causal signals from them have taken time to arrive at us now, or that causal signals from us will take some time to arrive at them, it seems very suspicious indeed to promote into the domain of the fully real those things causally inaccessible to us (now) altogether.

(1981:137)

¹⁴Weingard (1972:121) evidently thinks that “is real for” *is* transitive, and therefore equates this with the ancestral of “is spacelike separated from”. This would entail eternalism insofar as every event would be real for every other.

2.3.5 Fragmentation

To the tailored objections of the last few pages, I add a general complaint. It begins with a forthright observation by Gödel that the

concept of existence [...] cannot be relativized without destroying its meaning completely.

(1949:558)

What are we to make of this? As observed in §2.3.1, existence has *always* been relative to times if this just means that different things exist *at* different times. And for the presentist, existence₃ is equally relative: what exists₃ is permanently in flux.¹⁵

Perhaps Gödel is concerned that what exists₃ *for me* might differ from what exists₃ *for you*. But why is this more worrying than the fact that what exists₃ for me differs from what exists₃ (or perhaps *existed*₃) for *William the Conqueror*? The disparity might be thought to arise because William and I exist (and, for the presentist, exist₃) at very different times, whereas you and I exist (and exist₃) simultaneously. But this is just a classical intuition rearing its stubborn head: on relativity we are *not* simultaneous in any absolute and uncontroversial sense. Alternatively, perhaps we hesitate to allow a discrepancy in what exists₃ for us because we are so proximate. But in fact our proximity guarantees that on most of the preceding analyses hardly any discrepancy will arise.¹⁶

My suggestion is that we make Gödel's point in slightly different terms. Consider the ontological A-theorist's 'tide of absolute becoming'. This refers, albeit metaphorically, to an alleged process whereby successive events come into existence₃.¹⁷ It is a tide of *absolute* becoming, and moreover it is *just one tide*. Now we might in fact wonder whether there is *any* dynamic element to the proposals of the last few pages,

¹⁵In what follows I assume that by "existence" Gödel does mean existence₃.

¹⁶Two exceptions to this: if all that exists₃ relative to (x, t) is what is located at (x, t) , then we differ completely in what exists₃ for us; and on the relative simultaneity proposal, what exists₃ for us differs greatly if we are in (rapid) relative motion.

¹⁷See *e.g.* Broad (1923:67–68; 1938:280–281); but I take it there is such a 'tide' on presentism as well as past-and-presentism.

as opposed to merely a plethora of ‘timeless’ facts regarding what is present, and thus exists₃, relative to what. Setting that aside though, the most that the relevant proposals have provided is a coming into existence₃ that is relative to a ‘worldline’ (*i.e.* a sequence of contiguous timelike-related points); and there are as many of these ‘tides’ as there are worldlines. The same difficulty would arise with respect to the non-ontological A-theorist’s privileged properties. Classically these are alleged, again somewhat metaphorically, to ‘sweep through’ spacetime from past to future. But the recent relativistic proposals generate no such unified ‘sweep’, instead supplying a fragmented picture on which these properties ripple out from each and every spacetime point, but only relative to those points. In other words, my emendation of Gödel is this: the concept of *becoming* cannot be relativized without destroying its meaning completely.

2.4 Absolute Simultaneity Regained?

Now consider the following simple argument:

- (A) SR is true;
- (B) If SR is true then presentism is false;
- (C) Hence, presentism is false.

Clearly this argument is valid, and so the presentist must reject either (A) or (B). The last few sections have considered attempts to reject (B). I argued that each of the proposed formulations faces serious difficulties, and as such I henceforth take (B) to be true.

Indeed some *presentists* explicitly accept (B), focussing instead on a denial of (A).¹⁸ Their denial acknowledges the empirical success of SR, but seeks to accom-

¹⁸See Craig (2001:103–104) and Tooley (1997:335–338). Strictly speaking Tooley is a past-and-presentist, but (as indicated in §2.2) a lack of absolute simultaneity threatens this doctrine also.

moderate this in a watered-down version of SR (call it SR*) that is observationally equivalent. Whilst SR is a democracy, SR* is an explicit dictatorship: spacetime can be foliated into very many sets of parallel hyperplanes, but SR* holds one particular set to be privileged. Events that lie on a *single* hyperplane within this set are absolutely simultaneous, and the timelike direction orthogonal to these successive hyperplanes defines an absolute rest. Observational equivalence with SR is guaranteed insofar as motion relative to the absolute rest frame results in a deformation of our measuring apparatus that compensates for and conceals the relative motion. In this way nature conspires to hide the absolute rest frame from us.¹⁹

The presentist can hold, then, that SR* is true instead of SR. If so, presentism can be resurrected in its original form; tendentious re-dressings in relativistic garb are not needed. This manoeuvre is popular: Prior (1968, 1970), Tooley (1997:337–373), Hinchliff (2000:S584–586), Craig (2001) and Markosian (2004a:75) all endorse versions of it. Indeed the latter argues that SR* is *a priori* preferable to SR, presumably because we have an *a priori* predilection for absolute simultaneity.

Before going on to consider the potency of this move, I must express some initial reservations.²⁰ I grant that there *may* be a privileged frame which is absolutely at rest. But I similarly grant that there *may* be a privileged centre to the universe, or a privileged direction to space. These are all *possible*, but the latter two in particular we do not regard as likely. The reason is that such ‘privileges’ are simply redundant; we can explain both experience and the wider world without recourse to them. The same seems true of absolute simultaneity.²¹ Just as it would take an extremely strong metaphysical argument to persuade us of the reality of an absolute centre to the

¹⁹Such a theory may sound outlandish, but in FitzGerald (1889) and particularly Lorentz (1892, 1895) it has roots in papers seminal to the development of SR. For further details on the so-called “neo-Lorentzian” interpretation, see Craig (2001).

²⁰I borrow these reservations from Stein (1991:154–155 fn.3).

²¹I say “seems” because certain controversial interpretations of Quantum Mechanics do posit an absolute simultaneity relation (albeit one hidden from us). This is clearly good news for the presentist, but the interpretation of Quantum Mechanics is neither simple nor settled. If I were a presentist, I would not be holding my breath.

universe, or of a privileged direction, so should we require the same for absolute simultaneity. For my part I doubt that the presentist has arguments that are nearly strong enough.

2.5 The Modal Relativistic Argument

I shall propose a version of the argument from SR that claims immunity from responses based on SR*. Its immunity stems from its not requiring SR to be true, but merely to be *possible*; hence I dub it the *Modal Relativistic Argument* (MRA). I think MRA makes the presentist's hand seem extremely weak, especially in conjunction with all that has gone before; but if I am wrong then at least it encourages us to think more deeply about the presentist thesis.

Subject to certain clarifications in §2.5.1, MRA requires three premises:

- (1) Presentism is either necessarily true or necessarily false;
- (2) SR is either contingently true or contingently false;
- (3) If SR is true of any world, then presentism is false of that world.

If the presentist accepts all three of these, they are undone:

- (4) From (2), SR is true of some possible world;
- (5) From (3) and (4), presentism is false of some possible world;
- (6) From (1) and (5), presentism is necessarily false.

I take it, then, that the presentist disagrees with at least one of (1)–(3). We can almost immediately eliminate (3) as the source of the disagreement, since it is so close to the previously accepted (B). The sole difference is that it loosens the scope of (B) so as to apply to all worlds rather than just actuality; but the reasons for accepting (B) are likewise reasons for accepting this loosened (3). It is not just in

actuality that a lack of absolute simultaneity scuppers the presentist; surely this is true more widely.

I shall therefore say no more about (3). In §2.5.1 I turn to some book-keeping, before defending (1) in §2.5.2 and (2) in §2.5.3.

2.5.1 Book-keeping

I wrote in §1.3.1 that in rough terms presentism is the doctrine that “only present things exist”.²² Others portray it as holding that “nothing exists which is not present”; that “only the present is real”; and that “only present objects exist”.²³

Others strengthen these formulations though. Hudson portrays presentism as “the thesis that, *necessarily*, only present objects exist” (2001:46; my italics). Sider claims that the “presentist thinks [...] that, *necessarily*, it is *always* true that everything is (then) present” (1999:325; my italics). Moreover, some of the previously cited authors precisify their definitions along similar lines. Zimmerman (1996:115–117) does just this, as does Markosian in a footnote to his above characterization:

More precisely, it is the view that, necessarily, it is always true that only present objects exist.

(2004:47 fn.1)

The explicit focus of MRA on the modal status of the claim that only present objects exist₃ requires that one tread carefully here. Adopting Sider’s definition would mean that any query as to whether *presentism* is necessarily true would in fact ask whether it is necessarily true *that it is necessary* that only present objects exist₃. But the intended question is rather whether it is necessarily true *that only present objects exist*₃.

²²See Crisp (2004:15) and Keller (2004:84). In retrospect I meant that only present things *exist*₃.

²³For the first of these formulations see Bigelow (1996:35); for the second see Tooley (1997:234), Hawley (2001:34), Davidson (2003:77) and Crisp (2003:211); and for the third see Markosian (2004a:47).

By “presentism” *we* shall mean the view that only present objects exist₃. It follows that presentism is potentially true or false of particular worlds at particular times. *Prima facie* then, the actual world might be “presentist” even though other worlds are not, and indeed it might be presentist today but not tomorrow. Such a view is not overly plausible, but it is consistent with our definition.

2.5.2 Could Presentism Be Contingently True?

Now to a defence of (1). The ultimate strategy will be to argue that presentism cannot be contingently true or contingently false; thus it is necessarily true or necessarily false as claimed by (1). First though, I consider the received wisdom on this subject.

Received Wisdom

We saw in §2.5.1 that many writers refrain from commenting on the modal status of presentism. But from the evidence seen so far, it might be thought that whenever the modal status of presentism *is* commented upon, presentism is held to be necessary (or at least it is held that its proponents take it to be necessary).

This is not quite true. Bergmann does assume presentism to be held as necessary (1999:123), but adds in a footnote that his argument (which is not of relevance here) would go through “even if” presentism were contingent (1999:130 fn.13). Bigelow is similarly sceptical, thinking it “improbable” that presentism could be contingent. However, he concedes the possibility:

If presentism could be proved false by a scientific experiment then, it would seem, presentism would not be a “metaphysical” matter after all but would be a merely empirical hypothesis. Initially, that seems improbable, though we should return to this option.

(1996:36)

Crisp confirms that “most presentists think of their theory as necessarily true if true”.

However, he opts to “reserve judgement”:

The reasons I know of for being a presentist offer no reason at all for thinking presentism a necessary truth.

(2003:215)

Finally, Rea is also quite circumspect. He stops short of saying that presentism is contingently true (if true at all), but sees

no reason to dismiss at the outset the possibility that presentism and its denial are contingent.

(2003:248 fn.9)

It seems we have a lop-sided spectrum of opinion. Hudson, Sider, Markosian and Zimmerman take presentism to be (held as) necessarily true. Bigelow and Bergmann think it unlikely that presentism could be just contingent. Crisp and Rea have no such reservations, but fall short of fully endorsing it as contingently true (if true at all). Note also that the disagreement over presentism's modal status does not align with that between presentists and eternalists. In fact all four bases are covered: see Fig.2.2. It follows that (1) does not make the disreputable move of adopting a view of presentism held only by non-presentists. Still though, why take (1) to be true?

Presentism's modal status	<i>Presentist</i>	<i>Eternalist</i>
<i>Necessarily true if true at all</i>	Zimmerman & Markosian	Sider & Hudson
<i>(Arguably) contingently true if true at all</i>	Crisp	Rea

Figure 2.2

Intuitions and Arguments

There are three surprises in this area. The first we have met: many writers on presentism seem insensitive to its modal status. The second we have also met: there are differences of opinion within both camps even when modal considerations *are* addressed. The third surprise is that those who *do* address this topic do so only superficially. Crisp and Rea are alone in offering any justification for their views, and even their justification is essentially negative (they can give no reason why presentism may *not* be contingent).

In search, then, of a more positive justification, I first report some common intuitions: that the debate over presentism is ‘metaphysical’ in some full and meaty sense; that these are therefore issues of *necessity*; and that this is appropriate to a doctrine that is philosophical as opposed to physical.

What lies behind these fledgling intuitions? Perhaps the thought that philosophical investigation proceeds *a priori*. This doubtless marks an important contrast with (some) other disciplines. But it does not mean that philosophical doctrines are necessarily true (if true at all). First there is the Kripkean (1980) worry that the *a priori* and the necessary misalign, and do so twice over; for there are both *a priori* contingencies and *a posteriori* necessities. Secondly, even though philosophical reflection may itself proceed *a priori*, if the premises from which it embarks are contingent, only the contingent truth of the conclusion will follow.

Nor, as Crisp and Rea have observed, do the considerations in favour of presentism clearly portray it as necessarily true. I deal with these considerations in turn.

The first is simply that presentism is strongly intuitive. In fact I disputed this claim in §1.4, but that aside it seems excessive to think that gut feeling reveals not just truth but even *necessary* truth.

Perhaps this gut feeling is somehow tied to experience. I think that experience supports presentism no more than it supports non-ontological A-theories (recall §1.2.1).

Again though, even if our experience were such that it lent credence to presentism, would this entail the *necessity* of that doctrine?

Similarly, recalling §1.4.3, it does not appear necessary that we are free agents (indeed it may not even be true); and I still claim (as my promissory note records) that considerations involving persistence and-or the Problem of Change do not entail the truth, let alone the necessity, of presentism.

Fourth consideration: as remarked in §1.3.3, presentism is supposed to be the temporal analogue of actualism—which is itself a popular theory. Given the analogy, if there were good reasons to think actualism necessarily true (if true at all) then perhaps presentism should be regarded similarly. But in fact it makes little sense to discuss the modal status of actualism. What would it mean for this doctrine to be necessarily true? It hardly seems right to say that, in every possible world, only the actual world exists₃. Moreover, even if we could comprehend the idea that actualism is necessarily true (if true at all), it would still not follow that this carries over to presentism. For one thing the analogy might break down at the modal level. For another, if actualism—a theory of modal ontology—were *necessarily* true (if true at all), then the temporal analogue of this might appear to be that presentism—a theory of temporal ontology—is *always* true (if true at all).

Finally, what of presentism's attractively streamlined ontology? Arguably, presentism is not especially streamlined if it embraces either *haecceities* or abstract times (see §1.4.2). But this aside, perhaps there *is* a route from ontological parsimony to necessary truth. Suppose that, necessarily, either presentism or eternalism or past-and-presentism (*etc.*) is true. Suppose further that, necessarily, presentism is the most parsimonious of these. Final supposition: necessarily, parsimony is a criterion of truth. It would then follow that presentism is necessarily true.

It is the final supposition that seems weakest. Parsimony in itself cannot be sufficient for truth, since an extreme nihilism would soon follow. What is also required

of a theory is something like *adequacy*. Even then though, it is unclear how elegance and simplicity should be weighted relative to parsimony; perhaps a *ceteris paribus* clause must be included before parsimony is allowed to arbitrate between theories. But irrespective of this small print, the major objection to the final supposition is that it is simply misguided. Occam's razor, it will be said, is a *heuristic* principle to be employed when formulating or adjudicating between theories. It is a perversion of this principle to regard parsimony as a necessary criterion of truth.

In fact I have no wish to engage in a lengthy debate over the status of Occam's razor. I *tend* to the view that it is indeed just a heuristic maxim, but since my overall aim is to establish (1), and the argument from Occam's razor purports to do just this, I would be more than happy to be wrong here.

This aside though, Crisp and Rea seem correct in their claim that the arguments for presentism, such as they are, do not portray that doctrine as necessarily true. So why not just deny (1) and take presentism to be contingent instead?

Supervenience and Epistemology

Tempting as this is, I think we should pause for thought. (1) is in with a chance. The gist of my supporting argument is that *epistemic* considerations make it unattractive to hold presentism to be contingently true or contingently false. And if one does not hold presentism to be contingently true or contingently false, then one holds it to be necessarily true or necessarily false as claimed by (1).

A world is *presentist* iff presentism is true of that world. The contingent truth of presentism would then amount to the actual world, but not all worlds, being presentist. We can distinguish two versions of this claim: *supervenient* contingent presentism, which holds, roughly, that two worlds cannot differ *merely* as to whether they are presentist; and *non-supervenient* contingent presentism, which holds, again roughly, that two worlds can so differ.

Now to smooth out this roughness. We wish to discuss whether possible worlds might differ *only* as to their presentist status. But given that a difference *vis-à-vis* presentism means a *gargantuan* difference in terms of what exists₃, how could two worlds differ *only* with regard to presentism?

We can finesse this issue by construing possible worlds four-dimensionally. They contain, or perhaps represent, everything that has happened, is happening, and will happen in a world—irrespective of whether all of this, or only a particular sliver, exists₃. Even the most die-hard presentist should not object here. The suggestion is merely that we conceive of possible worlds as *models* of all that happens over time. The presentist is free to say that only a part of this model represents what exists₃, just as the eternalist chooses to embrace it whole. Moreover, the contingent presentist with whom we are currently engaged *allows* that not all worlds are presentist. It seems, therefore, that they can have no *general* objection to my talk of four-dimensional models, since in some cases they assert that *all* of what is thus represented in fact exists₃.²⁴

Now to streamline our definitions. *Supervenient contingent presentism* holds that by fixing the world-history, we thereby fix the presentist status of that world. *Non-supervenient contingent presentism* holds that a world's presentist status is *not* fixed by its world-history; the same world-history could be true of both a presentist and a non-presentist world.

Supervenient contingent presentism is not very plausible. How could a world-history determine the 'rules' of existence₃ for that world? How would changing that world-history correlatively change a presentist world into a non-presentist one (or *vice versa*)? Alter the number of objects in the world-history, alter their type, their distribution, their properties and the relations between them: such alterations do not underpin the difference we are pursuing.

²⁴Or at least that more than a single slice of the model corresponds to the existent₃. (There is the logical space for a contingent presentist to hold that *eternalism* is necessarily false.)

What about the laws of nature? If one is a Humean then to alter these *is* to alter the distribution, properties, *etc.* of objects as already discussed. On a more robust view of the laws of nature, it is certainly true that varying these might make ‘past objects become present’. Suppose that the actual world is presentist. Then it is plausible that different physiological laws might have allowed the recently deceased to live into the present and thus exist₃. But this is not what we are after. We want past objects not to ‘become present’ and *therefore* existent₃; we want them to remain past but *nonetheless* exist₃. This is no job for the laws of nature.

Indeed there appears to be a *Sorites* argument against supervenient contingent presentism. Consider two very different world-histories that are alleged to differ, *inter alia*, as to their presentist status. Imagine passing ever so slowly from one of these worlds to the other *via* a succession of possible worlds each differing only minutely from its predecessor. At every step the successive worlds might differ only over the colour of an object, whether an event happens fractionally earlier or later, whether there is one less atom, *etc.* It is implausible that any such step marks the transition from a presentist to a non-presentist world. But unlike with baldness or piles of sand, the distinction between a presentist and a non-presentist world is surely an absolute one with no grey areas. So not only can the transition not occur at a single step, but it cannot occur gradually either. In that case it cannot occur at all.

I turn then to non-supervenient contingent presentism. But I begin with the apparently unrelated tale of the pixies that pursue me relentlessly about Oxford. These pixies are invisible, noiseless, odourless, immaterial, and in fact entirely undetectable. Nonetheless, I believe they are out there (and in hot pursuit).

How would I persuade a sceptic? Perhaps by convincing them that the pixies exist *necessarily*; that there are *a priori* reasons as to why they *must* exist. But what if I think the pixies exist only contingently? This means, of course, that their existence is possible, but that their non-existence is also possible. And now it seems

that I espouse a seriously unattractive set of views, for if it is entirely possible that the pixies *not* exist, then why, given that there is no evidence for their existence, do I persist in saying that they do? A more appropriate response would seem to be agnosticism or indeed an Occamist repudiation.

Very similar thoughts apply to non-supervenient contingent presentism. Some things ‘show up’: if there were a cat on the mat I could see it from where I sit and would trip over it when leaving the room. But the truth or falsity of presentism is not similarly observable, as Markosian admits:

In particular, we Presentists think that the current state of the world is qualitatively indiscernible from the way it would be if Non-presentism [...] were [...] true.

(2004a:69)

Why is this? As discussed in an earlier context (§1.2.1), what we perceive at each and every spacetime point is determined, not by mysterious A-properties or what exists₃, but rather by what occurs at locations appropriately distanced from the point of perception. I hear a faraway gunshot, but whether the gunshot still exists₃ makes no difference to my perception. This lack of sensitivity is even more obvious with respect to the distant past. Whilst we might question the coherence of such an idea, my moment-to-moment experience would not differ even if the existence₃ of Napoleon and the whole 19th century were constantly in flux.

We can now see the problem with non-supervenient contingent presentism. This view holds that presentism is true of some worlds yet false of others. But in virtue of its non-supervenience, the truth or falsity of such presentism ‘floats free’ of all that is detectable; the price of non-supervenience is ignorance. Why assert presentism to be true of a world in which there is no evidence for its truth? One might as well believe in pixies.

Of course if our ignorance extends to any particular world, we are *ipso facto* ignorant about the actual world. We might therefore dilute contingent presentism:

having previously held that the actual world is presentist but not all worlds are, the contingent presentist could retreat to the claim that some worlds are presentist but others not—with no assertion being made about actuality. I believe that those presentists against whom MRA is aimed would balk at this. Prior, Craig *et al.* think that in the *actual* world, only present things exist₃. In addition though, one must observe quite how empty this contingent presentism would be. Some worlds are presentist and others not; but we cannot say whether a world is or is not presentist, even when that world is our own. Here is a distinction with no observable differences, with respect to which we cannot place the actual world, and for which I know of no good arguments. It therefore seems to me that, whether one takes it as supervenient or non-supervenient, contingent presentism is a desperately unattractive doctrine.

2.5.3 The Contingency Of SR

The final premise of MRA to be examined is (2): that SR is either contingently true or contingently false. If one happens to believe (as I do) that SR *is* true, and further that the laws of nature are contingent, then one will doubtless be strongly disposed to accept (2) already. But given (1) and (3) it seems that the presentist must resist. Clearly they will not hold SR to be necessarily *true*; they must claim it to be necessary false instead.²⁵ How should we understand this claim?

Not in terms of a strict, logical, necessity. It is unlikely, to say the least, that SR suffers from the kind of internal inconsistency that would generate a logical contradiction or closed tableau. The theory is too well understood for this to be a significant worry.

But might there be a lurking *interpretative* difficulty with SR? Although (I have claimed that) it is a self-consistent formal calculus, there may be deep-lying reasons

²⁵In so doing they align themselves against those presentists who attempt to relativistically reformulate their doctrine. I take it that such presentists think SR is true—or at the very least not necessarily false.

why it cannot possibly be understood as a theory of *time*. I suggest that the most likely way for the presentist to develop this is by observing that worlds satisfying SR contain no absolute simultaneity, and yet (they will claim) absolute simultaneity is *essential* to time.

Much will depend on how this latter claim is supported. It is far from obvious, and in fact goes rather against the grain. The vast majority of physicists and philosophers happily regard SR's non-spatial dimension as temporal, despite an explicit belief that it admits of no absolute ordering. And there is good reason for this: despite the lack of an absolute simultaneity, a universe satisfying SR may yet include a dimension that stands aside from three spatial ones, along which entropy increases, causes give way to effects, change occurs, experiences succeed one another, and clocks function as measuring devices. Can we really claim that such a dimension is not temporal?

The presentist has to bite this bullet. They must maintain that even if it contains all of the above, a spacetime that does not admit of an absolute ordering contains no *time*. And worse is to follow. Let us make the supposition—which in fact I reject—that absolute simultaneity *is* essential to time. Let us then describe as *quasi-temporal* a spacetime which, though not equipped with an absolute simultaneity, nonetheless contains a dimension with respect to which entropy tends to increase, causes lead to effects, experiences occur, *etc.* It seems that the presentist must insist that even *quasi-temporal* worlds are impossible; for in such a world presentism would again be false (due to the lack of an absolute simultaneity). So not only does the presentist have to establish the controversial thesis that absolute simultaneity is essential to time; in addition they must argue that there could be no world containing a merely *quasi-temporal* dimension.

I do not know how they can accomplish this latter aim. As to the former project, that of showing absolute simultaneity to be essential to *time*, it is also unclear how the presentist should proceed. Perhaps their best bet is to urge that *passage* is essential to

time (and to further observe that absolute simultaneity is necessary for passage). This is not immediately more persuasive than the earlier claim about absolute simultaneity: why think that *passage* is so essential to time that a spacetime lacking this would fail to be temporal, even if it exhibited all the other paradigmatic features of temporality? But the presentist might extract an answer of sorts from McTaggart (1927:14–15). *Change*, they will say, cannot occur without passage; and time is the dimension of change. To this there is the standard eternalist reply that change is in fact just variation in what obtains at different times (or perhaps different *quasi*-times given the recent discussion); it is not dependent on passage after all.²⁶ Whilst I fully endorse this reply, I assume the presentist rejects it. They will continue to maintain that a world with no absolute simultaneity, and hence no passage, contains no change. But again, could there not be *quasi*-temporal worlds in which (on the supposition that the presentist is correct) there may not be change as such, but there may still be variation in what obtains at different times? In such a world, where there is no absolute simultaneity, presentism would again be false. And indeed, could the *actual* world not be *quasi*-temporal in just this way?

But perhaps it is unfair to expect an *argument* from the presentist here. It is apparently essential to water that it have the molecular structure H₂O; but as Kripke (1980) has taught us, this is an *a posteriori* discovery. Might it similarly be necessary *a posteriori* that time admit of an absolute simultaneity?²⁷ If so, then it is hardly fair to insist on an *a priori* argument to this effect.

The first point to make in response is that the Kripkean analogy is far from perfect. Whilst most of us concede that water could not have been XYZ, or that I could not have been born to different parents, the concession regarding time is *much* less intuitive. To repeat what was said above: many of us very comfortably interpret

²⁶In addition the presentist must consider Shoemaker's (1969) claim that there could be time *without* change.

²⁷Which I take to mean that this would be *metaphysically* necessary. Dorothy Edgington and Hugh Rice have suggested that the presentist might adopt this line.

SR as informative about *time*, despite the lack of an absolute simultaneity. To the extent that there is an analogy here, our presentist resembles one who says that water *is* essentially XYZ; they claim as necessarily true that which we tend to regard as actually false. This is an uninspiring start.

A second (and I think decisive) objection is that it is desperately unclear how the presentist might have *discovered* the putative *a posteriori* necessity of absolute simultaneity to time. What *empirical* investigation could possibly reveal this? And even if empirical factors did somehow reveal an absolute simultaneity, how could they further establish this as *necessary* to time?

Thirdly, we may revisit old territory. Whilst we accept that anything without the microphysical structure H_2O would not *be* water, we think there could nonetheless be another substance that melted at 0°C , boiled around 100°C , filled the rivers and seas, *etc.* This provides a model for what was previously introduced as *quasi*-time: a dimension that is *like* time in many ways, but does not admit of an absolute simultaneity. On the hypothesis that absolute simultaneity is (metaphysically) necessary to time, it would be *quasi*-time, and not time itself, that most physicists believe to obtain in our universe (although doubtless they express this somewhat differently). It is no more plausible to contend that *quasi*-time is impossible than to claim that there could be no water-*like* liquid distinct from H_2O .²⁸

²⁸Note added June 2007: my attention has recently been drawn to the discussion of Bourne (2006b:204–224), which overlaps in part with the foregoing material. Bourne interprets an especially cryptic article by Gödel (1949) as arguing from (a) the compatibility with General Relativity of certain non-foliable (“Gödelian”) spacetimes to (b) the unreality (or “ideality”) of time. I am unconvinced that Bourne ever supplies a valid route from (a) to (b), but he seemingly attempts this *via* (c) time is necessarily A-theoretic, (d) Gödelian spacetimes are temporal, and (e) such spacetimes are acutely inhospitable to all A-theories. (I regard these three as jointly inconsistent, thus demonstrating not (b) but rather the falsity of (at least) one of (c)–(e). But I stress that this is my reconstruction of an argument I find obscure.)

The Gödelian spacetimes under consideration are a little unusual, and one might be led to doubt their physical possibility (or, with regard to (d), their temporality). I am far less inclined to doubt the possibility (and temporality) of SR worlds, and hence prefer to focus any modal argument on the latter. But I note with satisfaction that, although he himself is a presentist, Bourne and I agree on several points. In particular, just as I have rejected any attempt to regard SR worlds as non-temporal due to certain allegedly essential properties of time, so does Bourne reject a similar appeal that would allow the A-theorist to deny (d) (2006b:216–217). Instead Bourne opts for a denial of

2.6 Conclusion

Where does this leave us? In Chapter One I argued that there is little if any (experiential) support for non-ontological A-theories, and indeed that such theories are verging on the incoherent. For the remainder of that chapter I highlighted certain difficulties for the presentist, and (more briefly) for the past-and-presentist and ‘branching futurist’. By contrast, eternalism seemed relatively trouble free.

The current chapter has focussed on SR, arguing in §§2.2 and 2.3 that it is difficult if not impossible to provide a satisfactory reformulation of presentism in the absence of an absolute simultaneity. In §§2.4 and 2.5 I considered a modal argument to counter the presentist suggestion that SR might be false insofar as it fails to acknowledge (what they believe to be) a genuine, albeit hidden, absolute simultaneity. I argued that even if SR *is* false in this way, the presentist is still very much troubled by its *possibility*. The key claims were that we have no good reason to doubt this apparent possibility, and that it is unattractive to hold presentism as just contingently true.

At this point one should recall (from §2.1) that although presentism is an ontological A-theory, and indeed the most popular such theory, with respect to SR it has stood in for A-theories more generally. In other words I claim that the difficulties with SR, whether stemming from its truth or its mere possibility, are difficulties for

(c). In doing so he admits that the actuality of any contingent A-theory would not be revealed empirically (2006b:218), rather as I have contended that the truth of presentism does not ‘show up’.

Bourne then strongly criticizes what I would describe as a ‘non-supervenient contingent A-theory’ (2006b:219–220) for the very reason that I rejected non-supervenient contingent presentism in §2.5.2: what grounds could one possibly have for asserting its truth? Astonishingly though, this is extremely close to Bourne’s final position (2006b:220–224). He thinks that A-theories apart from presentism are ruled out for *a priori* reasons, and that some worlds are not A-theoretic since they are not foliable. However, *other* worlds (which can be foliated) might yet be presentist. The “might” is crucial though: Bourne does not claim that such worlds *would* be presentist, concluding instead (with regard to the B-theory and presentism) that “in those worlds where particular matters of fact do not rule either out, we have to say that either could be true and that it is a brute matter of fact which is” (2006b:223). It follows that “it is hard to see any reason for thinking that the actual world is [A-theoretic] rather than [B-theoretic]” (2006b:221)! One might be distracted at this stage by Bourne’s abrupt change in topic—he switches from defending presentism to defending *metaphysics*—but I shall retain my focus. When a presentist feels forced to admit that their own doctrine may well be false of actuality, they should surely start to reconsider.

all A-theories—be they ontological or otherwise. I would be happy to rest my case against the various A-theories on relativistic considerations. But the arguments of Chapter One mean I do not have to. Taken in tandem, the last two chapters amount to what I think is a convincing case against the A-theorist. Henceforth I will assume the B-theory.

Chapter 3

Two Theories Of Persistence

3.1 Introduction

Objects exist at multiple times: they *persist*.¹ How do they do so? This chapter provides brief introductions to the two most popular accounts: *endurance* and *perdurantism*. Those introductions are not, and could not be, independent of what has gone before though. My espousal of the B-theory, and of eternalism in particular, will soon lead to difficulties in formulating endurance. In Chapters Four and Five it will also furnish various anti-endurantist objections.

3.2 Perdurantism

I begin with perdurantism, the kernel of which I take to be that objects are temporally extended.² Lewis (1986a:202) and Sider (2001:2) provide a useful analogy: perduring objects extend through time rather as roads extend through space.

Such roads have salient parts, for example the streetlit section or the dual carriage-way. I believe that roads also have (most probably) *non*-salient parts corresponding

¹It is standard to say that an object persists iff it exists at more than one time, but the latter is more plausibly necessary than sufficient. We would hardly regard as persistent that which existed only at two greatly separated instants.

²I shall also write as if perduring objects are “four dimensional”; but temporal extension is what really counts. A temporally extended but spatially flat object would be *three* dimensional but nonetheless *perduring*.

to every sub-division of their length.³ Thus each and every road has a middle third, a second fifth, *etc.*, even if these sections stand out not at all. How *else* could a road extend through space except by having such parts?

A *simple* has no parts whatsoever (whether salient or otherwise). No-one believes roads to be simple, but some think that spatially extended simples are at least possible.⁴ I reject this. I am prepared to grant that an object may be (i) extended, (ii) lacking in salient parts, and (iii) strongly indivisible; but I deny that such an object could also be a simple. Consider the following putative simple: it is externally just like a snooker ball, internally homogeneous and continuous, and extremely robust. Suppose that this object is struck from the baulk line of a snooker table. Is *part* of the ball not touching the baize before the shot? Must we regard the cue as impacting the *whole* ball rather than a part of it? And how did the ball straddle the baulk line except by having a part either side of it? True: talk of “simples” usually aims at microscopic bodies (perhaps because actual macroscopic objects are *clearly* composite). But the literature on *extended* simples does not respect this,⁵ and rightly not; for why would sheer *size* generate extra complications? The objection is entirely general: irrespective of the scale, if an object extends from $-L$ to L on some spatial axis, then clearly *half* the object lies between $-L$ and 0 , and *half* between 0 and L .⁶

For entirely parallel reasons I believe that any temporally extended object pos-

³At least for *macroscopic* sub-divisions. Intermolecular gaps are a complication here.

⁴*E.g.* Scala (2002) and McDaniel (2007). Markosian (1998, 2004b, 2004c) ostensibly embraces extended simples, but distinguishes between *metaphysical* parts, “which are the things that actually compose composite objects”, and *conceptual* parts, “which correspond to the sub-regions of the region of space occupied by an object” (1998:223). He concedes that “anything with some extension will have *conceptual parts*” (1998:224).

⁵See Scala (2002:395), Markosian (1998:214; 2004c:415) and McDaniel (2007:140).

⁶Scala explicitly denies this, granting the possibility of a simple that “occupies a greater than point-size region of space and is indivisible because it does not have, for instance, a right or a left half. To look at one, you would think you can distinguish a right from a left half, but looks aren’t everything. When you think you point to a part of the atom, I say you are pointing at all of it or nothing at all” (2002:394). In a reply to Scala, Zimmerman (2002:398) describes these simples as “seemingly possible”. McDaniel also denies my claim: he grants as analytic that “[i]f it had two halves, then [a] simple would have proper parts”, but *denies* that “[i]f there were an extended simple, then it would have two halves” (2007:138–139).

sesses a *temporal part* for every sub-division of its duration.⁷ This, then, is the perdurantist account of how an object persists through time: it has temporal parts whenever it exists.

What *is* a temporal part though? It is tempting to reply: what is a *spatial* part? The perdurantist holds these to be largely analogous; if we understand one, we should understand the other.⁸ A fuller reply is available though: a temporal part is an improper part of its parent object as at a particular time, and exists only at that time.⁹

Just as my spatial parts are naturally associated and indeed united, so too are my temporal parts. Such parts are hardly *identical* (nor is my foot identical to my hand), but they are nonetheless parts of the *same* four-dimensional object. In perdurantist terms they are *genidentical*: related and united by a mixture of qualitative, spatiotemporal, and causal continuities.¹⁰ The genidentity relation is non-transitive and need not be one-one between temporal parts at different times.¹¹ Note that many perdurantists also countenance *non-natural* associations of temporal parts, so that there is an ‘object’, albeit an unfamiliar one, composed of my temporal parts, those of Napoleon, and those of an aubergine. As I shall use the term, such parts are *not* genidentical; only parts of *natural* (perduring) objects are thus related.¹²

⁷Sattig (2006:55) and Gilmore (2006:206–208) countenance (the possibility of) temporal extension without temporal parthood. They make no reference to a salient/non-salient or metaphysical/conceptual distinction, although an earlier draft (*private communication*) reveals Gilmore to believe in the possibility of *spatially* extended simples *à la* Scala and McDaniel.

⁸Although in fact there are certain non-obvious differences in the way we individuate spatial and temporal parts: see Butterfield (1985:35–37).

⁹In fact this defines an *instantaneous* temporal part. (I intend my characterization as equivalent to Sider’s definition: “*x* is an *instantaneous temporal part* of *y* at instant *t* =_{df.} (1) *x* exists at, but only at, *t*; and (2) *x* is a part of *y* at *t*; and (3) *x* overlaps at *t* everything that is a part of *y* at *t*” (2001:59). Sattig’s (2006:54) definition is similar, but since he focusses on *spatially* improper parts, a difference arises with respect to an object that is either non-spatial or spatially coincides with one of its proper parts.) An *extended* temporal part would be an improper part of its parent object as it is throughout a certain *period* (and would exist only at that period). A perduring object therefore counts as its own extended temporal part. Perhaps more surprisingly, this also seems true of an *enduring* object.

¹⁰The precise mixture depends on the type of object. See Chapter Seven for more on genidentity.

¹¹See *e.g.* Lewis (1976:24–25) and the discussion of fission in §7.5.2.

¹²In this I seem to follow Sider (2001:224–225). Naturalness may well be vague here.

3.2.1 Virtues And Vices

Any view that holds objects to be four dimensional and possessed of temporal parts is somewhat counter-intuitive. So why adopt perdurance?

Firstly, it is attractive to one impressed by apparent analogies between time and space; it treats temporal parts largely on a par with spatial ones.¹³ Eternalists in particular already ‘spatialize’ time to some extent by holding that places are an ontological model for times: all exist₃ equally. They may be inclined to go further and regard persistence through time rather as they do extension through space.¹⁴

However, perdurance’s main advantage is that it (allegedly) reaps metaphysical rewards far outweighing any counter-intuitive costs. I will focus on three particular examples much later in §7.5.2, but as a taster: the problems of fission and fusion, the statue and the clay, and Theseus’ Ship are all alleged to become tractable on perdurance. These are significant gains in themselves, but it is also thought that perdurance avoids the so-called ‘Problem of Change’, whereas endurance does not (see §4.4).

Critics of perdurance emphasize its counter-intuitive claims. Thus (i) Thomson dismisses it as a “crazy metaphysic” (1983:213); and (ii) Van Inwagen claims not even to understand it (1981:133). Other important objections centre upon (iii) the Rotating Discs Argument and (iv) Van Inwagen’s accusations of modal inductility (1990:252–254). I will comment on (iv) in §6.4.3, and on (iii) in Chapter Seven. Van Inwagen’s (ii) is rather undermined by his later work, which apparently displays a very clear understanding of perdurance.¹⁵ In any case the only real response to (ii) is to clearly explain the perdurantist’s claims, and this I have already tried to do. Regarding (i), the precise charge is that perdurance involves a constant generation

¹³Though recall fn.8.

¹⁴Though Parsons (2000:403–406) discusses a surprising potential outcome of this inclination: that *spatial* extension might not involve parts, but rather an endurance-like multiple location.

¹⁵Nonetheless, Van Inwagen (2000) has since repeated his claims to incomprehension.

of matter *ex nihilo*. I back Sider’s reply: such matter is in fact “caused to exist by previous temporal parts” in accordance with “the familiar laws of motion” (2001:217). The only change from the standard picture is that, strictly speaking, such laws no longer govern the *movement* of matter, but rather its *distribution* through spacetime. No perpetual miracle is required.

3.3 Endurance

3.3.1 Being Wholly Present

In contrast with perdurance, endurance is supposed to be our common-sense, default option. It is often formulated as holding that objects are “wholly present” at each and every moment of their existence.¹⁶ During that existence, they move in their entirety through space. They are spatially extended, with spatial parts; but not temporally extended, or with temporal parts.

Nonetheless, the contention that objects are wholly present is clearly philosophical; the man in the street would express only bemusement if asked whether he, or his street, were wholly present. Ideally we would unpack endurance in less rarefied terms.

Sider (1997, 2001:63–68) raises a profound difficulty though. Considering an object O at time t , we wish to analyse the claim that

O is wholly present at t . (E1)

An intuitive starting point is obvious enough: O is wholly present at t iff

Every part of O exists at t . (E2)

But in fact (E2) is inadequate. This is not due to familiar qualms about the sense of “exists”; these are avoided by a shift to

¹⁶See *e.g.* Lewis (1986a:202), Markosian (1994) and Mellor (1998:86).

Every part of O is located at t . (E3)

Instead, the difficulty concerns the meaning of “every part of O ”. If this means “every part that O has at t ” then we are left with the claim that

Every part that O has at t is located at t . (E4)

(E4) seems trivially true though; even the perdurantist accepts it. But if, on the other hand, “every part of O ” refers to every part that O ever has, then our putative analysis is that

Every part that O ever has is located at t . (E5)

On (E5), the only objects wholly present at t would be those that have by that time gained all the parts they will ever gain, and lost none of the parts they will ever lose. Worse follows though: enduring objects are supposedly wholly present *throughout* their careers. This together with (E5) would entail something obviously false: that objects never gain or lose parts.¹⁷

Nor can the endurantist mount a *tu quoque*. An instantaneous temporal part is wholly present at a time in a very clear sense: *all* of its (spatial) parts exist at and only at that time. In a similarly clear manner, perduring objects are *not* wholly present at a time, since they have parts at other times. But they are wholly present at one particular extended *region*: that containing *all* of their (temporal) parts.

What is the endurantist to do? Sider (1997; 2001:64–68) considers further (unsuccessful) formulations that centre on being wholly present. In §§3.3.2 and 3.3.3 I consider some alternative proposals instead.

¹⁷The mereological essentialist holds that objects not only do not but *cannot* gain or lose parts; perhaps (E5) is welcome in such quarters. I think mereological essentialism no less “obviously false” than mereological constancy; and also that, even if it were true, its truth should not follow *ex definitione* from the truth of endurance.

3.3.2 Being Temporally Unextended

One option for the endurantist is to borrow from their foe. However the perdurantist understands the notion of a temporal part, the endurantist can deny that there are such parts (or at least that *objects* ever possess them).¹⁸ Sider (2001:64–65) points out that an instantaneous existent might trouble such an endurantist, since the existent would count as its own temporal part. A tempting reply is that instantaneous existents do not *persist* (let alone endure), but alternatively the endurantist might shift to denying that objects have temporally *proper* parts. This has the advantage of overcoming another potential difficulty: the fact that a genuinely enduring object arguably counts as its own *extended* temporal part (see fn.9).

I do not think it disastrous to formulate endurance in terms of a denial of temporally proper parts. But note that this formulation would be inadequate if an object could be temporally extended without possessing temporal parts; such an object would then count as enduring (which I suspect the endurantist would very much resist). I have argued against the possibility of extension without parthood (recall §3.2), but it is instructive to observe how such extension *would* trouble the proposed formulation: the fact is that temporally extended objects are not supposed to count as enduring. Perhaps our formulation of endurance should reflect this then: enduring objects (persist and) *are temporally unextended*.

What initially seems like a distinct suggestion is for the endurantist to focus on identity. Might an object O endure iff it exists at a time t and is identical to an object at a distinct time t' ? Merricks (1999:427) and Sider (2001:54–55) contend that this is true even of a *perduring* object though. Such an object could have temporal parts, and thus exist, at both t and t' ; and *every* object is self-identical. It therefore seems that even a perduring object may exist at one time and be identical to an object that exists at a distinct time.

¹⁸See Lewis (1988:67 fn.4), Markosian (1994:247–248) and Zimmerman (1996:121–124).

To this the endurantist might respond that on perdurance there is no *temporally unextended* entity at t identical with a *temporally unextended* entity at t' .¹⁹ Hence they might reformulate: O endures iff it is temporally unextended, exists at t , and is identical to a temporally unextended object at t' (for some t and t'). But now this is just an unnecessarily complicated way of saying that objects are temporally unextended *and persistent*. I do not see that an explicit focus on identity helps a great deal.

Indeed, I do not see that the shift to being temporally unextended has helped a great deal. Anyone familiar with the difficulties of §3.3.1 will surely pose a pointed question: what is it for an object to be temporally unextended? If the idea is that *all of its parts* lie in a temporally unextended region, that merely welcomes back the previous ambiguities. Are we discussing all the parts it *ever* has? Or all the parts it has *at that region*? An endurance based on being temporally unextended seems no less problematic than an endurance based on being wholly present.

3.3.3 Spatiotemporal Occupation

Instead one might try to formulate endurance in terms of *spatiotemporal occupation*. Sattig attempts just this, defining theses of “three-dimensionalism” and “four-dimensionalism” as follows:²⁰

(3D) (i) an ordinary object occupies multiple spacetime regions, and (ii) these spacetime regions are temporally unextended, or instantaneous, and non-simultaneous.

(4D) (i) an ordinary object occupies a unique spacetime region, and (ii) this spacetime region is temporally extended.

(2006:48–49)

¹⁹Here and henceforth I use “entity” in a particularly broad sense that covers (i) enduring objects, (ii) their ‘lives’ or ‘careers’ (see §6.4.2), (iii) perduring (*i.e.* temporally extended) objects, and (iv) their temporal parts. (Such a ‘catch-all’ term will be useful when we proceed in Chapter Six to a meta-discussion of endurance and perdurance.)

²⁰See also Parsons (2000:400–401) and Gilmore (2006:199–206).

Might we borrow Sattig’s (3D) as a formulation of *endurance*?²¹ It is worth remarking first of all that (3D) and (4D) are exclusive given the uniqueness constraint in (4D)(i) and Sattig’s resolve not to “lump together clauses (i) and (ii) of each thesis” (2006:49).²² But the uniqueness requirement appears incoherent: how could an object occupy an extended region *without* occupying its various subregions? How could the coffee fill my cup, yet not fill both its lower and upper halves?

A resolution lies in the precise meaning of “occupation”. Sattig does not define this, but characterizes it by saying (*inter alia*) that

if [an object] *a* occupies a region *R*, and *R'* is a proper part of *R*, then it does not follow that *a* occupies *R'*. For example, a table does not occupy the region occupied by its legs.

(2006:48)

I think Sattig intends “occupation” to mean (what I will term) *exact* occupation.²³ As I would describe matters, I *occupy* the regions in which I have parts (whether these parts be spatial or otherwise); but I do not *exactly* occupy these regions, since I extend beyond them. In retrospect then, (3D) and (4D) would be more-or-less incompatible even without the uniqueness condition and the separation of their respective clauses.²⁴

²¹Sattig uses “endurance” for a doctrine distinct from but related to (3D). The different doctrines arise because he believes there to be a gulf between “ordinary time” and “spacetime”, the details of which would take us too far afield.

²²This is necessary because it would be *prima facie* possible to occupy both a unique *extended* region and also many *unextended* ones. (One could arguably do the former in virtue of the latter.) Note also that although they are exclusive, (3D) and (4D) are not exhaustive: *e.g.* Hudson (2001:45–71) argues that objects exactly occupy multiple extended spatiotemporal regions, and Lewis mentions (only to set aside) the possibility of objects “that persist by having an enduring and a perduring part” (1986a:202). In what follows I ignore these and other *recherché* options. I also ignore a recently canvassed alternative to perdurance, namely the *stage theory* as recommended by Sider (1996, 2000, 2001) and Hawley (2001). Sider (2001:191), Hawley (2001:41–43) and Haslanger (2003:319) all observe that stage theory and perdurance are *ontologically* equivalent (in which case perhaps I will be discussing stage theory after all, but only implicitly). The sole disagreement concerns whether persisting objects, or the referents of ordinary talk, are four-dimensional worms (perdurance) or their instantaneous temporal parts (stage theory).

²³If so, he should have written that “. . . if *R'* is a proper part of *R*, then *it follows that a does not occupy R'*”. However, his example strongly suggests the notion of exact occupation, as does an earlier “hand in glove” analogy (2006:48).

²⁴Not totally incompatible though: an object *might* exactly occupy both extended regions and unextended ones. Again I ignore this *recherché* possibility.

I fear that the newly discovered centrality of *exact* occupation means that we have once more failed to progress. What is it for O to exactly occupy R ? We want to say, roughly, that (a) every part of O is contained within R , and (b) every part of R contains some part of O . I think (b) will cause problems for the endurantist, but I set these aside.²⁵ With regard to (a) we must once again question the meaning of “every part of O ”. Does it mean (i): “every part that O has *within* R ”? Or rather (ii): “every part that O has in *any* region”? If O is an enduring object and R is an instantaneous spacetime region, (i) and (ii) are (most likely) distinct. Moreover, (a) is trivial on (i), and (generally) false on (ii).²⁶ This is the very difficulty that emerged with respect to being wholly present (§3.3.1) and being temporally unextended (§3.3.2). The shift to exact occupation has not helped.

In response the endurantist might attempt a non-mereological definition of “exact occupation”. Suppose that the notion of (non-exact) occupation can plausibly be taken as primitive. It seems not ridiculous to think that O *exactly* occupies a region R iff R is the *largest* region that O occupies. Such a proposal has two drawbacks though. First, the endurantist believes that objects exactly occupy *many* regions, yet some of these may well be smaller than others. An attempted salvage would hold that O exactly occupies R iff R is the largest region that O occupies *at that particular time*. But on such a proposal even *perduring* objects would exactly occupy multiple instantaneous regions. The second objection starts by observing that it seems a reasonable and intuitive part of the ‘calculus of occupation’ to say that if I occupy R_1 and a *simultaneous* R_2 then I occupy a region wholly composed of R_1 and R_2 . Thus

²⁵Or rather I relegate them to a footnote. Suppose that O exactly occupies each of two successive instantaneous regions R_1 and R_2 . Now consider the temporally extended region R_3 that is the fusion of R_1 and R_2 . If R_1 and R_2 each contain “every part of O ” then surely R_3 does also. Similarly, since every part of both R_1 and R_2 contains “some part of O ”, then surely this too is true of R_3 . Hence it seems to follow from (a) and (b) that if an object exactly occupies successive instantaneous regions then it also exactly occupies a temporally extended region. This is *not* what the endurantist wishes to say!

²⁶The parenthesized disclaimers are necessary because R could in theory be an instantaneous region containing all of the parts that O *ever* has. See my remarks on (E5) in §3.3.1.

from the fact that I occupy a hand-shaped region, and also the adjacent arm-shaped region, we infer that I occupy an entire hand-and-arm-shaped region. But what of the temporal parallel? Suppose that I occupy *successive* regions R_1 and R_2 (which I surely do, whether I endure or perdure). Do I not thereby occupy the *temporally extended* region wholly composed of R_1 and R_2 ? Indeed, do I not also occupy a much larger region containing all the regions that I *ever* occupy? This would be the largest region that I occupy, and hence (on the current proposal) the one I *exactly* occupy. Perdurantism once more!

I think it is time to bring this process to an end. Ideally the endurantist would have been able to provide a reductive definition of the notions they require. But it hardly seems disastrous if they must adopt these notions as primitive. Analysis ends at some point, they may say; and a respectable place to rest is with concepts such as being three dimensional, exactly occupying a region, *etc.* Such concepts are well understood. We surely know what it is to be three dimensional (with all three of these dimensions being spatial). We can similarly grasp what it means to be temporally unextended. And, despite a certain context-sensitivity, we would all more-or-less agree as to whether a quantity of liquid exactly occupies a given volume.

To summarize then, the endurantist may hold that notions of temporal non-extension, exact occupation, *etc.* can be understood without recourse to mereological analysis. My preferred formulation of endurance will be that one and the same persisting object exactly occupies multiple, instantaneous spacetime regions; such objects are *multi-located*. I further take it that (i) if x exactly occupies R then x does not exactly occupy any distinct region containing or contained within R ; and that (ii) x may have different parts at different regions that it exactly occupies. The first of these is very much part of how we naturally understand *exact* occupation. The second is also natural insofar as exact occupation is supposed to capture something of our pre-theoretical intuitions about persistence. I certainly *seem* to possess parts

at one time (or spatiotemporal region) that I do not possess at others.²⁷

²⁷See Gilmore (2006:200–202) for a similar discussion of exact occupation. (ii) in particular gives the endurantist an answer to certain difficulties raised by Merricks (1999:428–430).

Chapter 4

Endurance And Eternalism I: Non-Relativistic Arguments

4.1 Introduction

In Chapter Three we saw the endurantist struggle to analyse the notions of being wholly present, being temporally unextended, *etc.* By contrast, the perdurantist is well placed to offer mereological analyses. Thus whether x is a temporal part or perduring whole, the perdurantist may observe that x is wholly present within R iff R contains all the parts that x *ever* has.

Eternalism is squarely to blame for this disparity. Were presentism true, we could easily locate a sense in which enduring objects are wholly present at a time: all of their *existent*₃ parts would be at that time.¹ Eternalism also grounds several objections to endurance. Some of these stem from eternalism about *Minkowski* spacetime, and I consider them in Chapter Five. In this chapter I discuss non-relativistic arguments from eternalism to the falsity of endurance: §4.2 considers a mereological objection due to Merricks, and §4.3 discusses Barker and Dowe's accusation that endurance is paradoxical. But by far the most common objection to eternalist endurance is the

¹Indeed, all of a *perduring* object's *existent*₃ parts would be at 'that time'—*i.e.* the present. Hence the perdurantist would struggle to explain how objects are *not* wholly present at a time. Presentism might even entail that perduring objects never exist₃: can an object exist₃ even when only a fraction of its parts do? For more on presentist perdurance, see Merricks (1995:524–525), Lombard (1999), Brogaard (2000), and Sider (2001:71–73).

(so-called) ‘Problem of Change’. This is examined in §4.4.

First of all though, note that eternalism is *not* perdurance! Both are ‘four-dimensionalisms’, but one concerns spacetime, and the other physical objects. Nor is there an *immediate* entailment from one to the other; *prima facie* there might exist₃ a four-dimensional manifold with all times and places ontologically equal, and yet objects within that manifold might be multi-located. Historically these two doctrines have been conflated.² More recently, a spectrum of opinion has arisen. Stalnaker (1986:134) and Lockwood (1989:9) at least imply that eternalism automatically entails perdurance. Carter and Hestevold (1994) and Merricks (1995, 1999) *argue* that eternalism implies perdurance. Lewis (1986a:202–204), Sider (2001) and Hawley (2001) are eternalists who reject endurance, but do so for reasons (at least partly) independent of eternalism. Mellor (1981a, 1998), Johnson (1987), Van Inwagen (1990, 2000), Parsons (2000) and Sattig (2006) are all eternalist endurantists.

4.2 Multiple Location And Eternalism

The first challenge to eternalist endurance focusses on the exact occupation of multiple regions. Merricks observes that

an enduring object can have all of its parts in one place, P , and also have all of its parts in a distinct non-overlapping place, P^* . *This absurdity* follows from the possibility of motion combined with [eternalism] and the view that an object is wholly present at each time at which it exists.

(1995:528; my italics)³

Here we have an explicit claim that eternalist endurance (plus movement) entails an “absurdity”. What is the nature of this absurdity? Eternalism is claimed to be central to it, yet even on presentism an enduring object has “all of its parts in one place”,

²See *e.g.* Williams (1951:463), Quine (1953:442–443) and Smart (1963:132–135).

³Merricks uses “indexicalism” instead of “eternalism”. See Merricks (1995:523).

and *will* have them elsewhere. It might be thought problematic were an object to have all its parts in one place and *simultaneously* in another (more on this anon), but eternalist endurance need make no such claim. Objects are held to exactly occupy *equally existent*₃ regions, but not (usually) *simultaneously existing* ones.

Of course Merricks is free to protest that such multi-location is incoherent; perhaps he is best read as attempting just this. But in that case his argument will hardly trouble the endurantist. Its centrepiece is effectively the observation that on eternalist endurance the *parts* of an object are multi-located. No-one will find this incoherent who is not antecedently convinced of the more general incoherence of multi-location. The endurantist will merely reply that, yes, the object does indeed have all of its parts at *P*, and similarly at *P**. That is precisely what they hold.

Van Inwagen also considers the view that “what exactly fills one region of space-time cannot be what exactly fills another”. He rejects such a view:

Any plausibility that this assertion may have arises from an illegitimate analogy with the clearly true principle:

What exactly fills one region of *space* at a given time cannot be what exactly fills a distinct region of *space* at that time.

(1990:248)

Soon I will question this “clearly true principle”. Nonetheless I do think that the pure spatiality of diagrammatic representation might be partly responsible for an unease about multi-location. We represent enduring objects in distinct *spatial* regions of a diagram. Such regions coexist, *i.e.* exist *simultaneously*. Were we to forget or simply not focus sufficiently on the representative role of whichever spatial dimension goes proxy for time, we might erroneously think that endurance does fall foul of Van Inwagen’s principle. And what goes for formal diagrams goes equally for mental pictures and imaginings.

As a pictorial antidote, consider a cartoon strip. Asterix is supposed to be wholly present in each frame (in which he appears). Eternalists assert that no particular frame, and no set of depicted events, is ontologically privileged; all exist₃ ‘equally’. When spacetime is given *this* kind of purely spatial representation, there is far less tension to the claim that objects are multi-located. Perhaps this is because the very layout of a cartoon strip lessens the temptation to ‘spatialize’ the spacetime thus represented.⁴

However, one might even reject Van Inwagen’s “clearly true principle”. If *any* theory of time is compatible with time travel, eternalism surely is.⁵ Were I to travel back in time and talk to my younger self, the most natural endurantist account would hold that, at the time of the conversation, I exactly occupy two distinct and *simultaneous* spacetime regions.⁶ This is directly at odds with Van Inwagen’s principle.

4.3 Is Endurance Paradoxical?

Barker and Dowe (2003, 2005) present a second challenge to eternalist endurance. They contend that endurance is paradoxical, insofar as (they think) it requires objects to be both three dimensional and, more surprisingly, *four* dimensional.

Their argument focusses on a putatively enduring object O that

is multi-located throughout a 4D space-time region R . Thus there is a division of R into sub-regions r , such that O is wholly located at each r . If O is an enduring entity, the r s will be temporal slices of R .

(2003:107)

For each r , Barker and Dowe label the entity there located as O_r . The paradox is then as follows:

⁴See Mellor (1981a:130) for a related use of cartoon-style depictions.

⁵For a discussion of time travel and various ontological A-theories, see Miller (2005b).

⁶Note moreover that, intuitively, I *exactly* occupy these regions rather than just occupying each by dint of exactly occupying their fusion. Sattig (2006:50) uses this time-travel intuition to motivate the more general claim that an object can exactly occupy two regions (whether simultaneous or otherwise) without exactly occupying their fusion.

Take the fusion, or mereological sum, of all such O_r s. Call the fusion $F(O_r)$:

(i) Each such O_r is a 3D entity, since it is located at a 3D sub-region r . O_r is an entity with non-zero spatial extent and zero temporal extent. Each O_r is identical to every other. So each O_r is identical with $F(O_r)$. So, $F(O_r)$ is a 3D entity.

(ii) $F(O_r)$ has parts at every sub-region of R . So it has non-zero spatial and temporal extent. $F(O_r)$ is a 4D entity.

Conclusion: $F(O_r)$ is both 3D and 4D, but that is a contradiction since being 3D means having no temporal extent, and being 4D means having temporal extent.

(2003:107)

Eternalism is clearly vital to this argument. One can hardly fuse what does not exist₃, and so on presentism $F(O_r)$ would never amount to more than a single, three-dimensional, O_r . It would be difficult to maintain that such a ‘fusion’ is somehow *four-dimensional*.

Even on eternalism though, the endurantist might balk at the instruction to consider the “fusion, or mereological sum” of the O_r s. “*What fusion?*”, they might reply. Endurantists do not spurn composition—they are hardly nihilists—but they usually regard it as restricted.⁷ The endurantist might therefore say that there is *no* entity composed of all the O_r s (and perhaps that Barker and Dowe highlight the absurdity of supposing that there is). Since there is no such entity, *a fortiori* there is no such paradoxical entity.

Barker and Dowe anticipate this response but claim that their argument “doesn’t require commitment to a totally permissive mereology” (2003:108). That is, they say they can allow that entities have fusions only if certain relations hold between them. However, they “think space-time contiguity is sufficient” for fusion; and since the O_r s

⁷I return to the interplay between persistence and composition in §6.4.4.

are contiguous, they contend that $F(O_r)$ exists (and is both three and four dimensional). But Barker and Dowe are surely mistaken to believe contiguity sufficient for fusion. Perhaps they shook hands on completion of their paper. They did not thereby fuse.

The endurantist who believes in restricted composition thus has an easy escape. I want to allow endurantists to believe in unrestricted composition though.⁸ How, then, can the ‘paradox’ be resolved?

The endurantist can certainly object to (ii), which infers from the fusion’s having parts across a four-dimensional region to the conclusion that the fusion is itself four dimensional. Why should the endurantist accept this inference? They hold that *three-dimensional* objects can occupy *four-dimensional* regions in virtue of being multi-located. And according to (i), O ’s fusion is *just such* an object; it is none other than *enduring O*.

Barker and Dowe consider the reply that a multi-located object could have parts across a four-dimensional region without itself being four dimensional. They reject this reply after considering a fusion of *distinct* entities that exactly occupy the regions adjacent to those that an enduring object does; the fusion of these distinct entities *is* plausibly four dimensional (2003:109). But the endurantist can simply accept this, continuing to maintain that the identity of their fused ‘entities’ makes all the difference. In both cases the relevant four-dimensional region is ‘filled up’. But in one case it is filled by a single four-dimensional fusion, and in the other by a multiply located three-dimensional object. I do not see what Barker and Dowe have to offer against this.

I think the endurantist can therefore avoid the ‘paradox’. But an alternative reply is worth investigating, partly in itself and partly in the light of later developments.⁹

⁸§6.4.4 will be highly relevant here. In addition to suggesting that an unrestricted endurance is at least tenable, I will float the idea that endurantists might believe in something like $F(O_r)$ after all.

⁹See §6.4.4.

What should we say about the fusion of an object with itself? If we simply fuse plain old Jim with plain old Jim, then we doubtless obtain just plain old Jim. But Barker and Dowe are not (just) considering the fusion of O with O ; they are considering the fusion of O_1 with O_2 , *etc.* How are we to understand this? What is the fusion of Jim *as at t_1* with Jim *as at t_2* ?

Perhaps we should think that “Jim as at t_1 ” and “Jim as at t_2 ” simply refer to Jim—rather as “Cicero” and “Tully” are different names for the very same person. But note that Cicero and Tully are (of course) qualitatively identical, the very same size, composed of the same matter, *etc.* This is less clearly true if we think of Jim *as at one time* and Jim *as at another*.

In fact we might pose some awkward questions here. Suppose that at 12.23 on 6th March 2007 Jim is bearded, living in Seattle, and weighing around 80*kg*. Exactly one year later, he is clean shaven, lives in London, and weighs 85*kg*. Now consider the fusion of Jim as at these two locations.

First, how hairy is the fusion? Perhaps it is somehow of indeterminate hairiness. Or perhaps it is both bearded and clean shaven. But how? Does it have a bearded temporal part and a non-bearded temporal part?

Second, what is its mass? 165*kg* seems not an unreasonable answer. Granted: some of Jim’s 2007 matter would still be present a year later, in which case we only arrive at 165*kg* by counting this matter twice. But much of his matter will *not* be common to ‘both Jims’, and so even if we were to give ground here, we might still expect the fusion to weigh well over 100*kg*.¹⁰

Third, *where* is the fusion? It appears to be bifurcated between Seattle (in 2007) and London (in 2008). Does it exactly occupy the *sum* of these spatiotemporal regions?¹¹ Here we revisit our previous discussion; if the endurantist is antecedently

¹⁰In addition we could have fused the 2007 Jim with Jim some *forty* years later. Then there would be almost no matter in common and we could essentially just add ‘his weights’ together.

¹¹I intend no difference between a sum and a fusion here; I merely prefer the former since we are already discussing *Jim’s* fusion.

convinced that the fusion *is Jim*, they will answer negatively. But if one is not already convinced of this then Barker and Dowe have a point. The fusion certainly *occupies* the sum of the relevant regions; and from spatial analogues we might believe that if x *occupies* R then x *exactly* occupies either R or a region containing R .

Fourth, *what* is the fusion? Much will depend here on the answers already given. But if the fusion is a bifurcated, indeterminately hairy entity, or one with temporal parts, then the endurantist will hardly admit it to be a person.

Finally then, is the fusion identical *with Jim*? If the fusion is not a person then *a fortiori* it is not Jim. In addition, whilst there certainly are *people* weighing over 100kg, we may suppose that Jim *never* has. How, then, can he and the fusion be identical?

Now I do not pretend that all of these difficulties are unresolvable. One attracted to the view that the fusion *is Jim* might say, for example, that Jim has the properties of being bearded-in-2007 and clean-shaven-in-2008—and that he has these (and other) properties at *all* of his locations.

Against this idea, one might grant that, conceived of in some atemporal sense, Jim does possess such properties; but one might hold it to be nonetheless implausible that *at each particular location* Jim somehow ‘bears his past and future’ in this way. Indeed it seems particularly odd that even in 2007 Jim might possess the property of being clean-shaven-in-2008. Presumably if things had stood otherwise in 2008 then in 2007 Jim might have possessed the property of being *bearded*-in-2008. Are we comfortable with the idea that Jim’s *future* vicissitudes influence the way he is *now*? How exactly do they do this?

It is also unclear that the suggested strategy can deal with spatial properties. Jim as at one particular region is clearly located in that very region. Jim as at another location is clearly located elsewhere. What do we say of the fusion of these ‘Jims’? That it is R_1 -located *at* R_1 , and R_2 -located *at* R_2 ? That it is bent-shaped in a bent

region, and straight-shaped in a straight one? Such answers seem close to triviality.

Nor do I think that the difficulties I have canvassed will disappear if we fuse Jim as at *all* of his various locations. Then we might have an *extremely* massive entity, arguably with very many temporal parts, and with all sorts of degrees of hairiness. All in all then, whilst I *do* feel a temptation to say that the fusion of Jim with Jim is simply just Jim, when I contemplate Jim *as at* R_1 and Jim *as at* R_2 I am less certain that these fuse to yield Jim *simpliciter*. If the endurantist is at all moved by these considerations, then they might be inclined even to reject Barker and Dowe's (i).

4.4 The Problem Of Change

I turn, then, to the objection that is most stridently put against the combination of eternalism and endurance. My contention is that there is no 'Problem of Change' worthy of that name.

I begin in §4.4.1 with the canonical (though informal) statement of the perceived problem. This is closely followed by my reasons for initial scepticism. In §§4.4.2 and 4.4.3 I then attempt, on behalf of my opponent, to shore up their argument in two distinct ways. These attempts will fail. Since I know of no other strategies my opponent could employ, I will ultimately reject the Problem of Change. In §4.4.4, I then make certain observations concerning not so much the Problem of Change, but rather the project of analysing temporal predication.

4.4.1 The Problem Introduced

Lewis provides the classic statement of the Problem of Change:

The principle and decisive objection against endurance, as an account of the persistence of ordinary things such as people or puddles, is the problem of temporary intrinsics. Persisting things change their intrinsic properties. For instance shape: when I sit, I have a bent shape; when I stand, I have

a straightened shape. Both shapes are temporary intrinsic properties; I have them only some of the time. How is such change possible? I know of only three solutions [...]

(1986a:203–204)

The three solutions he goes on to discuss are (i) an endurance that regards intrinsic properties as disguised relations to times, (ii) presentism, and (iii) perdurance. I postpone discussion of (i) and (iii) until much later, since my initial interest is rather in the (alleged) problem itself. But having portrayed this problem as directed at the *eternalist* endurantist, I should comment briefly on (ii). The thought is that on presentism there is *no* sense in which I am both sitting and standing. Only one time ‘ever exists₃’—the present—and hence I simply sit, stand, or do neither. For the presentist, no difficulty ever arises.¹²

Lewis thinks there *is* an eternalist difficulty though. Note first that he asks how the described change is “possible”. This question is appropriate when confronted with the seemingly impossible or the apparently problematic. But Lewis presents no such data. Change is all around us, all of the time. No sense of paradox or intellectual discomfort attends it.

Contrast this with the claim that Lewis is sitting and standing *at the same time*; or that he is—quite literally—a married bachelor. Our reaction to *these* claims is one of intellectual revulsion. The *lack* of any such reaction to statements of ordinary change I take to reinforce the impression that, *prima facie*, there simply is *no* ‘Problem of Change’.

The *onus probandi* therefore lies squarely with Lewis (and sympathizers). They might proceed by observing that some contradictions, and even some mere difficulties, are not immediately apparent. A *reductio ad absurdum* might be complicated; we may struggle to follow the proof. But the case in hand appears different. For one thing,

¹²Lewis (1986a:204), Merricks (1995:526; 1999:422), Hinchliff (1996:126) and Zimmerman (1998a) give essentially this response. Lewis rejects the requisite presentism, Merricks and Zimmerman are non-committal (here), and Hinchliff endorses it.

many writers spot the alleged difficulty, not after diligent scrutiny, but rather at fifty paces. And for another, there seems to be relatively little scope for detailed analysis of our claims compared to a set of mathematical assertions, the consequences of which may not be immediately obvious.

A more promising strategy would be to find a *third* principle with which facts about change are in tension (at the very least). §4.4.2 considers a shift to atemporal predication with a subsequent application of the Law of Non-Contradiction. The attempt of §4.4.3 likewise wields some serious logical machinery: it is founded upon Leibniz' Law. That the literature contains such proposals I take to support the view that there is no obvious Problem of Change in their absence. And since each proposal ultimately fails, I take this to suggest that there is no Problem of Change after all.

4.4.2 Atemporal Predication

Let us attempt to demonstrate an inconsistency arising from the following two claims:

Jim is bearded at t_1 ; (1)

Jim is clean shaven at t_2 . (2)

How might this be done? Rea suggests that one sympathetic to the Problem of Change operates on (1) and (2) using the following “tacit assumption”:

(A) For any x and ϕ , if x is, was, or will be ϕ , then x is ϕ .
(2003:256)

(A) would then licence the claim that Jim is bearded and also the claim that he is clean shaven (*i.e.* *not* bearded). This appears to violate the Law of Non-Contradiction.¹³

Of course we do need a little more detail. Reading the second “is” as tensed, (A) is straightforwardly false: my *having been* ϕ does not entail that I am *now* ϕ . Hence this second “is” must be tenseless.

¹³Merricks reasons in just this manner (1995:526–527).

This paves the way for a rejection of (A) though. Rea thinks it might be denied “that tense is appropriately disregarded in the formulation of the puzzle”; this denial he calls “a *tenser* solution” (2003:257). This way of putting the response—that is, as asserting the indispensability of *tense*—makes it available only to those who ‘take tense seriously’. Recall §1.1: I cannot adopt this line.

Nonetheless, any rejection of (A) based on tense is at odds with the fact that (1) and (2) are standard ingredients for the Problem of Change—and yet (1) and (2) are not tensed!¹⁴ Hence the tensed verbs in the antecedent of (A) seem ill suited to our examples; for a perfectly coherent formulation of the puzzle may abjure the language of “is, was, or will be”. In that case the function of (A) or any (A)-like principle should not be to subtract *tense* from (1) and (2), but rather *temporality*. That is, of more relevance to our purposes is:

(B) For any x and ϕ , if x is at some time ϕ , then x is (atemporally) ϕ .

From this we conclude that:

Jim is (atemporally) bearded; (1–B)

Jim is (atemporally) clean shaven. (2–B)

At this point one could attempt a B-theoretic analogue of Rea’s denial of tense. This would deny that *time* “is appropriately disregarded in the formulation of the puzzle”. Objects are essentially temporal, it would be urged, and so predication is correlatively an essentially temporal phenomenon. We should not be surprised if, when we overlook this, we tie ourselves in metaphysical knots.

I think it may well be misguided to try to ‘de-temporalize’ (1) and (2). Nonetheless, this reply is potentially embarrassing given my concession regarding a *simpliciter*, atemporal sense of “existence” back in §1.3.3. It seems inconsistent to allow such

¹⁴Nor are Rea’s own examples. (1) and (2) do feature an “is”, but this cannot mean “is now” if t_1 and t_2 are distinct. And if they are *not* distinct then (1) and (2) are *plainly* contradictory.

atemporal talk when it comes to existence, but to become temporally fastidious over predication.

Fortunately there is an alternative reply to any argument based on (B). Atemporal predication seems appropriate for the Platonic triangle, or the number seven; these doubtless do have properties in some atemporal way. But what properties does *Jim*—very much a temporal object—have atemporally? Three answers immediately spring to mind:

- (a) Those (and only those) properties he has essentially;
- (b) Those (and only those) properties he has at all times;
- (c) Those (and only those) properties he has at any time.

Of these, I think that (a) is more attractive than (b), which is perhaps more attractive than (c). But if one adopts either (a) or (b), one should reject (B); for it grants to Jim atemporal possession of far too many properties. It is not the case that he is always or essentially bearded, for example, and hence on (a) or (b) he would not be atemporally so. Yet according to (B) he *is* atemporally bearded, merely in virtue of being bearded at t_1 . Moreover, it is not just that an espousal of (a) or (b) entails a rejection of (B). In addition, no *other* difficulties with the Law of Non-Contradiction lie in wait on (a) or (b). If Fa predicates an essential or permanent property of a , it is *never* the case that $\neg Fa$. This route to contradiction would be foreclosed.

If, however, one accepts (c), one will also accept (B) (since they are in fact equivalent). I will not rail against this idea that any property possessed by Jim at any time, he possesses atemporally; the logic and language of atemporal predication are to some extent ‘up for grabs’. If someone wishes to employ the terminology as (c) suggests, then so be it.

However, I *will* protest if it is *then* claimed that Jim’s being both atemporally bearded and atemporally clean shaven is somehow problematic. In semi-formal terms,

the background thought is presumably that we would have something like Fa and $\neg Fa$, which would contravene the Law of Non-Contradiction. But strictly speaking this requires a dubious *Atemporal* Law of Non-Contradiction:

Nothing can be (atemporally) both ϕ and $\neg\phi$. (ALNC)

Of course ALNC would not be dubious if the only properties that an object possessed atemporally were those had either essentially or permanently.¹⁵ But having supposed with (c) that an object is atemporally ϕ just if it is ϕ at *some* time, it seems that ALNC is tantamount to the conjunction of two *temporal* disambiguations of the Law of Non-Contradiction (one ‘synchronic’, the other ‘diachronic’ as follows):

Nothing can at any time be both ϕ and $\neg\phi$. (SLNC)

Nothing can be ϕ at one time and $\neg\phi$ at another. (DLNC)

SLNC is extremely plausible.¹⁶ But DLNC just asserts the impossibility of change, implying that Jim cannot be bearded at one time and clean shaven at another. Two observations are then necessary. First, if DLNC is a plausible principle then the excursion through atemporal predication is a pointless detour; we could have simply and more directly derived a contradiction between (1), (2) and DLNC. Second observation: DLNC needs, at the very least, a welter of supporting argument. *Prima facie* it is simply false. The starting point is surely that *of course* Jim can be bearded at one time and clean shaven at another. What has been said to make us think otherwise?

4.4.3 Leibniz’ Law

Rea’s suggestion on behalf of one trying to establish the Problem of Change has not borne fruit. In conversation but also in print one repeatedly encounters a different

¹⁵Recall the earlier claim that there is no obvious route to contradiction if one adopts (a) or (b).

¹⁶Although some doubt might be cast on it if an object can be multiply located even at a single time (something that would most obviously arise in connection with time travel: see the discussion of Van Inwagen in §4.2). Perhaps the endurantist might therefore feel moved to rephrase SLNC in terms of a *region* rather than a time.

idea: that Leibniz’ Law (LL) functions as an enthymeme in (Lewis’ exposition of) the Problem of Change. Thus Merricks writes that the Problem of Change “rests on the fact that identity entails indiscernibility” (1994:165), and also that “change, endurance and the indiscernibility of identicals lead to absurdity” (1995:527). In Johnston’s explanation of the difficulty, “we conclude from Leibniz’s Law” that change actually involves two (or more) “distinct things” (1987:115). Deutsch tells us that we hold statements of change to be true “in, it appears, direct violation of Leibniz Law” (2002:§2.1). And McCall is similarly concerned that “the indiscernibility of identicals is preserved” (1994:207).¹⁷

What is meant here by LL? I will take LL to be synonymous with the Indiscernibility of Identicals: the apparently indisputable claim that if ‘two’ objects are in fact one then ‘they’ share all their properties and relations. The contrapositive formulation of LL seems equally uncontentious, stating that if ‘two’ objects differ in their properties and relations then they are indeed *two* objects; and in logical notation LL takes the following familiar form:

$$\forall x \forall y \forall \Phi [(x = y) \rightarrow (\Phi x \leftrightarrow \Phi y)] \tag{LL}$$

The difficulty lies in applying LL to typical reports of change. Recall our paradigm case:

Jim is bearded at t_1 ; (1)

Jim is clean shaven at t_2 . (2)

If a contradiction with LL is to be derived then clearly it is to Jim that x and y must refer. But what is meant here by “Jim”? Perhaps x and y refer to Jim *simpliciter*. But then is Jim *simpliciter* bearded, clean shaven, neither, or both? I am not entirely sure; perhaps this just revisits the question of what properties Jim possesses atemporally.

¹⁷These authors are merely laying out the problem; their reactions to it vary immensely.

But whatever the precise answer, provided that x and y in LL both refer to Jim *simpliciter*, it would seem perverse and inconsistent not to predicate of y whatever we end up predicating of x . If we have reason to assert Φx , we should similarly assert Φy . In that case I fail to see how one could arrive at something inconsistent with the consequent of LL.

The more intriguing alternative is to allow x and y to refer to Jim *as at particular times*. The following interpretation would then give rise to a contradiction with (1) and (2):

“ Φ ” stands for “is bearded”;

“ x ” stands for Jim *as at* t_1 ;

“ y ” stands for Jim *as at* t_2 .

Now it might be objected that it is odd to regard LL as applying to the same object yet at different times. I am not sure this is *so* very odd; we apparently do refer to objects as at particular times, *e.g.* Jim as he was aged seven, or the Tory Cabinet in 1990. I briefly revisit this topic in §4.4.4, and in later chapters I will indeed talk of an enduring object as at a particular time (or equivalently as at just one of its multiple locations). On this occasion though, it is my opponent who needs the referential apparatus in question. If one cannot substitute for x and y in such a way as to refer to a single object at different times, I fail to see how LL can help them establish the contradiction they crave.

Grant them this referential apparatus then. What I would then object to is the continued application of LL in these diachronic contexts. So interpreted, it effectively states that if an entity at one time is numerically identical with an entity at another, then these ‘entities’ must be qualitatively identical as at those different times.¹⁸ But

¹⁸This assumes that the “=” in LL signifies numerical identity. I suspect that no-one would deny this, but if it were instead to signify qualitative identity, then whilst LL would be (trivially) true, it could not be used to generate a contradiction with (1) and (2). Jim as at t_1 is not qualitatively identical with Jim as at t_2 , and so the antecedent would be false.

why should we accept this? LL articulates a fundamental principle behind our reasoning in logico-mathematical cases, and it appears similarly indisputable when focussed upon ‘two’ entities at a single time.¹⁹ In such contexts, one sees its truth straight-away. But once the identity in the antecedent is interpreted ‘diachronically’—*i.e.* with x and y referring to an object as at different times—we are confronted with a claim whose truth is far less obvious. In fact the claim seems obviously *false*. The pen in my pocket, though less full than earlier today, is nonetheless the same pen. My pocket is the same pocket, despite now being sodden with ink. This is what we ordinarily say and think, and these intuitions should not be abandoned in the face of a law that has been wrenched without justification from its domain of origin and application.²⁰

Of course the intuitions I have recently aired are merely examples of the belief that numerical identity over time does not necessitate qualitative identity. One cannot and should not prohibit arguments to the effect that this belief is false, or that there is an entailment from numerical to qualitative identity after all; but one at least needs to hear such arguments. What could they be?

No attempt to *define* identity in terms of LL need worry us. We would have to ask: LL under what interpretation? If it is illegitimate to regard x and y as referring to a single entity but at different times, the definitional move carries no threat. But if, on the other hand, x and y *can* refer to a single entity as at different times, there is a type of identity, utterly entrenched within our thought and talk, that does not satisfy LL. One who takes the idea of diachronic identity with any seriousness will therefore spurn the mooted definition.

Nor will the following complaint impress us greatly:

“Being identical *just means* being the same; and being the same surely

¹⁹*Modulo* the comments of fn.16.

²⁰In fact, not only does identity over time seemingly not require qualitative identity; it sometimes requires qualitative *diversity*. If I see, today, someone qualitatively identical to Jim fifteen years ago, I may immediately conclude that such a person is *not* Jim.

means not changing!”

Recall that the complainant seeks to (counter-intuitively) link numerical identity and qualitative invariance. The “identical” in the first clause must therefore be interpreted numerically, and the “not changing” in the second clause qualitatively. There are now three possibilities for the two occurrences of “the same”. (I) The first occurrence could be intended qualitatively. But then the first clause simply states what the complainant is trying to prove. (II) The second occurrence of “the same” could be meant numerically. But then the *second* clause states what is to be proven. (III) The first occurrence of “the same” could be meant numerically, and the second qualitatively. In this case I agree with both clauses. But since the meaning of “the same” shifts between the clauses, this argument merely trades on an ambiguity.

Does my opponent have more to offer than definition or equivocation? I am not sure what else they may say. Granted: I have few *arguments* in favour of the independence of numerical and qualitative identity. But I can offer a plethora of intuitions and everyday utterances, in which case the emphasis remains on my opponent to explain why numerical identity might be thought, even for a moment, to entail qualitative constancy.

To summarize then, we might ask two questions. Is there a *prima facie* difficulty with (1) and (2)? In §4.4.1 I suggested that there is not. Might there nonetheless be some lurking tension with a *third* claim? This and the preceding section considered two plausible candidates, but neither passed muster. I can supply no further candidates, and so conclude that there is *no* problem with (1) and (2). If it *still* be asked how they are (jointly) possible then, not knowing where the questioner is ‘coming from’, it is hard to know what to say. Perhaps we should simply reply that the diachronic criteria of identity for persons allow for varying amounts of facial hair. But however we respond to this strange-seeming question, Lewis’s claim to have provided a “decisive objection against endurance” (1986a:204) seems somewhat exaggerated.

4.4.4 Analysing Temporal Predication

Can anything be salvaged from the Problem of Change? We have failed to locate any serious complications with (1) and (2). But (1) and (2) clearly *would* be more problematic were it not for their qualifying “at t_1 ” and “at t_2 ”. Just what difference do these qualifiers make?

Perhaps *this* is the Problem of Change. But I see no reason, especially given the last few sections, to anticipate a problem in the sense of “apparent contradiction” here. There is still less reason to see our ‘problem’ as concerning *change*. It would be no less appropriate to request an account of property instantiation for an *unchanging* object.

Still, we have at least been asked a sensible question. A useful way to regiment the various answers will be in terms of the logical structure they impute to sentences such as (1) and (2). I shall utilize a more abstract variant though, asking after the true logical form of (*):

O is p at t . (*)

Four apparently distinct answers will be considered.

Properties As Relations To Times

The first suggestion is that (*) has a *relational* structure: $P(O, t)$. This we read as “ O is p -related to t ”.

It might initially seem outlandish to regard apparently monadic properties as disguised relations to times. But at the level of *surface* grammar, the proposal has much to recommend it. A relational expression is obtained by eliminating two or more designators from a sentence.²¹ Are “ t ”, “1986” and “ten past two last Wednesday” not designators? They apparently designate *something*. And place-names such as

²¹See *e.g.* Lemmon (1965:179); and see Kripke (1980:24) for the notion of a designator.

“London” function as designators, so it is tempting, especially for the eternalist, to say the same of these temporal phrases. If this is correct then “is p at” would indeed be a relational expression.

What follows in terms of persistence if we adopt a relations-to-times view? Perhaps little. The endurantist ontology seems consistent with the proposal; the endurantist will simply take “ O ” to refer to an enduring object (that stands in various relations to times). But the proposal allows for a *perdurantist* interpretation also. “ O ” might then refer to a *four*-dimensional entity (still standing in various relations to times).

Now Lewis’ objection to the relations-to-times proposal initially appears quite simple. He claims that the proposal

is simply incredible, if we are talking of the persistence of ordinary things.
[. . .] If we know what shape is, we know that it is a property, not a relation.

(1986a:204)

However, if the proposal can be given both an endurantist and a perdurantist semantics, it is hard to see this claim as anti-*endurantist*—which is very much how Lewis intended it. The key to resolving this curiosity is that so long as the perdurantist espouses temporal parts then it is natural to interpret a perduring object’s relations to times as *derivative*. Perduring O is p -related to t (say), but only in virtue of O ’s temporal part at t being p *simpliciter*. Thus in later work, Lewis makes clearer his opposition, not to relations to times *per se*, but rather to the idea that, according to the endurantist, nothing is bent *simpliciter* (1988:66; 2002:4).²²

How should we evaluate this objection? The endurantist is likely to observe that although bentness may not be an intrinsic property, it may yet be regarded as a ‘*quasi*-intrinsic property’ insofar as it relates objects only to *times*. Hawley (2001:17) observes that whilst shapes are intuitively not relations to other *objects*, it is less clear

²²This prompts a question from Lowe (1988a:74): if, as Lewis believes, it is only temporal parts that are bent *simpliciter*, then given the “widespread ignorance” of such entities, whence does a preference for *simpliciter* properties arise?

that they are not relations to times. A similar reply would also be given to one who thought that the relations-to-times view does not allow for genuine *change*. Granted: being differently related to different *objects* need not amount to change. But being differently related to different *times* is another matter entirely.

Subject Modifiers

We have already flirted with Lewis' preferred solution (1986a:204). In terms of logical structure, the suggestion is that (*) should be understood as involving a temporal modification of the subject. Expressed notationally: *O-at-t* is *p*.

On this proposal sentences such as (1) and (2) would concern distinct subjects: Jim-at- t_1 and Jim-at- t_2 . The inevitable objection is that the proposal does not allow for *change*. Change, it will be said, amounts to *one and the same subject* possessing incompatible properties; and we have already admitted that, on the current proposal, (1) and (2) have *different* subjects.

At this point the defender of subject modifiers may concede that Jim's being bearded and *Tim's* being bearded does not count as change, and nor does the fact that Jim's upper lip is hirsute whereas his forehead is not. But they will insist that change *is* still distinct from mere variation. It involves *intimately related* subjects possessing incompatible properties (where the intimate relations are understood in terms of identity or genidentity as appropriate).

An alternative response would be to deny *any* violation of the change intuition. A natural semantic analysis of "*O-at-t* is *p*" takes "*O-at-t*" to refer to the *t*-located temporal part of *O*.²³ As noted above, this provides a derivative or vicarious sense in which *O* itself is *p*-related to *t*. So if the relation-to-times view can escape the charge that it does not allow for genuine change, then the perdurantist can simply piggyback

²³A dialectic curiosity: Lewis rejects the relations-to-times view because it fails to respect certain basic intuitions about properties. Does his own proposal in terms of temporal parts not fail to respect certain basic intuitions about *persistence*?

on this.

At this point I make a controversial suggestion. Might we offer an *endurantist* semantics for “*O*-at-*t* is *p*”? Recall that we understand endurance in terms of a single object (*O*) exactly occupying multiple spacetime regions. Doubtless we can refer to *O simpliciter*, but can we also refer to *O as at a particular region*?²⁴ We talk of Jim aged seven, the Tory Cabinet in 1990, and Dresden before the bombing. And whilst such talk might sometimes be interpreted in terms of the *way* that the relevant object then is or was, this does not always seem possible. Jim’s mother points to a photograph and remarks “This is Jim aged seven”. Is she really saying that this is the *way* Jim was (aged seven)? I would have thought that she is drawing attention to *Jim*—but perhaps to a temporally qualified, seven year-old Jim. In more abstract terms we might speak of *O as at R₁*, of *O as it occupies R₂*, or perhaps of the *R₃* ‘instance’ of *O*. The endurantist may grant that this sounds a *little* strange; but then only very rarely is multi-location *explicitly* formulated and discussed at all. The unfamiliarity of the language results from the unfamiliarity of the subject matter.

Apart from providing the endurantist with an additional option when it comes to temporal predication, the suggested referential apparatus also facilitates a semantics for sentences such as “Jim in 1984 was taller than Tim in 1990”. Let us make matters simpler by exchanging the “was” for a tenseless “is”. Even so, it seems wrong to attempt to hack our sentences into the logical form “In 1984: [Jim is...]”; neither “in 1984” nor “in 1990” governs the sentence as a whole. Are we committed, then, to Jim being related to one ‘degree of height’ in 1984, Tim being related to another in 1990, and to the idea that the relevant degrees somehow persist through time?²⁵ Are there similarly persistent degrees of girth, or styles of beard? Subject modifiers would permit a more intuitive logical analysis (and associated semantics): *Taller(Jim-in-1984, Tim-in-1990)*; where the perdurantist takes the *relata* to be temporal parts,

²⁴This suggestion was mooted in §4.4.3.

²⁵See Prior (1967:169–170).

and the endurantist objects as at particular times.

Sentential Operators

Perhaps it is mistaken to try to reduce “at t ” to a qualifying term. Indeed, perhaps it is not reducible at all, operating at a sentential level instead. The true logical form of (*) might then mirror a perfectly grammatical reformulation of that claim: “At t : O is p ”.

Because this structure is so close to a grammatical structure that *all* parties accept, it is important to emphasize that the current proposal regards this as the *ultimate* logical structure of (*). At this level of ultimate structure the proponents of the relations-to-times and subject-modifier accounts prefer the proposals already discussed.

Their proposals readily suggest an appropriate semantics though. What of the current one? Were no temporal modifier present, we would understand the truth of “ O is p ” as arising from the fact that O lies in the extension of the predicate “is p ”. How do we introduce time into this picture? I think the most natural suggestion is that considered by Sattig (2005:77–91). The idea is to introduce temporality by saying that what lies within the relevant extension is time relative. As Sattig observes, this

idea [...] is standard in intensional semantics, where the idea is cashed out by saying that [“is p ”] has as its *intension* a function from times to classes of ordinary objects. Given this apparatus, the move from the semantics of atemporal predications to the semantics of temporal predications can be informally described as building a time not into the extension of a predicate, but rather into the intension of the predicate.

(2005:80)

Sattig goes on to reject the account on offer (2005:81–86). His main objection is that if “is p ” has a time-relative extension then this prevents an object from being *atemporally* p —or, in his terms, p *simpliciter*. Now Sattig admits that there are

understandings of “is *p simpliciter*” that differ from that which he employs here. For example, if being *p simpliciter* amounted to no more than (i) being *p* at *some* time, or (ii) being *p* at *all* times, then there is no obvious reason why the possession by “is *p*” of a temporally relativized extension would prevent an object from being *p simpliciter*. One could at this stage question whether there is *any* sense beyond (i) and (ii) in which we want to allow that “*O* is *p simpliciter*”. But I have argued that the eternalist does at least acknowledge a sense of “exists”—*i.e.* exists₃—that plausibly corresponds to Sattig’s “exists *simpliciter*”; and so this is not a line that I can easily endorse. Moreover, an abstract triangle (say) is neither triangular *at a time* nor triangular *simpliciter* in the sense of (i) or (ii); it is triangular in an atemporal way. How is this possible if the extension of “is triangular” is determinate only once a time has been supplied?²⁶

With respect to this last point (and as Sattig admits) one could question the sense in which an abstract object possesses a shape. It is because abstract objects are not in time that temporally relativized predicate extensions present a problem. But if such an object is not in time then presumably it is also not in space. Hence it is doubtful whether it could be triangular (or indeed any other shape).

I would suggest that this issue can in any case be finessed by taking (some) predicates to have both a temporally varying extension and also an atemporal extension.²⁷ The idea is that *O* is asserted to be *p* either at a time or *simpliciter* (*i.e.* atemporally). In the latter case the assertion is true just if *O* lies within the (unchanging, atemporal) extension of *p*. In the former case the assertion is true just if *O* lies within the extension of *p* at the relevant time.²⁸

²⁶Note that a similar difficulty arises for the relations-to-times view. Perhaps my set square is triangularly related to many times, but do we not want to say that it is triangular in the sense that the *Platonic* triangle is triangular? Presumably, the latter is not triangularly related to *any* times.

²⁷I think this would be necessary for only very few predicates. The endurantist requires something along these lines when it comes to “exists”, and arguably also for properties possessed by both *abstracta* and spatiotemporal objects. But I am not convinced that anything is, say, red *simpliciter* in a sense distinct from both (i) and (ii).

²⁸Here I part company with Sattig (2005:85–86), though with some uncertainty. He seems to

Adverbialism

The adverbial analysis of temporal predication is perhaps the hardest to evaluate. Grammatically, “at t ” just *is* an adverbial expression, as is “yesterday”, “in 1984”, *etc.* It is not clear what to make of this though. Should we analyse (*) by analogy with the modal adverbs “possibly” and “actually”? That might suggest a logical form: “At t : O is p ”. But this is just the form considered above, with “At t ” treated as a sentential operator.

An alternative is to regard the temporal qualification as applying to the “is” of (*): O is-at- t p . But I find it hard to understand what this could mean. In fact I tend to regard the “is” of predication as entirely dispensable; some languages (*e.g.* Russian) *do* dispense with it, and certainly the standard logical rendering of “ O is p ” as “ $P(O)$ ” contains no *element* corresponding to the “is” of surface grammar. And if we can dispense with the “is” of predication, how are we to understand qualification of this “is”?

Perhaps the “is” in “ O is p ” does correspond to something though: an *instantiation relation*. Furthermore, perhaps the “at t ” in (*) then qualifies this relation.²⁹ In fact I am loath to accept that there is a *relation* between O and its properties. Is O not *directly* p ? And if not—if there must be a binding relation between O and p —then why does O not need binding to this binding relation, and so on?³⁰ I note in addition that the current proposal countenances more than a plain instantiation relation. Temporal qualification entails either a vast number of such relations, or a relation that can be qualified in a vast number of ways. This is not an attractive

think that the ambiguity of “exists” arises insofar as different qualifications can be applied to it (*i.e.* either “*simpliciter*” or “at t ”); hence such ambiguity does not emerge from an ambiguity in “exists” itself. I do not understand why this is a criticism rather than a mere observation. What is wrong with the idea that the extension of “exists” is only determinate once either a “*simpliciter*” or an “at t ” has been appended?

²⁹See Johnston (1987:127–129), Lowe (1988a) and (more ambiguously) Haslanger (1989).

³⁰This difficulty is known as “Bradley’s Regress”. It is mentioned in the present context by Lewis (2002:6–7) and Haslanger (2003:341).

picture.

There is also the danger that the introduction of an instantiation relation will resurrect those objections put against the relations-to-times view. If O 's being p requires an instantiation relation between the two, it seems that a perspicuous logical representation of this would be as $I(O, p)$. How do we accommodate a time within this representation? Lewis (1988:65–66 fn.1) thinks the adverbialist is committed to a three-place relation here: $I(O, p, t)$. On the earlier relations-to-times view, O was (p -)related to t ; now it is suggested that O is (instantiation-)related to both t and p . So whilst Lewis can no longer complain that this mistakenly construes properties as relations, he can (and does) protest at what relationality there remains within the account. His objection appears to be that having a shape should not involve a relation to *anything*.³¹

At this point Lowe and Haslanger reply that Lewis has misunderstood. “ O is p at t ” involves, not a three-place relation, but rather a two-place relation between O 's *being p* and the time t . This we might represent as $R([O \text{ is } p], t)$.³² By now I am starting to lose my grip on the proposal though, and certainly I do not see how the semantics of this is suppose to proceed. Clearly *something* is allegedly related to t . But what kind of entity is O 's *being p* ?

Doubtless there is more that the adverbialist can say here. But the theory seems ripe to burst into a number of sub-theories, each of which could be examined at length. Such an examination is not essential to our purposes. What *is* important is that even if the adverbial approach does not ultimately succeed, neither endurantist nor perdurantist seems likely to be left with *no* viable account of temporal predication. Earlier in §4.4 we failed to locate any kind of *problem* associated with change. Now

³¹Lewis also finds it obscure what “standing in some relation to straightness [has] to do with just plain being straight” (1988:65–66 fn.1).

³²Perhaps this “ R ” should be an “ I ” if O 's being p is *instantiated* at t . Lowe and Haslanger differ as to how to analyse the “ O is p ” *relatum*. Lowe claims that on his proposal a “two-place relation is related to a time” (1988a:74), *i.e.* O is related to p . Haslanger, by contrast, writes that “the primary instantiation of the property [p] by the object [O], need not be construed relationally” (1989:122).

we may add to this that, whilst there are interesting issues that remain unresolved, it seems improbable that temporal predication will furnish a major *criticism* of either endurance or perdurance.

Chapter 5

Endurance And Eternalism II: Relativistic Arguments

5.1 Introduction

Having considered the non-relativistic threats to endurance, I now turn to relativistic worries. In Chapters One and Two I suggested that relativity strongly favoured eternalism over presentism. The question for this chapter is whether it similarly supports perdurance over endurance.

Several recent authors contend that it does.¹ Anti-endurantist arguments based on the notion of coexistence have been proposed by Balashov and by Hales and Johnson; I consider these in §§5.2 and 5.3 (respectively). Gilmore's critique of relativistic endurance is the subject of §5.4, and Balashov's charge of explanatory deficiency is examined in §5.5. Finally, in §5.6, I address relativistic *perdurantism*.

First of all though, we must consider what relativistic endurance might involve. Pre-relativistically, the endurantist holds that one and the same persisting object exactly occupies multiple, instantaneous spacetime regions (see §3.3.3). But how can we understand "instantaneous" in the absence of an absolute simultaneity? Balashov suggests that, given relativity,

the central concepts of the endurantist and perdurantist ontologies, such

¹See Smart (1972) for an early discussion. See Quine (1960:172) for a still earlier *assertion*.

as “temporal part” and “being wholly present at a time,” lose their objective meaning and become *relativized to a reference frame, or perspective*.

(2000c:331; my italics)²

Of course the frame relativist will have to specify whether they mean a particular reference frame here (and if so which?), or whether enduring objects are wholly present at the times of *all* such frames. Even so, frame-relative proposals suffer from a common problem: they accord to reference frames, and to times as designated by such frames, a quite unwarranted metaphysical status. Such frames are no more than (often) convenient ways to describe the contents of spacetime; they capture no structure intrinsic to spacetime itself. It might alternatively be convenient to describe the contents of spacetime using (four-dimensional extensions of) cylindrical or spherical co-ordinates. We would not dream of singling out as ‘objects’ only those entities that lie, for example, on surfaces of constant radius or co-latitude.

We therefore face a difficult question: where *do* we locate enduring objects? Gilmore (2006:208) asks this very question, and we shall consider his suggested answers in §5.4. However, the issue is not immediately pressing, since Balashov’s coexistence-based argument makes the simplifying assumption that objects are spatially unextended. To this argument we now turn.

5.2 Balashov On Coexistence

Balashov’s central contention is that only perdurance is compatible with a relativistic interpretation of coexistence. His early papers (2000a, 2000b) on this topic are convoluted, and so my explication borrows heavily from Gilmore’s (2002:242–244) streamlining of the argument (together with much of his excellent rebuttal). Thus

²For similar frame-relativist thoughts, see Rea (1998:232–234), Sider (2001:59), Hawley (2001:53) and Sattig (2006:179).

streamlined, the argument has three central premises:³

- (1) Relativistic coexistence is best analysed in terms of spacelike separation (Coexistence As Spacelike Separation: CASS);
- (2) The endurantist but not perdurantist must understand such coexistence in ‘temporally loaded’ terms (“The Asymmetry Thesis”);
- (3) The ‘temporally loaded’ coexistence relations that arise from CASS are absurd (“The Absurdity Thesis”).

The idea, then, is that on a combination of CASS and endurance, certain “absurd” coexistence relations arise (details of which follow in §5.2.2). These relations are claimed not to arise on the combination of CASS and perdurance.

The endurantist could take this as a *reductio* of CASS. For now though, I assume the truth of (1) so as to consider in §§5.2.1 and 5.2.2 the strength of (2) and (3) (respectively). In §5.2.3 I examine Balashov’s (2005) radical moves in response to (Gilmore’s) criticism of (1)–(3). Finally, I conclude in §5.2.4 with a meta-level discussion of relativistic coexistence relations such as (1).

5.2.1 The Asymmetry Thesis

How does Balashov support his second premise, namely that there is a endurantist-perdurantist asymmetry when it comes to coexistence? The gist is that

[t]he endurantist concept of coexistence is tensed or “temporally-loaded” in a way in which the perdurantist one is not. It is tensed because it holds between entities that change their position in space with time and, consequently, coexistence itself becomes a function of time.

(2000b:S552)⁴

³In fact Gilmore identifies *four* premises, the extra one being eternalism (about Minkowski space-time). Balashov repeatedly endorses this (2000a:162–163 fn.16; 2002:224–225; 2005:2).

⁴See also Balashov (2000b:S553–S559; 2000a:142; 2005:5).

For the perdurantist though, the

facts about the coexistence of perduring objects, or of their parts, are tenseless facts, which do not change with time. (2000a:153–154)⁵

Two clarifications are important. First, Balashov does not mean to commit the endurantist to tense in the sense of §1.1. His meaning is better captured by the alternative locutions that endurantist coexistence is “temporally-loaded” or “a function of time”.

Secondly, one might wonder how, in the context of relativity, Balashov’s talk of space and time should be understood. Were we to replace “space” and “time” with “spacetime”, we would be left with the claim that enduring entities change their position *in* spacetime *with* spacetime. This is hardly very clear.⁶

In fact Balashov’s “time” refers to an object’s *proper time*.⁷ Here one might object that this notion is only coherent given his unrealistic idealization of objects as (spatially) pointlike (2000a:133; 2000b:S553; 2005:2); extended objects simply do not have an unambiguous proper time.⁸ However, as I have understood it, endurance holds that objects exactly occupy multiple spacetime regions; and what an object coexists with surely differs from region to region. This provides at least a minimal sense in which the coexistence relations of enduring objects ‘change’: they exhibit a variety of such relations.

What of perduring objects? Apparently these “do not change their locations with time” (2000b:S552). Here one might add that such objects are *singly located* in spacetime, and thus do not exhibit the variety of coexistence relations that pertain to enduring objects. But is this the whole story? Perhaps perduring objects “do not change their locations”, and are singly located, *in themselves*. But they have

⁵See also Balashov (2000a:142, 144; 2000b:S556, S560–S561).

⁶*Cf.* Gilmore’s observation on this topic: “Change of position in a manifold M is always change of position *in* M *with respect to* some temporal dimension T , where T is separate from M ” (2002:249).

⁷See Balashov (2000a:150, 154; 2000b:S556; 2005:2, 9, 14).

⁸See Gibson and Pooley (2006:172).

temporal parts at different spatiotemporal regions, each of which stands in different coexistence relations to the wider universe. Do these not provide a sense in which the perduring object *does* both move and stand in different coexistence relations?

Balashov objects to this line of thought, claiming that it focusses only on “the *vicarious* sense in which the properties of temporal parts of perduring objects can be attributed to the four-dimensional wholes” (2005:16). According to Balashov, the perdurantist “denies that objects have temporary properties in anything stronger than this sense” (2005:16–17). Maybe so; but still this seems to grant *a* sense in which perduring objects stand in varying coexistence relations. Only by focussing on the fact that perduring objects do not *directly* (*i.e.* non-vicariously) participate in such relations can Balashov establish the asymmetry he craves.

A summary so far then: endurantist coexistence is indeed a temporally (or *spatiotemporally*) sensitive phenomenon, insofar as enduring objects stand in different coexistence relations at different regions; and perdurantist coexistence *arguably* differs from this. What of the claim that endurantist coexistence is “temporally loaded” though? Is this just another way to express its temporal sensitivity? Perhaps, but Balashov *also* understands the ‘temporal loadedness’ of endurantist coexistence to licence the use of temporal terms such as “already”, “yet”, “still”, *etc.* (2000a:152–153; 2000b:S556–S560). To this terminology I have no real objection. Many pairs of regions that an enduring object exactly occupies can be temporally ordered. If *y* exists for *x* as at an earlier region, but not as at a later region, it seems right to say that *y no longer* exists for *x* as at that later region. The multiple locations of an enduring object similarly licence claims involving “still”, “already” and “not yet”. In conclusion then, *if* we can quietly forget about the vicarious sense in which perduring objects stand in different coexistence relations at different regions, then we may grant the Asymmetry Thesis. However, this thesis is not enough to underpin Balashov’s subsequent argument, as I am about to explain.

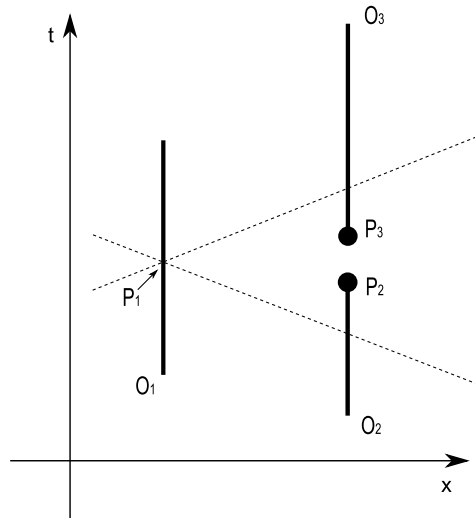


Figure 5.1

5.2.2 The Absurdity Thesis

Now for a concrete example of the kind of absurdity that is alleged to plague the endurantist but not the perdurantist. Premise (1) (or CASS) holds that spacelike separation grounds coexistence: x as at p and y as at q coexist iff p and q are spacelike separated. Consider the situation depicted in Fig.5.1. It is clear from their spacelike separation that, on CASS, O_2 as at P_2 coexists with O_1 as at P_1 , and O_3 as at P_3 coexists with O_1 as at P_1 .⁹

Balashov observes that O_2 and O_3 “are *still* or *already* in existence” for O_1 (2000b:S560). However, he claims that

there is no *tensed* sense in which [O_2 and O_3] can be in existence together: [O_2 's] end lies in the *absolute past* of [O_3 's] beginning. (2000b:S560)¹⁰

This is the kernel of endurantist’s (perceived) problem. Because of his adherence to the Asymmetry Thesis, Balashov believes it does not arise for the perdurantist. Our task for this section is to enquire: are the envisaged coexistence relations really so absurd?

⁹I will not always repeat the qualifying “as at P_1 ” etc.

¹⁰See Balashov (2000a:155) for a similar example (with very similar phrasing).

They are no *more* absurd for being temporally loaded. O_1 coexists with O_2 and O_3 , but O_2 and O_3 do not themselves coexist. How much worse is it that O_1 *still* coexists with O_2 and *already* coexists with O_3 ? When I perversely assert that Jim is (now) both bearded and clean shaven, this contradiction is not worsened by adding that he is *still* bearded and *already* clean shaven. The temporal determinations merely involve comparisons with earlier and later perspectives, comparisons that simply distract from the initial contradiction—which is quite troubling enough.

This has far-reaching consequences. In §5.2.1 I conceded that the coexistence relations of an enduring object do ‘change’ (in some sense). Reading Balashov, one gets the impression that this is relevant to the argument only insofar as it licenses the application of temporal determinations such as “still”, “already”, *etc.* However, we have just evaluated as worthless, from the point of view of worsening the situation, this very terminology. Hence any endurantist-perdurantist asymmetry with respect to temporally-loaded determinations makes no difference to the alleged absurdity.

Gilmore (2002:246–252) makes essentially this point, arguing that the following is equally problematic for the *perdurantist*: (i) O_1 ’s temporal part at P_1 coexists with O_2 ’s temporal part at P_2 ; (ii) O_1 ’s temporal part at P_1 coexists with O_3 ’s temporal part at P_3 ; and yet (iii) all temporal parts of O_2 are timelike separated from all temporal parts of O_3 .¹¹ To repeat: our (somewhat qualified) concessions regarding the Asymmetry Thesis mean that we cannot apply the vocabulary of “still” and “already” to this perdurantist scenario. But this makes no difference to the severity of the (temporally *non*-laden, *unchanging*) situation involving temporal parts. The Asymmetry Thesis is just not relevant.

In addition one might doubt that there is *anything* paradoxical about the situation of Fig.5.1 (on either endurance or perdurance). What tension there apparently is in the various coexistence relations stems from the following antinomy: their relative

¹¹In fact Gilmore thinks this not problematic at all (for reasons we will soon encounter).

locations indicate that O_2 and O_3 do not coexist; but it is nonetheless tempting to think that (i) they *do* coexist, since (ii) each coexists with O_1 . This temptation must be resisted. Spacelike separation is the alleged underpinning for coexistence. Since the former is non-transitive, so too is the latter. Only a failure to detach oneself from the intuitive, pre-relativistic coexistence relation (which *is* transitive) will permit the inference from (ii) to (i). If CASS is properly adopted and internalized, the antinomy never arises.

5.2.3 Objections From CASH

That there is at root no absurdity in Balashov’s envisaged scenario (let alone an absurdity that pertains to endurance but not perdurance) is one of Gilmore’s central accusations (2002:244–246). Balashov has since accepted this criticism (2005:17–18), and we therefore turn away from his original tripartite argument.

Balashov’s second attempt starts from the observation that CASS can only ground the coexistence of two objects. He therefore generalizes CASS to *CASH*: Coexistence As Sharing a Hyperplane (2005:19–22). Suppose that objects $O_1 \dots O_n$ exist at locations $R_1 \dots R_n$. According to CASH, these objects coexist at those locations just if $R_1 \dots R_n$ lie on a common (spacelike) hyperplane.

Balashov thinks that two anti-endurantist arguments follow from CASH. But since both could be avoided by adopting a more liberal form of CASH, Balashov also presents an argument against such liberalization. I consider the three arguments in turn.

Contextuality

The first is that according to CASH three objects as at three particular locations can coexist “pairwise”, yet not coexist “*all together*” (2005:28). Thus in Fig.5.2 Bob as at P_3 coexists with Stan as at P_1 and also Fred as at P_2 , and Stan as at P_1 coexists with

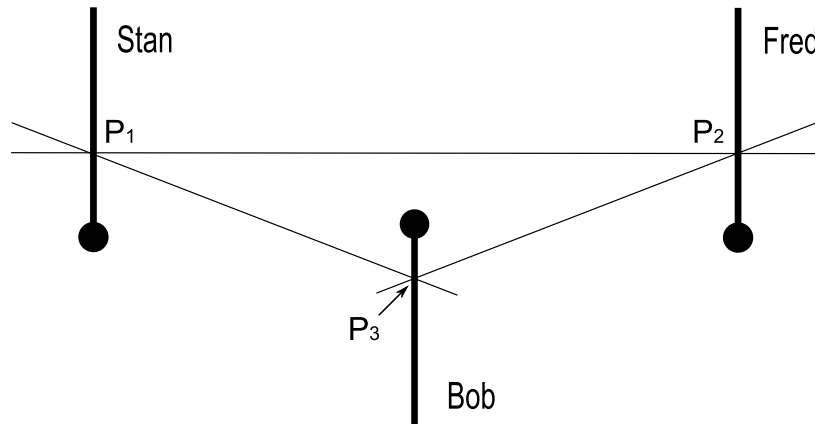


Figure 5.2

Fred as at P_2 ; yet the three of them (as at these locations) do not coexist together.

This strange phenomenon apparently involves *contextuality*. Again, the endurantist *could* regard this as a *modus tollens* consideration against CASH: CASH entails contextuality; contextuality is absurd; hence CASH is false. Instead though, Balashov wants us to accept CASH and interpret the resultant contextuality as an argument against endurance.

To do so, we would also require a second “Asymmetry Thesis” to the effect that no analogous oddity arises for perdurance. I think such a thesis would be false. Balashov allows that temporal parts stand in coexistence relations.¹² What, then, of the following situation?

- (i) Stan’s P_1 temporal part coexists with Fred’s P_2 temporal part;
- (ii) Stan’s P_1 temporal part coexists with Bob’s P_3 temporal part;
- (iii) Fred’s P_2 temporal part coexists with Bob’s P_3 temporal part;

and yet

- (iv) Stan’s P_1 temporal part, Fred’s P_2 temporal part, and Bob’s P_3 temporal part do not all coexist together.

¹²See Balashov (2005:13–15). What he denies is that such relations pertain to the perduring whole in anything but a vicarious manner.

Irrespective of just how strange or troubling this really is, it is surely no *less* strange or troubling than the corresponding endurantist scenario.¹³

Again though, the ultimate conclusion is predictable. Even apart from the failed asymmetry, there is nothing problematic here. The situations described *would* be strange (and indeed impossible) on a pre-relativistic understanding of “coexists”. But if CASH has already been adopted, contextuality is merely an interesting aspect of relativistic coexistence. And if it has not, then contextuality is merely a strike against CASH.

Chronological Incoherence

Balashov’s second CASH-based objection fares no better. It begins with the claim that certain sequences of spacelike hyperplanes containing more than one object are “chronologically incoherent”: as the sequence progresses one moves in a future direction along one worldtube, but in a past direction along another. (Thus consider the sequence SH_1 and SH_2 in Fig.5.3a, where A , B and C are the worldtubes of three objects.) Balashov admits this to be no serious problem provided that, for a given situation, there *is* a sequence that is *not* chronologically incoherent. He adduces the sequence of hyperplanes parallel to SH_1 and SH_3 as just such a sequence.

However, Balashov next contends that in certain cases

a chronologically coherent series of temporal-like worlds is *not* available
(unless one makes such a series improperly short) [...]

(2005:33)

As is by now customary, such cases are alleged to trouble endurantists but not perdurantists. Balashov’s example of such a case is Fig.5.3b.

¹³Balashov anticipates this objection but thinks that temporal parts are of only “secondary importance to the perdurantist ontology. Their failure to obey a ‘reasonable calculus’ is, therefore, metaphysically inconsequential” (2005:31). But contradictions involving temporal parts are contradictions nonetheless, and should not be shrugged away. Suppose a theory entails that *spatial* parts A and B are co-located, and likewise B and C ; and yet that A and C are differently located. We should reject this theory rather than turning a blind eye on the grounds that spatial parts are only of “secondary importance”. The same is true of temporal parts: *if* there is a difficulty here, it is a difficulty plain and simple.

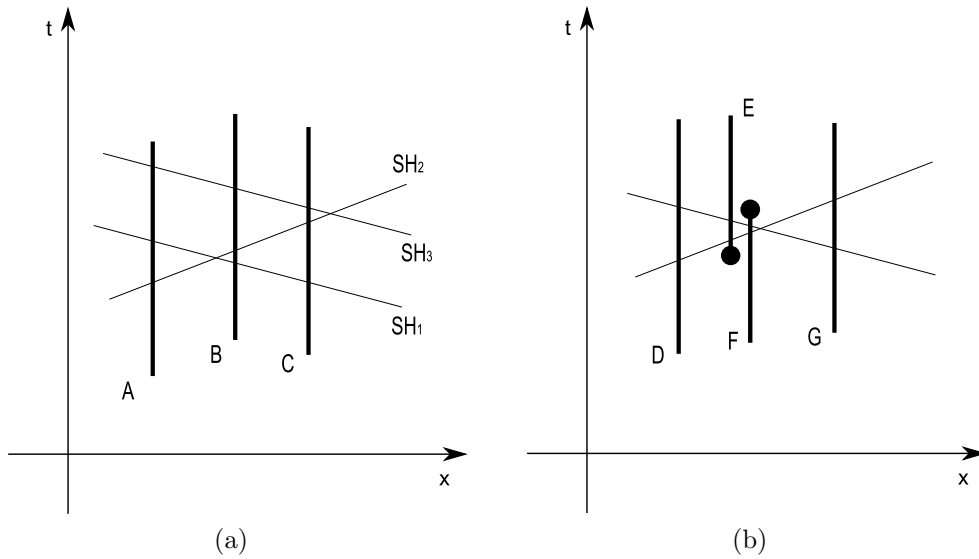


Figure 5.3

By this point there may be a certain amount of inductive scepticism regarding the claimed disanalogy between endurance and perdurance. But irrespective of this, Balashov’s central contention—that no chronologically coherent sequence of hyperplanes is available—is simply false. *Every* foliation of space-time by parallel spacelike hyperplanes constitutes a chronologically coherent sequence. As such a sequence progresses, one moves in a future direction along the worldtube of every object (with a worldtube intersecting the hyperplanes in question).

How could Balashov have overlooked this? In supporting his claim that in some cases no chronologically coherent series is possible, he first focusses only on *D*, *E* and *F* in Fig.5.3b. The two depicted hyperplanes are chronologically coherent with regard to these. He then observes that “[a]dding [*G*] to the picture, however, turns the series into a bad one” (2005:33). This is entirely true (the essential feature being that *G* is on the ‘far side’ of the intersection of the hyperplanes), and similar problems will arise for any sequence containing intersecting hyperplanes. The response of the previous paragraph merely points out what should have been obvious all along though: there are sequences of hyperplanes that do *not* intersect, *viz.* parallel sequences of hyperplanes (or hypersurfaces more generally).

Perhaps I have misinterpreted Balashov’s argument. I have tacitly taken his parenthetical disclaimer concerning the shortness of certain sequences as ruling out ‘sequences’ of just one hyperplane: such ‘sequences’ would be chronologically coherent in a trivial sense. But perhaps the disclaimer alludes instead to the fact that any sequence of parallel hyperplanes each of which contained *all four* of D – G would be “improperly short”, covering only the region where E and F (roughly speaking) ‘overlap’. The suggestion would then be that such sequences, and hence any parent sequences containing them, are in some way defective.

To this alternative interpretation there are two replies. The first is merely to emphasize that whilst any sequence of parallel hyperplanes containing all four objects might arguably be ‘short’, each such sequence is part of a (chronologically coherent) foliation of spacetime running from the most distant past to the farthest future. This parent sequence is certainly *not* “improperly short”.

Secondly, consider the narrative of the parent sequence in our example: all three objects exist for a while; a fourth is then ‘born’; for a brief period all four exist together; and then one of the original three ‘dies out’. It is the brevity of the middle period that Balashov objects to (on this, my secondary reading of his parenthesized disclaimer). But why should such brevity render the parent foliation illegitimate? Surely it should be not just permissible but even *expected* given the relative positions of E ’s start point and F ’s end point?

The Triangle

Balashov’s third objection is important insofar as it threatens to militate against a liberalization of CASH that focusses not so much on (flat) hyperplanes, but rather on (curved) hypersurfaces. That is, we might otherwise adopt CASH*: n objects coexist as at their various locations iff those locations lie on a common spacelike hypersurface.

Balashov notes that a shift to CASH* would help to deal with the ‘problems’

of Contextuality and Chronological Incoherence (2005:34). He overlooks a far better motivation for the shift though: in a curved spacetime (such as our own!), *hyperplanes* are simply not available. It follows that if there is any hope for CASH, it must be formulated in terms of hypersurfaces instead.

Nonetheless, Balashov thinks this would be mistaken. His main objection is that if we allow co-presence on hypersurfaces to underpin coexistence, then

small shifts in the mutual arrangement of objects and adding new objects to existing collections could induce drastic disturbances in the profile of the resulting ‘coexistence surface’ and its spatial geometry. (2005:35)

His example involves supposing that

three objects coexisting in a certain spatially flat temporal-like world form an Euclidean triangle there (*i.e.*, a triangle whose angles sum up to two right angles). Adding other objects to the coexistence pool could make things go ‘wild’, even among the members of the original group: the triangle they define might suddenly stop being Euclidean, and this for no physical reason. (2005:35)

Talk of “adding other objects to the coexistence pool” is somewhat opaque, but I think Balashov envisages roughly the following: (i) O_1 , O_2 and O_3 as at R_1 , R_2 and R_3 respectively, lie on a *hyperplane* and (therefore) form a Euclidian triangle; and (ii) O_4 as at R_4 does not lie on the same *hyperplane*, but is located on a (curved) *hypersurface* also containing R_1 , R_2 and R_3 .¹⁴ His contention is then that once we include O_4 in our consideration of O_1 , O_2 and O_3 as at the locations in question, something could go ‘wild’. In particular O_1 , O_2 and O_3 might cease to define a Euclidean triangle. Presumably this would occur if O_4 is located such that the hypersurface through all four is curved in the vicinity of O_1 , O_2 and O_3 .

The following analogy should show how benign all this is. On a suitably large scale, Oxford, Cambridge and London are but geographical dots. These three dots

¹⁴Balashov *may* also intend: (iii) there is no *other* location of O_4 such that it lies on the given *hyperplane*; and (iv) there is in fact *no* hyperplane containing O_4 as well as O_1 , O_2 and O_3 .

lie on a unique *flat* spatial plane. Although one easily forget such things, this plane does not quite lie on the Earth's surface, since the latter is of course curved. Instead, the plane in question is a shallow slice through the Earth which, if cut along, would result in the loss of much of Southern England. Relative to their flat spatial plane, the three cities form a Euclidean triangle (as would any three dots on any plane). But suppose we now consider a fourth conurbation (such as Slough). No flat plane contains all four locations, but there are infinitely many curved surfaces—*e.g.* the Earth's surface—that do. Relative to the Earth's surface, the locations of Oxford, Cambridge and London form a *non*-Euclidean triangle.

We should be familiar, then, with the idea that what is true of three points relative to one surface may be false relative to another. In the geographical example the inclusion of Slough shifted the focus from the original, flat plane to a different, non-flat surface; and the relations between the original three cities varied correspondingly. No change is wrought in Oxford, Cambridge or London as we shift our focus though, and nor does there appear to be anything particularly 'wild' here. The same is true of Balashov's four-dimensional analogue. There is nothing here to worry us.

5.2.4 Coexistence: Who Needs It?

Having rejected Balashov's arguments based on CASS and CASH, I now turn to these alleged underpinnings themselves. Why is Balashov concerned to identify a relativistic coexistence relation *at all*?

The background is straightforward: in addition to the universal, eternalist sense of *coexistence*₃, we have a firm attachment to a more selective or 'locative' sense in which I coexist with Blair but not Gladstone or Pitt. An absolute simultaneity *would* ground this relation: were *x* and *y* contemporaneous, they would coexist. But what can ground (this non-trivial) coexistence in the absence of an absolute simultaneity?

Balashov (2000a:133) wisely attempts to delimit the answers by suggesting certain

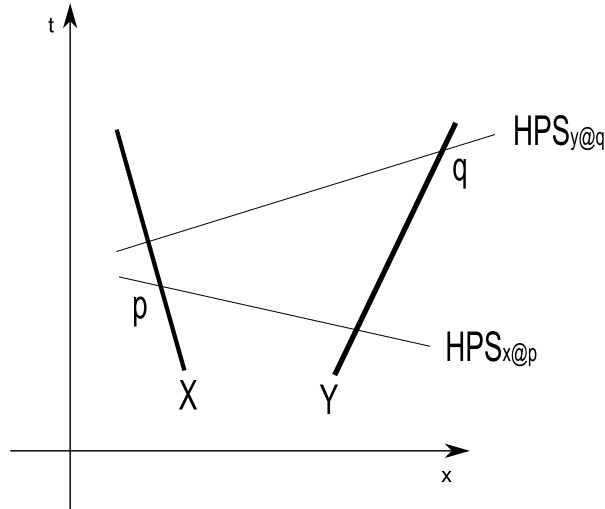


Figure 5.4

desiderata for a candidate relation. It should be: (i) objective, (ii) symmetric and (iii) relevant. We revisit (i) in due course. (ii) seems sensible enough though: if x coexists with y , one naturally assumes that y coexists with x . Finally, (iii) encapsulates the thought that if x and y are to coexist in virtue of standing in a spatiotemporal relation, there must be some plausible story as to how that relation connects with coexistence. For example, the fact that z lies in the backwards lightcone of an entity y that is spacelike separated from x would be no good reason to think x and z coexistent. The relation in question is just not relevant.

These *desiderata* enable Balashov to disregard certain non-starter candidates (2000a:133–138) of which I mention only one as an example. It might be proposed (deep breath!) that x (as at p) and y (as at q) coexist iff p is simultaneous (in the rest frame of x as at p) with *some* point on y 's worldline; and q is simultaneous (in the rest frame of y as at q) with *some* point on x 's worldline. Call this proposal *CARFS* (Coexistence As Rest-Frame Simultaneity); a situation in which it would rule that x and y coexist is shown in Fig.5.4 (where “ $HPS_{x@p}$ ” stands for “the hyperplane of simultaneity for x as at p ”).

As Balashov notes, CARFS fails to respect relevance (2000a:137). The coexistence

of x as at p and y as at q should depend solely on the spatiotemporal relations between p and q . It should not depend on whether x and y also exist at *other* points simultaneous with p and q in the relevant frames.

What of objectivity? It is unclear what Balashov means by this. He certainly intends to rule out Gilmore’s proposed candidate (*REL*), which portrays coexistence as inherently frame relative. That is, according to *REL*, x as at p and y as at q coexist *relative to frame F* iff p and q are simultaneous *in F* . Gilmore (2002:255–257) points out that *REL* meshes with one relativistic treatment of simultaneity, and also that *REL* is transitive (and, we might add, symmetric). However, Balashov protests that there is still no “fact of the matter” as to whether he coexists with Gilmore (2005:8); the implication is that an absolute and not a (frame-)relative fact is required.

The maximally liberal frame relativization of *REL* might seem extravagant, but frame relativization need be neither promiscuous nor at odds with an objectivity requirement. Recall *CARFS* and Fig.5.4. The alleged coexistence of x and y involved frame-relative facts, but only two frames were involved, and moreover these frames were singled out by x and y themselves. *CARFS* may have its problems (*e.g.* with relevance as discussed above), but it is not obvious that the involvement of frames associated with x and y renders *CARFS* in any way non-objective.

Moving beyond *CARFS* and *REL*, we might suppose that x as at p coexists with y just if, for *every* inertial reference frame, y is located at *some* point simultaneous in that frame with p . Effectively this requires that y ’s worldline traverse the ‘elsewhere’ of p . Alternatively, one could suggest that x as at p coexists with y just if there is *some* inertial reference frame in which y is located at a point simultaneous with p . In fact this latter candidate is just Balashov’s *CASS*, which in one form holds that x as at p coexists with y just if *some* location of y is spacelike separated from p .¹⁵ The more standard formulation of *CASS* is that x as at p coexists with y *as at q* iff p and

¹⁵See Balashov (2000b:S559).

q are spacelike separated. This relation is non-transitive. It also means, surprisingly, that x as at p can coexist with y as at *very many* spacetime regions. And finally, CASS might even violate Balashov’s own (iii). Two entities on opposite sides of the universe cannot interact, can never come to know of one another’s existence, and have light-cones that only overlap in the extraordinarily distant past and future. Are such objects not so utterly disconnected that there is *no* (non-trivial) sense in which they coexist? The fact that they are spacelike separated just seems irrelevant.

I will not trouble the reader by further remarking on Balashov’s CASH or on an intriguing proposal in terms of *Stein Presents*: regions of spacetime points that can both affect and be affected by an object during a short, contextually determined, temporal interval.¹⁶ The fact is that *all* of these relations have advantages and disadvantages. Some, as we have seen, are non-transitive. Others fail relevance. Some frame-relativize too liberally. And, carefully understood, some are even non-symmetric.¹⁷

It follows that none of these relations reproduce the intuitive properties of coexistence. This should be no surprise given the earlier discussion of relativistic *presentism* (§§2.3–2.3.5). Recall in particular that the only symmetric and transitive spatiotemporal relations are “exists in the same universe as” and “is at the same point as”; the choice is between universality and a strangely pluralistic solipsism (as Stein (1968:18) puts it). Neither relation can underpin coexistence as we naturally think of it, and I suggest that there is not even a front-running candidate with *roughly* the right ‘shape’. As with relativistic presentism, relativistic coexistence is simply a non-starter. There

¹⁶See Gibson and Pooley (2006:166–167, 170–171) and Arthur (2006:146–151).

¹⁷One can *guarantee* symmetry by stipulating that x and y coexist iff x exists for y and y exists for x (see Gibson and Pooley (2006:169)). The quest is then to find an appropriate candidate relation for “exists for”, and we may re-interpret our ‘coexistence’ candidates in this light. Some of *these* candidates are not symmetric. For example, there is no reason why x must traverse the elsewhere of y as at *any* point along y ’s worldline even if y traverses the elsewhere of x as at *every* point along x ’s worldline. (Let x have a very short worldline and y a very long one.) Consider also a proposal that x as at p exists for y as at q iff p is simultaneous with q in the rest frame of y as at q . It need not (and generally will not) follow that y as at q exists for x as at p .

is no such relation.

This need not disappoint us. Suppose we know which objects are spacelike separated from us, which are simultaneous in various reference frames, which lie within our Stein Presents, *etc.* Would it really matter what *coexists* with us (even supposing there is a fact of the matter here)? Tony Blair is spacelike separated from me, he lies in my Stein Present, he is simultaneous with me in my rest frame, and so on. Knowing all this is enough. I would *rather* know such facts than simply that he (somehow) coexists with me. By contrast, consider an alien that lies beyond my Stein Present, is located at points spacelike separated from me, but also ceases to exist at a point spacelike separated from me. It would really be of no greater interest to (somehow!) learn that this alien coexists with me in a non-trivial sense.

Finally though, a man who *is* interested in such facts: Balashov takes it to be “uncontroversial that any viable ontology of objects *must* embrace the concept of coexistence” (2000b:S552; my italics). Similarly, no-one

would be willing to deny, on pain of solipsism, that she coexists with various objects—tables and chairs, as well as other persons—and no one would be inclined to admit that, in any interesting sense of coexistence, she coexists with all of them indiscriminately.

(2000a:131; 2000b:S552)

I *am* prepared to deny non-trivial coexistence. If no spacetime relation approximates to the intuitive relation, then in this regard intuition plays us false. But it hardly follows that, in some non-trivial sense of “coexist”, I do not coexist with *anything*, or that I coexist with *nothing*; it is rather that this sense of “coexist” is entirely rejected. Life is no more lonely as a result. I coexist in the universal, eternalist sense with really very many entities; and indeed, the eternalist world is rather densely populated in my immediate neighbourhood.

5.3 Hales and Johnson

If the reader shares the sentiments of §5.2.4 they will be tempted to view with suspicion any further argument based on relativistic ‘coexistence’. Hales and Johnson produce just such an argument. It is suspicious indeed.

They start, and start to go wrong, with their definition of endurance:

Objects are wholly present at each moment of their existence. We can formulate this as a necessary condition for endurance: something is an enduring object only if it is wholly present at each time in which it exists. An object is wholly present at a time if all of its parts co-exist at that time. Put contrapositively, the principle states that if an object is not wholly present at each time at which it exists (if all its parts do not co-exist at each time at which it exists) then it is not an enduring object.

(2003:532)

In an article discussing the impact of relativity on persistence, the unqualified use of “time” is unfortunate. Let it pass nonetheless. Instead, recall from §3.3.1 how difficult it is to analyse the notion of being wholly present. Hales and Johnson are floundering. It is *trivial* that “an object is wholly present at a time if all of its parts co-exist at that time”, provided we assume that “all of its parts” refers to all of the parts it *then* has. But the alternative assumption is that “all of its parts” refers to all of the parts it *ever* has, in which case Hales and Johnson’s ‘endurance’ is but a disguised mereological essentialism. Moreover, and as we shall see, this definition is so central to their argument that its inadequacies can hardly be isolated and contained.

The next problem comes soon after, when Hales and Johnson introduce the notion of coexistence. The following is said to be “clear”:

First, simultaneity is sufficient for co-existence: if two things exist at the same time, they co-exist. Secondly, co-existence is transitive: if p and q co-exist, and q and r co-exist, then p and r co-exist.

(2003:533)

What is meant by “simultaneity”? The main argument can help us here. Hales and Johnson consider A and B , two non-coincident proper parts of an object which are denoted by A_1 and B_1 as they are at t_1 (in the object’s rest frame), and by A_2 and B_2 as they are at t_2 (in the same frame). We learn that we

can construct another inertial reference frame, moving with respect to the rest frame of the object, such that the proper parts of the object that are simultaneous are A_1 and B_2 . In our example, A_1 and B_1 co-exist as measured in one frame, and A_1 and B_2 co-exist as measured in the other; thus B_1 and B_2 must also co-exist.

(2003:533)

Clearly then, “simultaneity” should be understood as simultaneity in an inertial reference frame. Hales and Johnson’s usage suggests that the link between simultaneity and coexistence is fairly respectable: entities that are simultaneous *in a frame* coexist *in that frame*. What could be more reasonable than this? But their (interpretation of their) transitivity claim is extravagant by comparison. In general terms, they start from the coexistence of x and y in *one* frame, add to this the coexistence of y and z in *another* frame, and infer the coexistence *simpliciter* of x and z !

The excessive liberality of this reasoning is highlighted by the realization that x and z could therefore coexist without being simultaneous in *any* reference frame. Indeed this is true of B_1 and B_2 in Hales and Johnson’s own example. But one might well think that in fact simultaneity is *necessary* for coexistence, or at least that this is just as “clear” as its being sufficient. It may of course be difficult if not impossible to hold on to all of our pre-relativistic intuitions about coexistence (recall §5.2.4). But why sacrifice necessity simply to retain sufficiency?

An alternative line of enquiry considers the precise sense of “coexistence” being employed. Is it the universal, eternalist sense? Or is it the locative sense in which I (intuitively) coexist with Blair but not Gladstone or Pitt? *Modulo* the definitional difficulties of §3.3.1, it is in the latter sense that we want certain parts of “wholly present” objects to coexist. But by taking simultaneity in *some* reference frame to

be sufficient for coexistence *simpliciter*, and by explicitly requiring transitivity of the latter, Hales and Johnson unwittingly single out the *universal* sense in which everything coexists with everything else.¹⁸ But there is no reason, then, to *argue* that B_1 and B_2 coexist. Eternalism itself secures this.

Thus deprived of an adequate (or indeed any) analysis of non-trivial coexistence, it is hard to fairly assess the remainder of the argument. I shall make a maximally charitable (and somewhat unrealistic) assumption: that Hales and Johnson could, somehow, provide a locative sense in which B_1 and B_2 uncontroversially coexist. If so, then their claim at the end of the last quoted passage would be vindicated.

That very claim soon reappears as the antecedent of their conditional *dénouement*:

If B_1 and B_2 co-exist, then the object composed of parts A and B is not wholly present at t_1 : it has a part B_2 present at t_2 , just as real as B_1 at t_1 .

(2003:533)

The first thing to say here is that this only further endarkens the interpretation of “wholly present”. Recall that “an object is wholly present at a time if [(1)] all of its parts co-exist at that time” (2003:532). If the coexistence of B_1 and B_2 means that the object is therefore not wholly present at t_1 , it seems that in practice an object is wholly present at a time if (2): all of its parts which coexist with a part located at that time *are themselves* located at that time!¹⁹ As a disambiguation of (1), (2) is certainly novel. I can see no obvious reason to accept it, although this is hard to judge given the absence of any concrete analysis of (locative) coexistence.

Now for the final nail in the coffin. B_2 is Hales and Johnson’s example of a part that is not present at t_1 ; this is somehow supposed to mean that the object is not (then) wholly present. But B_2 *is* present at t_1 : it is present there, not because B_2 is

¹⁸*Cf.* Putnam (1967) on relativistic *existence*. Miller (2004:356–357) also observes that Hales and Johnson have inadvertently honed in on the universal notion of coexistence.

¹⁹I use “if” for ease of comparison with Hales and Johnson’s (1). In fact if B_2 is to have any bite they require an “only if” or “iff” instead.

“as real as B_1 at t_1 ” (whatever *this* means), but rather because B_2 *just is* B_1 . As the object endures, so do its parts. These parts exactly occupy multiple regions. B does this in the guise of B_1 and B_2 .

Perhaps the reply will come that we should therefore consider a *changing* object. Suppose that at t_1 (in the object’s rest frame), A_1 and B_1 *fully* compose the object in question. At t_2 though (still in the object’s rest frame), it instantaneously grows another part, C . As such, the object is fully composed of A_2 , B_2 and C_2 at t_2 . But now C_2 is plausibly (i) a part of the object, and (ii) *not* present at t_1 (not even as C_1 : *ex hypothesi* C does not exist then).

Have we a problem for the endurantist here? Perhaps; but not a new one, and certainly not a *relativistic* one.²⁰ Any endurantist worth their salt can already deal with mereological change.²¹

5.4 Gilmore And The Every Slice Principle

Gilmore’s (2006) critique of relativistic endurance is much more sophisticated. He starts from the worldtube of an object (or its “path”), and asks where within that worldtube we should locate the enduring object. He identifies four initially plausible answers, only to argue that each faces grave difficulties.

In §5.4.1 I will agree with Gilmore that three of these endurantist responses are untenable. I will also introduce his fourth option. §§5.4.2–5.4.4 then reject, for the most part, his criticisms of this fourth option. This will point towards certain morals in §5.4.5.

²⁰Merricks (1999:428–430) concentrates on this (non-relativistic) difficulty.

²¹The endurantist could build this into the notion of exact occupation, observing, *à la* Gilmore (2006:201), that there is no obvious contradiction in an object having different parts at the different regions it exactly occupies (see also the end of §3.3.3). In other words, by refusing to offer the *mereological* definition of endurance that Merricks easily controverts, the endurantist can simply side-step the issue.

5.4.1 Setting Things Up

As remarked above, Gilmore begins with the “path” of an object:

R is the *path* of *O* =_{df.} *R* is a region and is the union of the (region or) regions that *O* exactly occupies.
(2006:204)

This notion of a path is valid for both enduring and perduring objects; I will use “worldtube” synonymously. Gilmore next asks a “Location Question”:

What is the general principle that determines, for any given material object, *which subregions of that object’s path are exactly occupied by the object?*
(2006:208)

The perdurantist answer is simple: an object exactly occupies its entire path.²² The endurantist instead regards an object as exactly occupying multiple regions within its path. Very well; but which regions?

Gilmore suggests and then criticizes four different answers:

1. *The Every Slice Principle*. We return to this shortly.
2. *The Rest Frame Principle*. This holds that an object exactly occupies regions of its worldtube all the parts of which are simultaneous in the rest frame of that object (2006:219–200). Gilmore argues that any relatively moving, spatially extended parts of such an object present a problem. Such a part exactly occupies a region composed of points that are simultaneous in *its* rest-frame, and so does not exactly occupy subregions of the regions exactly occupied by the object. Objectionable consequence: moving parts do not lie within their wholes (2006:220–222).²³

²²In §5.6 I consider a more troubling question though: where are the *temporal parts* of a perduring object located?

²³A more severe problem, not mentioned by Gilmore, is that the rest frame of a spatially extended object is not, in general, well defined in special relativity. (See the related point about proper time at fn.8 of §5.2.1.)

3. *The Top Down Principle.* This assumes a privileged temporal foliation of spacetime. Objects exactly occupy only those maximal regions of their worldtubes that are also subregions of the leaves of this foliation (2006:222–224). Gilmore complains that whether an object exactly occupies a region thus becomes extrinsic to facts about that region. If the privileged foliation depends, for example, on distant mass-energy distributions, then whether an object exactly occupies a particular region also depends on such facts. In addition, Gilmore points out that certain spacetimes are simply not foliable.

4. *The Bottom Up Principle.* In rough terms, this imagines tiny timers attached to the pointlike parts of an object. These measure the proper time along the trajectories of the parts in question. Initially the timers are set to zero. The object then exactly occupies regions of the worldtube at which the timers on the pointlike parts all read the same (2006:224–226). One can anticipate the impending objection. The phenomenon at the heart of the so-called ‘Twin Paradox’ will lead to the timers of relatively accelerated parts of the object falling out of step, with the result that surfaces of constant timer reading cease to be spacelike.

I agree with Gilmore that (2)–(4) are untenable for the reasons he gives. Turning, then, to the Every Slice Pinciple (ESP), this holds that an object exactly occupies each and every “achronal” (*i.e.* spacelike) slice through its worldtube (2006:209–219).²⁴ How is “slice” to be interpreted? Flat hyperplanes arguably have no special metaphysical significance and in any case are not available in a curved spacetime such as our own. Gilmore therefore takes “achronal slice” to mean *any* hypersurface that is everywhere spacelike; the (spatial) geometry of such surfaces will be generally be curved. One further qualification is also required: the region in question must be

²⁴Gilmore’s official characterization is that R is achronal iff “ R is a region, and for any distinct points p and q in R , neither p nor q is absolutely earlier than the other” (2006:204).

maximal, where a region is a maximal achronal slice through an object’s worldtube iff it is not a subregion of any other achronal regions within the worldtube.²⁵ A summary of ESP is therefore that enduring objects exactly occupy every maximal achronal region within their worldtube.

5.4.2 Immanent Causation

Gilmore raises three apparent problems for ESP, which I address in this and the next two sections. In fact I will discuss his objections in reverse order, beginning with his observation that, for the identification of an object exactly occupying one region with an object exactly occupying another, “an appropriate sort of causal relation (often called ‘immanent causation’)” must hold between these ‘objects’ (2006:214). This very general principle he calls *MURIC* (Multi-location Requires Immanent Causation). I am minded to accept it.

Gilmore believes that ESP is incompatible with MURIC. In particular, ESP permits the very same object to exactly occupy both of the overlapping regions R_a and R_b in Fig.5.5. But according to Gilmore, MURIC does *not* permit this, since the object at R_a cannot be the (immanent) cause of the object at R_b , nor *vice versa* (2006:215). If we are wedded to MURIC, it seems that ESP will have to go.

Let us take a step back. Anyone initially attracted to ESP will surely regard R_a and R_b as containing objects and, indeed, objects of the same *type*; the remaining question is whether they contain the very same object. Let the object at R_a be O_a and that at R_b be O_b . In line with MURIC, we should indeed decide whether O_a and O_b are one and the same based, in part, on whether they are causally related in an appropriately intimate way. But they *are* so related. In particular, every *part* of O_a is either (i) an immanent cause of the state of a particular part of O_b (*viz.* itself), (ii) in a state that is immanently caused by a part of O_b , or (iii) must be reckoned a part

²⁵Gilmore adds this qualification in response to an objection to be considered in §5.4.4.

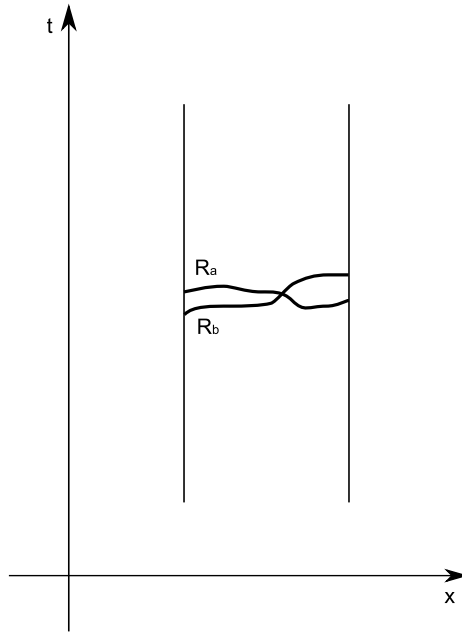


Figure 5.5

of O_b because it is exactly located in a region where R_a and R_b overlap. (The same holds *mutatis mutandis* for every part of O_b .) Granted: the state of O_a as a whole is not causally grounded in the state of O_b , or indeed *vice versa*; but the satisfaction of (i) to (iii) surely constitutes excellent grounds to nonetheless identify O_a and O_b .

This observation should save ESP from Gilmore's MURIC objection, but consideration of the remainder of Gilmore's discussion will be instructive. In response to his alleged difficulty with MURIC, Gilmore offers the defender of ESP an amended version. Gilmore calls this *MURIC'*:

Necessarily, for any material object O and distinct spacetime regions R_1 and R_2 , if O exactly occupies both R_1 and R_2 , then there is some region R such that:

- (i) R_1 and R_2 are achronal slices of R ,
- (ii) there is a set S of achronal slices of R such that every point in R belongs to at least one member of S , and for any two members, x and y , of S , the contents of x bear the appropriate sort of immanent causal relation to the contents of y , or *vice versa*.

(2006:216)

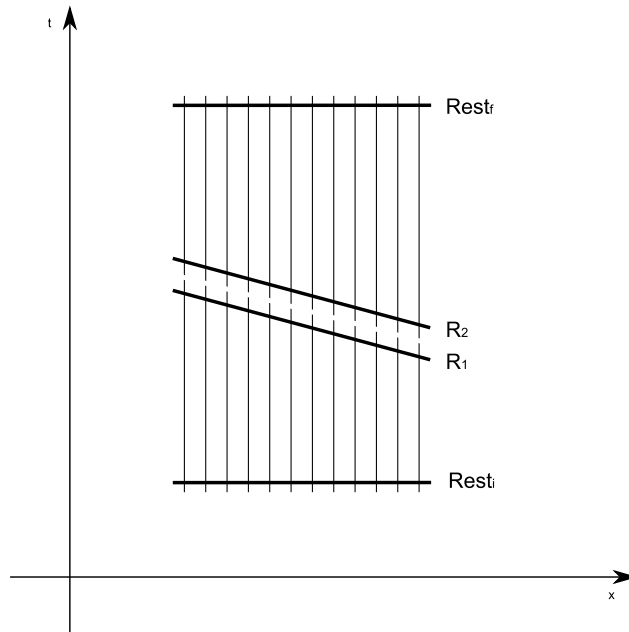


Figure 5.6

After noting two points in favour of MURIC*, Gilmore objects to it as follows. Consider an entity composed of several molecules bound together. In the rest frame of that entity, the molecules are all replaced, successively but extremely rapidly, by intrinsic duplicates to which they are causally unrelated. With diagrammatic gaps representing non-causal replacement (but not spatiotemporal gaps) we thus have the situation depicted in Fig.5.6.

The objects exactly located at the regions labelled R_1 and R_2 are surely distinct, since they are on opposite sides of a causal discontinuity. But MURIC* apparently lets us down, in that it fails to rule out their identity.²⁶ This is because, at least according to Gilmore, there *is* a set S satisfying requirement (ii) of MURIC*: *e.g.* the set of parallel slices running from $Rest_i$ to $Rest_f$ (2006:218–219).

²⁶MURIC and MURIC* only place *necessary* conditions on when the occupiers of two regions may be regarded as one and the same, so should not putative counterexamples involve cases where we *want* to say two such occupiers are the same despite MURIC(*) vetoing this? The case under discussion involves exactly the reverse. Gilmore is right to see it as problematic, however, for the lack of appropriate casual connection between them is the *only* thing preventing our regarding the occupiers of R_1 and R_2 as the same. Hence it is down to MURIC(*) to rule out their identity.

Since MURIC and ESP are not obviously incompatible (for the reasons given above), there is perhaps no pressing need to defend MURIC*. Nonetheless, it is being saddled with another’s guilt. Is it true that *every* two members of the set of rest slices bear the “appropriate sort of immanent causal relation” to each other? Surely (the contents of)²⁷ Rest_{*i*} and Rest_{*f*} are *not* immanent-causally related, since they lie on opposite sides of a causal discontinuity! Gilmore thinks that Rest_{*i*} and Rest_{*f*} *are* so related because he explicitly assumes that “the relevant immanent causal relation is transitive” (2006:218); and because, roughly speaking, Rest_{*n*} is very plausibly immanent-causally related to Rest_{*n+1*} for all *n* (even within the region of causal discontinuity).²⁸

It is the transitivity assumption, and not MURIC*, that is to blame here. Indeed this assumption even troubles MURIC itself. On the basis of transitivity Gilmore explicitly conceded that *any* two rest-frame slices are immanent-causally related to each other. Rest_{*i*} and Rest_{*f*} are therefore immanent-causally related; and so *even according to MURIC*, their contents may be identified. This appears to be a *reductio* of the transitivity claim.

Transitivity also causes difficulties for the less liberal forms of relativistic endurance that Gilmore considers after rejecting ESP (see §5.4.1). Any causal discontinuity not parallel to the permitted object-containing slices of a worldtube gives rise to the very same problem.

Indeed, the combination of transitivity and near-instantaneous ‘immaculate replacement’ raises the same issues even in the *non*-relativistic case. Suppose that horizontal lines in Fig.5.6 represent planes of absolute simultaneity. Any two successive simultaneity slices through the worldtube in question would be immanent-causally

²⁷*N.b.* this qualification will occasionally be omitted.

²⁸Within this region, only a single particle is ever non-causally replaced from one rest slice to the next. Since, as Gilmore points out, we do allow that objects can persist through the gain and loss of parts, such slices “are as intimately causally related as any two slices through a spatially extended, persisting thing ever are” (2006:218).

related. By transitivity then, Rest_i and Rest_f are again immanent-causally related, and no MURIC-like principle will prevent us from identifying them.²⁹

The most obvious moral here is that the relevant immanent causal relation is not transitive. Recognizing this is the only way to uphold what should be an uncontroversial truth: that objects causally isolated from each other are not immanent-causally related. Admittedly, the endurantist has a problem if they think that immanent causal relations are *sufficient* for identity. If this were the case then the fact that immanent causal relations hold between any two successive rest slices would make each such slice identical to the next. By the transitivity of identity, we could then conclude that *all* such rest slices—including Rest_i and Rest_f —are identical.

The endurantist must therefore deny that being immanent-causally related is sufficient for identity.³⁰ Somewhere along the chain of (pairwise) immanent-causally related slices, identity is lost: there are (at least) two such successive slices that do *not* contain the very same object. This will be because, to put it in rough terms, ‘too much’ of the object has by this stage been replaced ‘too quickly’. True: in a different context these two slices might contain the very same object. But that is just to say that identity can fail to hold as a result of accumulated changes. I think this quite plausible. In any case though, the more immediately relevant point is that, however the endurantist deals with non-instantaneous causal discontinuities, they are not a specifically *relativistic* problem.

5.4.3 Time Travel

Gilmore’s second criticism of ESP concerns time-travelling impenetrable extended simples (2006:213–214). Having already rejected the possibility of extended simples

²⁹I reconsider non-relativistic cases of immaculate replacement in §7.3.3. (In fact I will take a somewhat sceptical stance.)

³⁰If it is analytic that *immanent* causal relations hold only between states of *the same object* then I rephrase in terms of *quasi-immanent* causal relations: relations that are intrinsically identical to *bona fide* immanent causal relations except that they need not be accompanied by identity. The example in the main text illustrates how this might arise.

(§3.2), it seems I have an obvious response to this criticism. However, I abjure this obvious response since (a) not everyone rejects the possibility in question, and (b) Gilmore's criticism can be developed so that it does not, I think, require extended simples after all.

So consider again the worldtube of Fig.5.5, interpreted now as that of an impenetrable extended simple. According to ESP, the object in question is located in very many overlapping subregions of that worldtube, *e.g.* R_a and R_b . But in that case these objects do interpenetrate after all!

Gilmore's immediate riposte in defence of ESP is that R_a and R_b contain *the same* object. Allowing such *self*-penetration is consistent with denying that any two *distinct* objects can interpenetrate. This response need not have a hint of 'magic physics' about it (how does the object 'know' that it may only penetrate itself?) because, at least for extended objects that are not simples, 'self-penetration' is really *overlap*, not interpenetration. ESP in no way suggests that any region of the worldtube of an object is occupied by matter twice over. The occupants of R_a and R_b (for example) share a part, and so do not interpenetrate, in just the way that the central third of a desk shares a part with (but does not *penetrate*) the left-hand half of the desk. Then again, Gilmore's objects *are* simples; they have no parts to share. But must the defender of ESP therefore allow that self-penetration occurs? Are regions of the worldtube of an extended simple persisting as *per* ESP multiply occupied by matter? And if not, might we still maintain that here we have just overlap and not interpenetration?

However one deals with the initial set-up, it is the next cycle of Gilmore's objection that he takes to spell trouble for ESP. Suppose that our simple's path extends around a closed timelike loop so that, in some region of spacetime, the object is on a collision course with its earlier self. The intuitive expectation is that the simple would *not* self-penetrate. But how can we uphold this given the earlier concession that our

simple *can* self-penetrate?

There need be no difficulty here. If a world contains extended simples that do not interpenetrate, then (assuming the world is law-governed) it will, for example, be the existence of certain powerful short-range forces that grounds such non-penetration. The law will ensure that if two occupied disjoint subregions of some global spacelike surface S are within some minimum distance from one another, then the pairs of occupied subregions of spacelike hypersurfaces to the immediate future of S will be more distant from one another. The law will be oblivious to whether it is the same object occupying such pairs of regions or not, and it is entirely consistent with the kind of intra-worldtube overlap required by ESP, which only ever involves occupation by the same object of two regions that do not both lie on some spacelike hypersurface. On the other hand, if the world is not law-governed, then the pattern of multi-location exemplified by our simples is simply as it is. But there is no reason why this pattern should not be both consistent with ESP and involve no worldlines that intersect themselves.

I therefore reject Gilmore's second objection to ESP. But a helping hand is on offer.³¹ Suppose that our time-travelling object *can* penetrate other objects of its type (including itself).³² Fig.5.7 depicts the situation we have in mind; the diagonal worldtube is the time-travelled continuation of the vertical one.

In *this* case ESP is in a pickle. Consider EF and GH. Intuitively, the time-travelling object does not exactly occupy the fusion of EF and GH, but ESP threatens to yield the opposite result since this fusion is a maximal achronal slice through the object's worldtube.³³ Even more intuitively, the object *does* exactly occupy EF and (separately) GH. But since neither of these regions is a maximal achronal slice through

³¹The hand belongs to John Hawthorne.

³²In this re-worked example the object, though still extended, need not be a simple.

³³The mere fact that EF and GH are not contiguous does not prevent their exactly containing a single object. Many 'dispersed' objects, such as suits and football teams, exactly occupy just such regions. Indeed most objects are to some extent 'dispersed' due to inter-molecular separations.

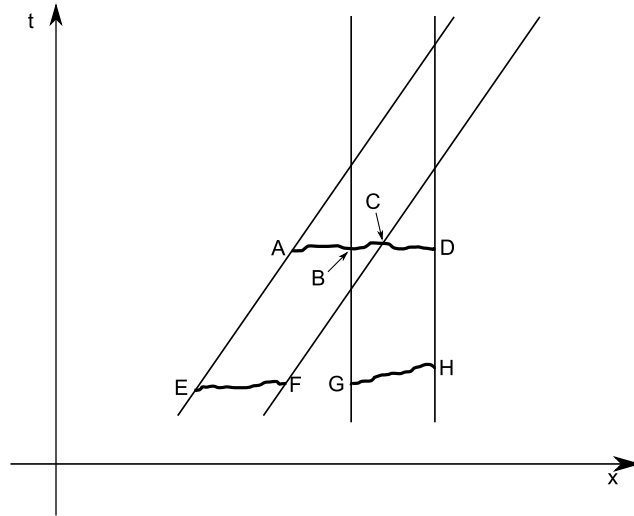


Figure 5.7

the object's worldtube, ESP denies this.³⁴

The alert reader will object that the fusion of EF and GH is *not* in fact achronal; the existence of timelike loops means that EF is in the absolute future of GH (and *vice versa*). Hence the intuitively desirable result is secured: the time-travelling object exactly occupies both EF and GH, but not their fusion. Gilmore, however, cannot offer this response, for he defines ESP in terms of a *local* sense of “achronal” according to which the fusion of EF and GH *is* achronal.³⁵ He rightly points out that adopting the alternative, global, sense would only court other difficulties. Consider, for instance, the region ABCD. Gilmore's preferred formulation of ESP in terms of local achronality (and maximality) gives precisely the wrong result: the object would exactly occupy ABCD and neither of ABC and BCD. But on a *global* achronality requirement, whilst the object would not exactly occupy ABCD, it would still not exactly occupy either ABC or BCD: the timelike loop means that both of these regions contain points timelike related to their neighbours. Hence neither is globally achronal.

³⁴Gilmore notes (but does not solve) what is effectively a non-relativistic version of this problem (2006:231 fn.29).

³⁵See Gilmore (2006:229 fn.19, 231 fn.33) for details. As a rule of thumb, *R* is *locally* achronal iff *R* *would* be achronal in the absence of timelike loops. The strict sense of “achronal” discussed above (see fn.24) corresponds to *global* achronality.

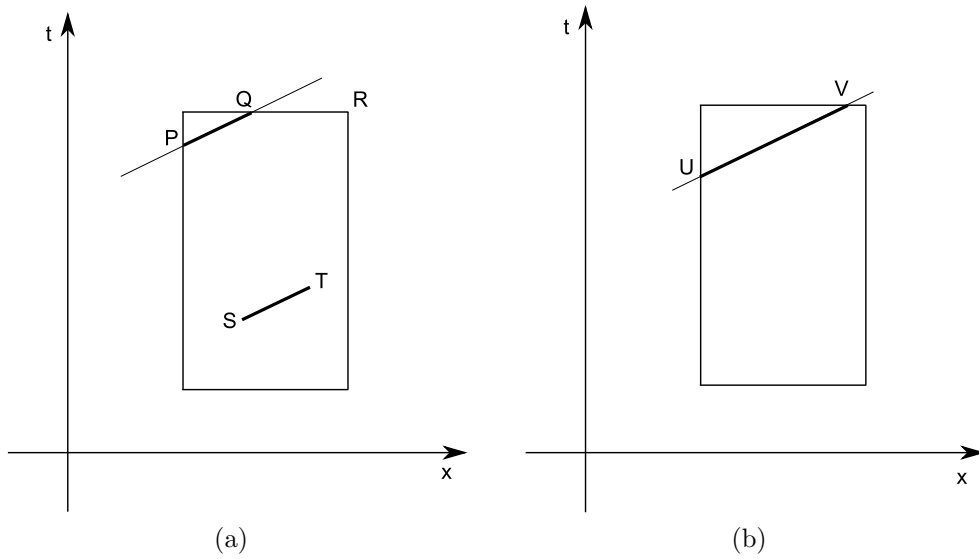


Figure 5.8

The moral is that ESP is in difficulty. Rather than offer yet another principle-based answer to Gilmore’s Location Question, I will shortly attempt to undercut this question itself. Such a move will also dissolve Gilmore’s final objection to ESP (*i.e.* *his* first objection), and so I turn briefly to this.

5.4.4 Corner Slices

In fact it is this objection that leads to the requirement of maximality in ESP (see §5.4.1). Consider the worldtube in Fig.5.8a, and in particular the (achronal) subregion PQ. ESP *without* the maximality requirement would rule that the object whose worldtube is depicted *does* exactly occupy PQ. But this answer becomes impossible to credit when we consider similar regions that are closer still to the top left-hand corner of the worldtube. In the most extreme case, such a region might contain only a single particle. Surely the object does not exactly occupy such a region.³⁶

Gilmore’s (2006:213) solution effectively notes that PQ, rather like ST, is not a *maximal* achronal region within the worldtube; it is a subregion of many larger achronal regions (such as PQR). This is not clearly erroneous, but it arguably goes

³⁶Miller (2004:365–6) raises this problem in a similar context.

too far. Consider the region UV in Fig.5.8b. Supposing the worldtube to be that of a human, this region might contain all the usual parts of a person except for a right hand. Does such a slice does not contain the person in question? If instead we consider someone who *loses* a hand, ESP (subsequently) locates that person at just such a slice.

5.4.5 Morals

The time-travel and corner-slice objections to ESP have proved problematic. But the blame does not lie solely with ESP. I suspect that any answer to Gilmore's Location Question will fail if that answer is meant to apply to *all* types of object—especially if it further restricts itself (*à la* ESP) to characterizing the objects' locations in purely spatiotemporal terms.

A more promising account would have the endurantist proceed on a case-by-case, region-by-region basis, so that whether an object exactly occupies a region depends critically on the type of object being considered. The endurantist believes that objects are three dimensional and exactly occupy multiple spacetime regions. But the precise locations of such an object are not determined by the fact that some spacetime region contains its worldtube and that certain subregions of this region satisfy various geometric constraints. It is, of course, the other way around. Facts about where the object is located determine which region is its worldtube. This is as true for point particles as for composite objects; facts about where a particle is located, together with the causal laws, determine the other point-sized regions in which the particle is located.

For composite objects, bedrock is the pattern of (multiple) location of the fundamental entities that, at various spacetime regions, compose them. *Some* three-dimensional achronal regions will contain the right sort of such entities, arranged in the appropriate way, for these to compose a particular type of object at that region.

One thus arrives at three-dimensional objects. In general, whether a given three-dimensional region contains an object of a given type will not just be a matter of the intrinsic character of the contents of that region. It will also depend on regions to its past and future having the right kind of content.³⁷ And it will further depend on regions that are spacelike related to it having the right kind of content (statue-shaped regions within blocks of marble are not statues).³⁸

This gives us variously located three-dimensional objects. But some of these ‘objects’ are the very same object. Such identity facts will be determined by a mixture of spatiotemporal and causal considerations (see the discussion of Chapter Seven); but, as with composition, the precise details may be expected to vary from kind to kind and from object to object. In any case, it is only at this late stage that the identifications that determine an enduring object’s worldtube enter the picture. One obtains the path of an object of a certain type by first determining which three-dimensional regions contain objects of that type, by then determining which regions contain the same object, and by finally taking the fusion of the relevant set of such regions. But if the path is arrived at in this way, which locations within it are occupied by its object cannot be an interesting question that remains outstanding. The answer is already before us.

5.5 Balashov On Explanatory Deficiency

In addition to the considerations of §5.2, Balashov has presented a further argument against endurance. His conclusion in its most general form is that, especially in comparison with perdurance, endurance is an explanatorily inadequate theory of persistence.³⁹

³⁷*Cf.* Sider (2001:187–8).

³⁸It is this type of consideration that gives the maximality requirement in ESP whatever plausibility it has, particularly in regard to the region ST in Fig.5.8a.

³⁹Balashov proceeds to this conclusion in two separate papers from two rather different starting points. In one he starts from a discussion of a two-dimensional spatial world (“Flatland”) that

What are the data to be explained? Balashov contends that one and the same persisting object exhibits a vast array of different three-dimensional shapes that all fit together into a smooth four-dimensional volume. The shapes to which Balashov refers are not simply those shapes that an object possesses over time. Rather, such shapes are doubly indexed to both a *frame* and a time. For example, what is in one frame a sphere that later becomes a cube might, in another frame, be an oblate spheroid that later becomes a cuboid. In this way, objects exhibit a multitude of doubly indexed shapes which, as Balashov observes, “arrange themselves into a ‘nice’ 4D volume in space-time” (2000c:334). He claims that the perdurantist can easily explain this fact (and we will see how in §5.6); but that the endurantist cannot. To summarize then, the various

3D shapes taken together exhibit a remarkably unity: they can be lined up neatly in spacetime to fill a nice 4D volume, without ‘corrugation’ and ‘dents’. How would the endurantist explain this unity among the 3D shapes?

(2000c:334)⁴⁰

How indeed? Begin with the non-relativistic case; there too the successive shapes of an enduring object aggregate up into a smooth four-dimensional volume.⁴¹ But in this case the explanation is clear: a *causal* story accounts for the shape of an object’s worldtube. If I overeat, my worldtube soon thickens. If I diet, it all-too-gradually narrows.

Miller makes this very point in response to Balashov:

Various causal facts about an enduring object *O* at time *t*, make it the

is embedded in a three-dimensional space containing spatially three-dimensional objects (1999). Right-thinking Flatlanders reason abductively to the conclusion that their objects are spatially three dimensional; Balashov thinks this parallels the (this worldly) argument for perdurance that we are about to discuss. In a second paper he attempts to illustrate the same line of thought using the traditional relativistic ‘problem’ of the Pole and the Barn (2000c).

⁴⁰See also Balashov (1999:651–653).

⁴¹Although Miller (2004:367) makes the nice point that on mereological universalism most worldtubes are anything but smooth or nice. Balashov’s claim is nonetheless broadly true for ‘everyday’ objects, although we should bear in mind that trees get pruned, watches disassembled, *etc.*

case that O will exist at t^* . So there is no explanatory mystery here.

(2004:367)

Later on:

[W]e take as basic the three-dimensional objects and use the various ‘rules’ in the form of the laws of nature to predict what those objects will be like in the future. So it can hardly come as a surprise when we discover that those objects fill nice four-dimensional volumes: for that is precisely what we predicted, given our theory.

(2004:368)

This causal strategy is essentially correct. However, whilst Miller’s remarks are entirely appropriate to the non-relativistic case, she is inexplicit as to how to alter the story—or even whether it needs altering—to deal with relativity. Interpreted relativistically, her causal story must be taken as frame relative (witness the unqualified talk of times). Would such a causal story not privilege the frame in which it is told in a manner inconsistent with relativity? One might reply that the causal story can be given relative to *any* frame, and thus no frame is privileged. But suppose that, as is natural to interpret Miller, the causal goings-on in frame A are used to generate the successive shapes and properties of an object in that frame. What of the shapes and properties of the object in frame B ? Perhaps these are to be derived from the successive shapes and properties in A , or (equivalently) from the object’s worldtube as generated in A . But when, in the spirit of relativity, we also assert that the causal goings-on in B could have grounded matters, we surely risk undermining our explanation. How can the goings-on in A account for the shapes in B when the shapes in A are themselves accounted for by the goings-on in B ? Does this not mean that *neither* frame tells the fundamental story?

I will therefore amend the causal account. Sider (2001:82–3) provides the basic idea when he suggests in response to Balashov that the endurantist begin by focusing

on the *parts* of an object—and in particular its constituent particles.⁴² He continues:

Provided the endurantist can make sense of the part-whole relation in a relativistic context, then, she can account for the shapes of macroscopic objects in various reference frames.

(2001:83)

Balashov was aware of Sider’s then-unpublished suggestion; his discussion includes a pre-emptive riposte. The kernel of this is that “instead of offering a real explanans [...] the move, in effect, boils down to restating the explanandum” (1999:655). How so?

Chemical explosions, the second law of thermodynamics, and superconductivity are all adduced to articulate Balashov’s point; but the central claim is clear enough. Why does an object, *O*, move from *A* to *B*? Answer: because its constituent particles take that path. Balashov would rightly claim that this just restates the *explanandum*. That *O* moves from *A* to *B* is tantamount to its particles doing the same. Of course *if* we somehow explain the one fact then, given certain facts about composition, we explain the other; but neither fact *by itself* explains the other. They are two sides of the very same coin.

Yet Balashov’s response rests on a misunderstanding. The spacetime path of an object does indeed involve little if anything more than the combined spacetime paths of its constituent particles. Nonetheless, the *point* of re-stating the *explanandum* at the particulate level (and, to clarify, I concede that it is a mere re-statement) is that one can *then* give a genuine explanation of the re-stated facts. This genuine explanation does not just amount to, as Balashov puts it, “putting [a] finger on the worldlines of such particles to find out what space-time point is occupied by what particle” (1999:654). It rather requires one to say *why* a particle at one spacetime

⁴²To engage with Sider and (later) Balashov, I adopt the language of particles. This is merely for convenience, and embodies no commitment to a fundamentally particulate ontology. (If the reader prefers, they might understand such language in terms of ‘particle-like’ phenomena within Quantum Field Theory.)

point is also at *this* adjacent spacetime point rather than *this* one; and such a story will be told in terms of physics. The various local fields around a particle determine where it ‘next’ is; such fields again determine where it is ‘after’ that; and so on until we have the complete worldline. The same considerations determine the worldlines of all of an object’s particles, and thus they ultimately account for its four-dimensional paths.

Of course in everyday contexts we rarely consider such particulate explanations. But earlier we saw a disadvantage to more macroscopic causal accounts: in which frame is the macroscopic story to be told? A distinct advantage of the particulate explanation—and this is a point that Sider misses—is that the explanation of the particle worldlines can easily be stated in terms of a *frame-free* physics, and thus we can avoid even the appearance of a clash with relativity.

To repeat then, it is physical law that explains why a particle follows the worldline it does; this depends on the fields local to it. Similar facts explain the worldlines of nearby particles, leaving us with a fully grounded four-dimensional ‘sheaf’. *If* this sheaf is ‘smooth’ or ‘nice’ then this is because the trajectories of particles within material objects are constrained by physical law to remain in stable configurations. As for the endurantist’s three-dimensional objects, these *then* enter the picture *via* facts about composition. Once we have a story as to why the particles do what they do, compositional considerations of the sort outlined at the end of §5.4 licence the endurantist to re-state these microscopic facts in macroscopic, three-dimensional terms. Small wonder, then, that the three-dimensional object-shapes thus derived coalesce into a smooth four-dimensional whole. They are each composed of constituent particles at different points along their worldlines; and considerations from physics ensure that, in the case of familiar objects, these worldlines are closely associated into a smooth volume.

5.6 Perdurantism And Relativity

During §5.2 I repeatedly doubted Balashov’s claimed asymmetries between endurance and perdurance. Whenever an enduring object at a particular region (arguably) stood in problematic coexistence relations to other objects, it seemed that exactly the same would hold of an instantaneous temporal part located in the same region. I now suggest that the other arguments of this chapter, to the extent that they trouble the endurantist at all, can be put in parallel form against the perdurantist.

To begin in most recent territory, recall that even four-dimensional objects have a multitude of three-dimensional shapes ‘associated’ with them. Such shapes aggregate into smooth four-dimensional world-volumes, but according to Balashov,

the four-dimensionalist has a ready and natural explanation of the this fact: different 3D shapes are *cross-sections* of a single 4D entity [...]

(1999:653)

Similarly:

The explanation is that one is dealing with a 4D object presenting its various 3D *parts* [...]

(1999:653; my italics)

It is true that if objects perdure then the three-dimensional shapes are cross-sections through those four-dimensional objects. The question, though, is whether Balashov is entitled to simply *assume* the existence and shape of four-dimensional objects, only for this to then ground facts about three-dimensional parts. Balashov thinks this right and proper, claiming that “such parts are ‘carved out’ from a pre-existing ontological entity” (2000c:333). Yet there is no obvious sense in which the four-dimensional entity ‘pre-exists’.⁴³

One might also take issue with Balashov’s comment that the

⁴³Balashov uses the same terminology elsewhere (1999:654-6).

facts about the occupation of 4D volumes by perduring objects are fundamental and irreducible to the facts about the mereological relations between four-dimensional wholes and their three-dimensional parts.

(2000c:323)

It is misguided to think perduring objects are simply given. In fact this is no more true of perduring objects than of enduring ones, and the reason is the same in both cases. Perduring objects have their four-dimensional shapes in virtue of their constituent matter. Still assuming a particulate ontology, the perdurantist regards such particles as extremely thin, tube-shaped, four-dimensional entities; but what determines the twists and turns of these tubes is local physics (which can be given a frame-free formulation). The locations of successive temporal parts of the perduring constituents are thus grounded; and within material objects, constituent worldtubes tend to coalesce. Hence the ‘smooth’ four-dimensional volume, with its three-dimensional cross-sections, can again be explained. As with endurance though, it is facts at the microscopic level that provide the ultimate grounding for these shapes.

Little of clarity emerged from Hales and Johnson’s anti-endurantist argument (§5.3), but I nonetheless suspect that *if* the spatial parts of an enduring object as at different locations coexist in some problematic way, then the spatial parts of a perduring object’s (distinct) temporal parts will coexist in the same problematic way.

As for Gilmore, his starting question was: which regions within its path does an object exactly occupy (2006:208)? He rightly observed that this question is simple for the perdurantist: the object exactly occupies its entire path. There is a question in the vicinity, however, that Gilmore does not ask. Where within its path are we to locate a perduring object’s *temporal parts*?

One might well think that there are four plausible answers. An object might have temporal parts at and only at: (i) regions of its worldtube all the parts of which are simultaneous in the rest frame of that object; (ii) regions of its worldtube all the parts of which are simultaneous with respect to a privileged, universal, temporal foliation;

or (iii) regions of its worldtube that are simultaneous according to tiny timers attached to the pointlike parts of the object. Of course these three answers precisely parallel the endurantist options investigated in §5.4.1; and there are parallel objections to them. For example, on (ii) it becomes utterly extrinsic as to which regions of the worldtube contain temporal parts. On (iii), so-called ‘temporal’ parts can run in timelike directions if one part of the object is rapidly and regularly accelerated.

What of the fourth answer? It is of course an analogue of the Every Slice Principle, and states that a perduring object has temporal parts at every maximal achronal region of its worldtube.⁴⁴ But certain collections of temporal parts are naturally united into ‘everyday’ objects, and causal considerations play a major part in this unification. Any causal discontinuities would make it hard to articulate precisely when certain temporal parts should and should not be ‘genidentified’ in this way, and so we could motivate a MURIC-like objection to ESP for temporal parts. Similarly, on such a principle it seems that temporal parts can interpenetrate. Does this not lead to a problem with a non-interpenetrating but time-travelling object on a collision course with its former self? And finally, what of (achronal) corner slices through an object’s worldtube? Do these too count as temporal parts?

Of course the perdurantist may offer parallel replies to those given in §5.4 on behalf of the endurantist. My present point is rather that we have seen no arguments against endurance that are not equally problematic for anyone concerned to locate temporal parts within the relativistic domain. In that respect the authors examined in this chapter fail in their mission.

I make two final observations. This section has contended that any relativistic argument focussing on the particular locations of an enduring object, or on its coexistence relations as at those regions, can be put in parallel form against a perduring object’s temporal parts. This motivates a closer scrutiny of endurance and perdu-

⁴⁴See also Le Poidevin (1991:66–67.)

rance; perhaps these theories are more closely related than one might initially think. The next two chapters address this very issue.

Last of all though, a recommendation. Rea, Sider, Hawley, Balashov and Sattig all seem convinced that temporal parts *should* make the transition to the relativistic world.⁴⁵ They attempt to achieve this by relativizing such parts to a frame, but I suggest instead that they simply let go: temporal parts can just be abandoned in the face of relativistic difficulties. The perdurantist could continue to maintain that objects exactly occupy single, spatiotemporally extended regions. To this (I believe) they should add that such objects have parts at each and every spatiotemporal subregion. But there is no obvious need for these parts to be classified as spatial, temporal, or something in between.⁴⁶ The perdurantist can still talk of overlapping spatiotemporal worms, the sharing of parts, the relativization of properties to parts, *etc.* What would be lost? And yet there are clear gains: the perdurantist finesses awkward questions as to how to reconcile *temporal* parts with relativity.

⁴⁵See §6.1 and in particular fn.2.

⁴⁶*Cf.* Gibson and Pooley (2006:162–163).

Chapter 6

Are Endurance And Perdurantism Equivalent?

6.1 Introduction

Despite the apparently clear differences between endurance and perdurance, a minority of writers contend that there is no genuine debate here. This is a view to which I am attracted, and one that I shall develop and consider over the next two chapters.

How might there fail to be a genuine dispute between two theories that apparently make very different claims? First, an answer that doubtless raises many more questions: there might be no *fact of the matter* as to which theory is correct. Second, an answer that undercuts the original question: the ‘two’ theories might be one and the same.

More must be said of each of these answers. What would it mean for there to be no fact of the matter about persistence? In what sense could endurance and perdurance be “one and the same”? This chapter attempts to answer such questions. In §6.2 I say a little more about the idea that there might be no fact of the matter to settle the endurantist-perdurantist debate (this is a topic to which I shall return in §7.5.1). In §§6.3 and §6.4 I consider at rather more length whether we might regard endurance and perdurance as but verbal variations on a theme.

6.2 No Fact Of The Matter

Hirsch believes that “the world can be described, with equal completeness and correctness, in more ways than one” (1982:150). He thinks this particularly applies to persistence:

The question is sometimes put: Do bodies have temporal parts? But it seems to me that the question, so put, is *verbal*: the philosopher who says that there are temporal parts is using language differently from the philosopher who denies that there are such things. (1982:189)

Rea seems to agree, recalling the idea that

the debate between nominalists and realists about universals [is] moot; the world could be described equally well in the language of either. I am inclined to think that the same is true of the debate between endurantists and perdurantists. (1998:258)

Finally, Sidelle considers a raft of theories: endurance (with coincidence between objects), mereological essentialism, sortal dominance, nihilism, unrestricted composition, perdurance and more. His suggestion is that

among these packages—and perhaps others—there can be no fact of the matter as to which *truly* describes the material ontology and persistence of things in the world. They can only be understood as different ways of articulating, extending and making coherent the combination of our ordinary judgments and theoretical ideas. (2002:134)

These authors apparently agree that there could be (and in fact *are*) different but equally correct ways of describing persistence.

It is important that these sentiments amount to more than the trivial observation that we could have used different *words*—*e.g.* “shobject” instead of “object”—to talk of persistence. Nor do these authors intend that English and French, for example, provide “different but equally correct ways of describing persistence”. Whilst it is

notoriously difficult to affirm the equal validity of different world-descriptions without falling into traps such as these, I do find myself sympathetic to the attempt. Perhaps we could talk of a lack of metaphysical ‘joints’ to reality; of distinct but equally valid *frameworks* and *conceptual schemes*; or of *existential relativity* and *internal realism*.¹ But these are topics into which I would prefer not to venture. The relevant literature is unwieldy and, I think, has a tendency towards obscurity (sometimes because the ‘relativist’ struggles to differentiate their thesis from the more trivial linguistic claims such as those considered above). For now then, I will confine myself to a modest suggestion: that even *after* all the relevant words have been chosen and their meanings fixed, there might *still* be nothing to decide between endurance and perdurance.

Here we might consider the ‘away goals’ rule employed in certain two-legged European football matches. In the event of the aggregate scores being level at the end of normal time in the second leg, any away goals ‘count double’. Thus a team that has won 1-0 at home but lost 2-1 away would win the tie in virtue of their away goal.² However, the end result would in all situations be precisely the same were away goals to count treble, quadruple, or indeed if they counted for 1.000001 ‘of a goal’. None of this implies a laxity in the meaning of “away goal”, “double”, “treble”, *etc.* It is rather that the world does not decide between the standard (or perhaps *conventional*) way of talking, and an inconsistent but equally ‘correct’ alternative.³

I want to say something similar about persistence. Consider Lewis’ *Humean Supervenience*:

the doctrine that all there is to the world is a vast mosaic of local mat-

¹Carnap (1950) endorses the idea of different frameworks, whilst Davidson (1974) rejects the possibility of alternative conceptual schemes. For discussions of existential relativity and internal realism, see Sosa (1993, 1999) and Putnam (1981, 1983, 1987) (respectively).

²Note that the final aggregate score remains 2-2 though; an away goal does not literally count twice.

³For another example, consider the electron. We could have adopted the convention that electrons are *positively* charged. Obviously this would have brought consequences for the charges of other particles, but the resultant world-description would not have been less *correct*.

ters of particular fact, just one little thing and then another. [...] We have geometry: a system of external relations of spatiotemporal distance between points. Maybe points of spacetime itself, maybe point-sized bits of matter or aether or fields, maybe both. And at those points we have local qualities: perfectly natural intrinsic properties which need nothing bigger than a point at which to be instantiated. For short: we have an arrangement of qualities. And that is all. There is no difference without difference in the arrangement of qualities. All else supervenes on that.

(1986b:ix-x)

I find this a very persuasive picture, and in particular I am drawn to the thought that Lewis' mosaic is *all* that we are given; the rest is up to us. When we experience those parts of the Humean tapestry local to us we find that many temporally unextended spacetime regions contain very similar patterns. Often, it is natural and useful for us to (sub-consciously) regard the tiny 'bits and pieces' within such a region as composing something larger that exactly occupies it. Let us suppose that this composed entity is rather cat-like.⁴ Suppose there is a similarly cat-like entity in a subsequent and temporally contiguous spacetime region (and likewise for a succession of such regions). It is then up to us whether we choose to *identify* these cat-like entities and regard the cat as multi-located, or whether we think rather that whilst each cat-like entity exists at only one temporally unextended region, it is nonetheless *associated* with adjacent cat-like entities so as to form something temporally extended. The mosaic imposes no particular practice on us here. We merely face a choice of how to (conveniently) talk of these 'two' entities and the continuities that run between them.⁵

⁴Recall from Chapter Three fn.19 that I use "entity" in a broad sense that is neutral between endurance and perdurance.

⁵Although the issue is not entirely clear, Lewis seems to have originally thought that Humean Supervenience entailed perdurance (1986b:x, *xiii*). I side with Haslanger (1994) in thinking it does not (and I note that Lewis later (1994:474–475) gave ground to Haslanger here). Haslanger's conclusion is that in order to move from the Humean basis to either endurance *or* perdurance, one requires "background ontological principles that interpret the facts of instantiation, and license the introduction of entities" (1994:358). Such principles are necessary because, according to Haslanger, the very same spatiotemporal spread of qualities can be instantiated either by enduring pointlike entities or by instantaneous "stages" instead. However, whilst she in fact prefers endurantist "background principles", I note that talk of *interpretation* and *licensing* is strongly suggestive of decisions rather than discoveries here. If one additionally thought that there were no good reason to adopt

Of course this would be rejected out of hand by one who thinks there are nature-given facts about diachronic identity (or non-identity). Such an objector will deny that any *decision* is required as to whether an entity within a certain temporally unextended region is identical to an entity within another such region. I do not share this view (and I even reject it as applied to basic particulars). I admit that there are ‘nature-given’ *continuities* holding between (some) spatiotemporal regions; but I think it is very much our decision as to what consequences to grant these. However, these topics will be more naturally dealt with after a fuller discussion of the nature of identity and genidentity. That is the topic of Chapter Seven, and hence we shall return to the ‘no fact of the matter’ view in §7.5.1. In the remainder of this chapter I investigate a different line of thought: whether the endurantist-perdurantist debate might turn out to be insubstantial for different reasons. Could these theories be somehow one and the same?

6.3 Translation Schemes

Dwain thinks he is standing on a sidewalk, whereas Archibald maintains it to be a pavement. These two furrow their brows and fret endlessly as to whether that beneath their feet is *really* a sidewalk or *really* a pavement; they adduce all sorts of recondite arguments for their position; and perhaps they are even moved to publish. But anyone familiar with American and British English sees their dispute as ridiculous. Dwain and Archibald merely use different ‘labels’ for the very same object. Their disagreement (if one even wants to call it this) is purely verbal.

Might it be that endurance and perdurance in fact acknowledge the very same entities, but merely label these differently? This seems not too distant from the (early) view of Smart (1955):

one set of “background principles” rather than another, it would seem extremely natural to adopt a “no fact of the matter” view towards the endurantist-perdurantist debate.

What we express in our ordinary language representation [*i.e.* endurance] by saying that the spherical cricket ball becomes ellipsoidal we express in our four-dimensional representation [*i.e.* perdurance] by saying that the three-dimensional cross-section for $t = t_1$ is ellipsoidal. [...] In our four-dimensional representation *we talk about the same facts* as in our ordinary language representation, *but the form of representation is different.*

(1955:240; my italics)⁶

At the start of this excerpt Smart provides the barest bones of a translation scheme between endurance and perdurance (albeit under different descriptions). Such a scheme would surely be welcome to those who think endurance and perdurance in some sense equivalent, for it would suggest that everything affirmed by the endurantist is likewise affirmed by the perdurantist (and *vice versa*). To that end I consider in §6.3.1 a recent (and more detailed) translation scheme proposed by Miller (2005a), and then in §6.3.2 a proposal put forward by McCall and Lowe (2003, 2006). Still, the Holy Grail for one who thinks endurance and perdurance equivalent would be to show that the ‘dispute’ resembles that between Dwain and Archibald, *i.e.* to show that there is a one-one correspondence between the elements of the two ontologies. The discussion of McCall and Lowe will suggest a foundation for just such a correspondence; we will develop this suggestion in §6.4.

6.3.1 Miller

Miller (2005a) has recently proposed a translation scheme between endurance and perdurance that she thinks reveals their equivalence. In theory I should welcome Miller as an ally, but in practice I have certain reservations.

Central to her enterprise is an ambiguity that Miller claims to find in the notion

⁶Smart goes on to say that “[f]or many purposes the four-dimensional logic is better” (1955:240), but he does not suggest this representation to be any more *correct*, as opposed to (sometimes) more useful, than the other. All this despite the fact that Smart later produced the first real arguments from relativity against endurance. He still thought that “sentences ostensibly about [enduring] objects could be mapped onto sentences ostensibly about [perduring] objects”, but by that stage was nonetheless “inclined [...] to deny the existence of the [enduring] objects” (1972:5).

of “having a part”. One way in which a part can be had is the “metaphysically basic” sense. This sense she introduces by considering an object O that

is at t_1 composed of A and B , and at t_2 composed of A and C . At t_1 O has part[s] A and B t_1 ly, and has part C t_2 ly. So there is some technical sense—having a part_{mb}—in which O has part C at t_1 .
(2005a:95)⁷

By contrast there is a more standard sense of “having a part” according to which the only parts that O has at t_1 are A and B . We will use an “s” subscript to indicate the possession of a part in this standard sense.⁸ Miller tells us that the notion of having a part_s “is captured by having some part_{mb} P at t in a t ly manner” (2005a:95), in which case it follows that P is t_n ly a part_{mb} of O at t_m iff P is a part_s of O at t_n .⁹

Miller then uses the alleged ambiguity to explain why perdurance and endurance do not conflict. Her idea is that when the endurantist says that all the parts of an object are wholly present at a time, they are talking about parts_s. By contrast, when the perdurantist says that an object has parts at times other than the present, they mean parts_{mb}.

However, it is not just that endurance and perdurance are therefore consistent. According to Miller, they even make the same central claim. To see this we must consider her definitions of these doctrines. An object is said to endure iff it is wholly present at all times, where

O is wholly present at t_1 just if every t_1 ly part_{mb} is present at t_1 . And a four dimensional object O has a temporal part O -at- t_1 just if every t_1 ly part_{mb} of O is present at t_1 . So an object O has all of its parts at a

⁷Miller also talks of *being* a part_{mb} of an object, and I shall adopt this manner of speaking. P is a part_{mb} of O (at t_m in a t_n ly manner) iff O has part_{mb} P (at t_m in a t_n ly manner).

⁸And likewise for the corresponding notion of *being* a part.

⁹The “at t_m ” in this formulation is redundant, but I follow Miller in including it. Similarly when talking of properties she remarks that “at t_1 [...] O has the property of being red t_1 ly, and [...] of being red t_2 ly and blue t_3 ly” (2005a:94; my italics). As observed above, if P is t_n ly a part_{mb} of O at t_m , this is because P is a part_s of O at t_n . It follows that P is t_n ly a part_{mb} of O at *all* times; having a part_{mb} would be better understood as temporally *insensitive*. Having a part_s still varies with time though: if P is t_m ly a part_{mb} of O but not t_n ly a part_{mb} of O then it will be a part_s of O at t_m but not t_n .

time t_1 in the endurantist sense, iff O has a temporal part present at t_1 in the perdurantist sense. Hence we can interdefine “ O is wholly present at t ” with “ O has a temporal part present at t ”. Then it follows that “ O is wholly present at every time at which it exists” translates into “ O has a temporal part present at every time at which it exists.” Thus we translate “ O is wholly present at every time at which it exists” to “ O is the mereological fusion of temporal parts.”

(2005a:101)

Since this latter phrase is Miller’s definition of perdurance, she concludes that endurance and perdurance are but verbal variations on a theme.

The problem here is that Miller not only makes endurance and perdurance equivalent; she also renders them trivially true. To see this, we must ask whether it could *fail* to be the case that “every t_1 ly part $_{mb}$ is present at t_1 ”. This requires a little interpretation, since the phrase “every t_1 ly part $_{mb}$ ” is strictly speaking ill formed. But a candidate meaning is obvious: a “ t_1 ly part $_{mb}$ ” of O is presumably an entity that *is* t_1 ly a part $_{mb}$ of O .¹⁰ And what is it to be t_1 ly a part $_{mb}$ of O ? Recall that C is t_2 ly a part $_{mb}$ of O (at t_1 : see fns.9 and 10) simply in virtue of O ’s being *composed* of (A and) C at t_2 .¹¹ In slightly more generality this suggests that if P (partly) composes O at t_n then P is t_n ly a part $_{mb}$ of O (at *all* times). However, this “if” can be strengthened to an “iff”, since there is no obvious way in which P can be t_n ly a part $_{mb}$ of O if it does *not* (partly) compose O at t_n (and nor does Miller suggest that this is possible). Thus we have (i): *iff* P (partly) composes O at t_n is it the case that P is t_n ly a part $_{mb}$ of O (at all times). To this we can add the seemingly indisputable (ii): if P (partly) composes O at t_n then P must at least be present at t_n . Together (i) and (ii) entail that if P is t_n ly a part $_{mb}$ of O (or is a ‘ t_n ly part $_{mb}$ ’ of O) then P is present at t_n .

The point of this rather dense exposition is that the *definition* of parts $_{mb}$, together with a seemingly indisputable fact about composition, guarantees that, for any ob-

¹⁰“... at some time”? In the shift to the ill-formed phrase, the redundant temporal qualification has been lost.

¹¹*Cf.* Miller’s earlier claim that “an object that is red at t_1 is red in a t_1 ly manner” (2005a:94).

ject, “every t_1 ly part_{mb} is present at t_1 ”. Given Miller’s (above) characterizations of “wholly present” and “has a temporal part” it further follows that every (composite) object is always both wholly present and possessed of temporal parts. Whilst this conclusion might generally be good news for an equivalence view, on this occasion it has been reached far too easily. The truth of endurance and perdurance should not follow trivially from the definitions of a part_{mb}, a temporal part, and what it is to be wholly present. The debate is supposed to be much more substantive.

Nor is Miller deliberately proposing a controversial thesis to the effect that endurance and perdurance *are* trivially true; she seems unaware that her definitions have this consequence. In fact we should take her argument, not as establishing the equivalence (and trivial truth) of perdurance and endurance, but rather as exhibiting the inappropriateness of her definitions. But if one jettisons these definitions, one also loses the suggested path linking “wholly present at a time” to “has a temporal part at a time”. This undercuts Miller’s central aim of providing a translation between endurance and perdurance.

6.3.2 McCall And Lowe

A still more recent translation scheme has been proposed by McCall and Lowe (2003, 2006).¹² The proposal at the heart of this scheme will form the basis of the ontological equivalence thesis to be examined in §6.4.

McCall and Lowe contend that the

objects of the physical world can be described using either 3-dimensional or 4-dimensional language, and that the descriptions are equivalent in the sense of intertranslatable.

(2003:118)¹³

¹²McCall has long held the view that endurance and perdurance are in some sense “equivalent” (1994:209). By contrast, Lowe had until recently argued for endurance against perdurance: see Lowe (1987, 1988a, 1988b).

¹³For similar expressions see McCall and Lowe (2003:114; 2006:570).

They start their exposition by observing that, for the perdurantist, temporal parts are “the basic ontological elements of the world” (2006:570). For the endurantist, however, “the world is made up ultimately of subatomic particles which have no temporal parts” (2006:570). As we shall see, this is a slightly unfortunate start.

McCall and Lowe then go on to equate the instantaneous temporal part of a perduring object with the “momentary sum” of the particles that then compose the enduring object (2006:573–574). They apparently take this sum to be three dimensional, for they soon conclude that

the intertranslatability of [endurantist] and [perdurantist] description rests ultimately upon entities which can be described indifferently as “instantaneous [...] temporal parts”, or “3D objects which exist at one time only”.

(2006:574)¹⁴

I will adopt and examine at length the suggestion that what the perdurantist thinks of as an instantaneous temporal part, the endurantist regards—roughly speaking—as a three-dimensional object existing “at one time only”. But I regard McCall and Lowe’s talk of *particles* as both distracting and a little inaccurate. The inaccuracy lies in the idea, fostered by McCall and Lowe in their very first paragraph, that particles lie firmly in endurantist territory, whereas it is temporal parts that the perdurantist must regard as “primitive and basic” (2006:574). This is simply not so. The perdurantist can also espouse a particulate ontology; it is just that they will regard such particles as temporally extended, and with temporal parts for every sub-division of their duration.¹⁵ Indeed, whatever reasons the endurantist may have

¹⁴My “endurantist” and “perdurantist” interpolations replace “3D” and “4D” (respectively), although McCall and Lowe also use these terms to indicate three- and four-dimensionality. On which note, the interpolated ellipsis replaces “4D”: it is a further curiosity that McCall and Lowe repeatedly commit to the apparent oxymoron that is an “instantaneous 4D temporal part”. They tell us that, “[p]roperly speaking, an instantaneous temporal part is a 4D object with zero extension along the time axis” (2006:572). Consequently they find themselves in a muddle when trying to equate this to a *three*-dimensional sum of particles. I do not understand why they could not have said at the outset that instantaneous temporal parts are (by definition) temporally unextended, and thus three dimensional.

¹⁵Are temporal parts not “primitive and basic” after all then—provided we understand this in

for embracing a particulate ontology will likely induce the perdurantist to make a similar move. Particles are no less a part of either doctrine.

This means that a more natural perdurantist equivalent of the endurantist's "momentary sum" of particles is a sum of the instantaneous temporal parts of (what we might loosely regard as) 'those very particles'; if the language of particles is appropriate, it is appropriate on either side. But there is an alternative (and I think preferable) way of talking about these sums; for they are not *just* sums of particles (or temporal parts thereof). In fact, the sum of the relevant particulate temporal parts is no more and no less than a temporal part of (what the perdurantist regards as) a *composite* four-dimensional object.¹⁶

What of the endurantist's "momentary sum" of particles? How do we conceive of this more macroscopically? The question is difficult to answer insofar as McCall and Lowe rather oscillate between talk of a "set" or "collection" of the relevant particles, and talk of the "sum" of those particles. I *think* the idea is that (certain) sets or collections of particles possess a sum, this being whatever entity (if any) those particles jointly compose. My suggestion, then, is that a "momentary sum" of enduring particles is simply an enduring *object* as at a particular time.¹⁷ So, whilst the perdurantist thinks that a given region of spacetime is exactly occupied by a sum of particulate temporal parts, or equivalently by the temporal part of a composite object, the endurantist thinks the very same region is exactly occupied by a "momentary sum" of particles, or equivalently by one of the many 'instances' of a multi-located object. Setting the distracting talk of particles to one side, we

terms of the temporal parts *of perduring particles*? Such temporal parts may well be bedrock for the perdurantist. However, there is no suggestion that McCall and Lowe are discussing *particulate* temporal parts; and in fact they appear to regard the temporal parts of even a *composite* object as "primitive and basic" (2006:573–574). This is precisely what I object to.

¹⁶This temporal part is what McCall and Lowe seemed to think was "primitive and basic".

¹⁷Here I have a retrospective confession: my prior (though tentative) approval of locutions such as "*O* as at *R*₁" was motivated in part by what follows in this chapter. That is *not* to say that I have grave misgivings about such locutions. But I do intend to give theories of equivalence a 'decent run', and so am inclined to charity here.

arrive at the proposal that will form the basis of an alleged ontological equivalence between endurance and perdurance. In terms of our now-familiar terminology, an enduring object is multi-located, with each of its many ‘instances’ exactly occupying a three-dimensional spacetime region. A perduring object, by contrast, has multiple (instantaneous) temporal parts, each of which exactly occupies a three-dimensional subregion of its path. The suggestion is that these are but different labels for the very same entity. An instantaneous temporal part of a perduring object *just is* one of an enduring object’s many ‘instances’, *i.e.* the object as at that particular location.

6.4 Ontological Equivalence

6.4.1 Introduction

Note that McCall and Lowe do not merely *translate* between momentary sums of particles (which I have interpreted as objects as at a time) and temporal parts; they seek to *identify* these.¹⁸ This, as they put it, is “the foundation of the 3D/4D translation scheme” (2006:574), and they do indeed sketch how a wider-ranging translation between endurance and perdurance might flow through these putatively identical entities. Roughly speaking they intend to “reduce” talk of an enduring object to talk of its momentary sums (each of which I take to be the object *as at a time*), and then to translate this *via* talk of the corresponding temporal parts into talk of four-dimensional perduring objects. Of course one could run the translation in the other direction also.

It seems to me that, even if successful, the most this provides is a way to express the endurantist’s claims in “perdurantese”, and similarly the perdurantist’s claims in “endurantese”. This is not enough—it is not *nearly* enough—to demonstrate an equivalence though. The vital element that McCall and Lowe have overlooked is

¹⁸They talk of “entities that can be described indifferently” either way (2006:574).

that the perdurantist must also *assent* to the endurantist's claims (once parsed in perdurantist terms); and likewise the endurantist must assent to (the translations of) the typical perdurantist claims. McCall and Lowe seem not even to consider whether this holds (let alone do they argue that it does).¹⁹

This is no idle worry. Whilst an identification of the three-dimensional entities countenanced by the two ontologies is in some ways plausible (as I shall argue below), there are reasons to suspect that in other ways the ontologies might align less well. In fact, even with respect to three-dimensional entities, the endurantist believes that an object as at one location is identical with 'an object'—they would say *the same* object—as at another. But then the perdurantist absolutely denies that an instantaneous temporal part at one time is identical to an instantaneous temporal part at another. Consider also perduring *objects*: these are both concrete and four dimensional. Does the endurantist countenance anything that corresponds to these? And what of *extended* temporal parts? Or the fact that the perdurantist typically countenances all sorts of disparate and gerrymandered entities—whereas the endurantist seemingly does not?

The remainder of this chapter attempts to answer such questions.²⁰ But rather than focussing on translation *per se*, I shall instead consider a thesis of *Ontological Equivalence* (OE) between endurance and perdurance. OE holds that endurantist and perdurantist countenance the very same entities, but merely differ over how to label these.²¹ Whilst we may not ultimately accept OE, I take it to be of interest to

¹⁹Indeed, McCall and Lowe go on to present endurantist and perdurantist accounts of identity through change that would be *clearly* distinct according to their translation scheme (2006:575–576). That is, replacing talk of temporal parts within their perdurantist account does not yield anything like their endurantist account of change (and nor is there an obvious path in the other direction). To summarize the criticism one might say that although McCall and Lowe have produced a translation *scheme*, they have neglected to show that the theories are *inter-translatable*, *i.e.* that they are translations *of one another*.

²⁰The exception is the issue about the identity (or lack thereof) between the three-dimensional entities countenanced by the two theories. Chapter Seven deals with this issue in depth.

²¹I take it that the truth of OE would not only portray the endurantist-perdurantist debate as somewhat shallow, but would also go some way towards showing the doctrines to be inter-translatable. I am less sure what consequences inter-translatability *in itself* would have (and hence

discover just where and why it fails; and indeed we may learn more about endurance and perdurance whilst trying to support it.

Why think that OE is even vaguely plausible though? We have seen it start to emerge from McCall and Lowe's translation scheme, but still: what motivates it? Most of the impetus comes from consideration of the three-dimensional entities countenanced by the two theories. For two reasons it is tempting to try to identify these. First, this would mesh particularly well with the observation in §5.6 that "any relativistic argument focussing on the particular locations of an enduring object, or on its coexistence relations as at those regions, can be put in parallel form against a perduring object's temporal parts". The arguments would be the same, because the subject matter is the same: enduring objects as at various locations just *are* the perdurantist's temporal parts. No wonder that objections to the former furnish parallel objections to the latter.²²

But it also seems to me that the following considerations should carry significant weight. Suppose the situation is such that, as we would ordinarily describe it, there is an apple in Jim's hand. Both endurantist and perdurantist grant the truth of the everyday statement "There is an apple in Jim's hand". But what *grounds* the truth of this statement? For the *endurantist*, it is the fact that a certain three-dimensional region contains something round and green, with pips and a stalk *etc.* This entity is multiply located, but *one* of its locations is in the relevant region. For the *perdurantist*, the claim is again made true by something round and green with pips and a stalk *etc.*; and indeed this something is exactly located in the very same spatiotemporal region.

my focus on OE instead). For example, consider the claims that (1) all grass is green, and (2) all grass is grue and observed before t or bleen and not observed before t (where "grue" and "bleen" are defined in the standard way *à la* Goodman (1954:73–80)). (1) and (2) are truth-functionally equivalent; (1) is true just if (2) is. In *some* sense then, these are inter-translatable. But does (2) not impute a different (and perhaps more complex) structure 'to the world'?

²²Recall also from §4.4.4 the proposed semantics for "*O-at-t* is p ". I suggested that "*O-at-t*" might refer to a temporal part of (perduring) O , or to (enduring) O as at a particular location. This is very much consonant with (my reading of) McCall and Lowe's proposal.

Moreover, both endurantist and perdurantist think there is only *one* thing that exactly occupies this region, *viz.* the green, rounded entity with pips and a stalk *etc.* It is *this very thing* that the endurantist regards as an instance of a multi-located apple; and it is *this very thing* that the perdurantist takes to be a temporal part of an apple. When considered in this manner, it is hard not to sympathize with the idea that, at least when it comes to the exact occupants of instantaneous spatiotemporal regions, endurance and perdurance are offering different labels for the very same entity. Within this context OE does not appear too implausible a thesis.

Can OE survive in other contexts though? I proceed by asking what might correspond to the other elements of the perdurantist ontology. In §6.4.2 I consider how OE might be extended to include perduring, four-dimensional objects; and in §6.4.3 I consider extended temporal parts. I then conclude with some mereological considerations in §6.4.4.

6.4.2 Perduring Worms

Although endurance and perdurance both acknowledge three-dimensional entities, the perdurantist additionally countenances temporally extended, *four*-dimensional entities. Indeed they believe everyday objects to be just such ‘worms’. If the endurantist ontology is a mere re-labelling of the perdurantist one, then endurantists should likewise countenance four-dimensional entities. But what could these be?

The most natural answer is suggested by McCall:

Does a four-dimensional object have temporal parts? Yes. In three-dimensional language we would say that the ‘life’ or ‘history’ of the object (as distinct from the object itself) is divisible into as many periods as there are spatial intervals on the real line.

(1994:213)²³

Similarly Sidelle writes that the perdurantist

²³See also McCall (1994:211).

sees time as a fourth dimension along which material objects extend, and along which an object may be arbitrarily divided into parts. Many people claim to find this intuitive, while opponents think all that is intuitive is that the *career* of an object is so extended and divisible.

(2002:125–126)

Maxwell similarly portrays the endurantist as holding that

it is not objects, but rather the history [*sic*] of objects, that can be conceived as being spread out in time: and histories exist only insofar as objects persist and change.

(1985:29)

For a final espousal of lives though, we should return to Barker and Dowe:

Take again a multi-located entity O , be it enduring entity or universal. Say that O is multi-located throughout a 4D space-time region R . Intimately connected with O and R , there is, we submit, a 4D entity which we call *the life of O* , or $L(O)$. [...] Lives are part of common sense ontology; we speak of entities—be they people, animate entities or inanimate—having long, interesting, varied, good, etc. lives. Lives are 4D things; they have beginnings, middles, and ends. $L(O)$ is just like an event occurring at a region R ; it is located at R with proper parts located at each subregion r in R .

(2003:110)²⁴

The emergent idea is that for every object the endurantist countenances an associated *career*, *life* or *history*. These are temporally extended, and can seemingly be partitioned just as the perdurantist’s four-dimensional worms are. In fact, these are not the only temporally extended entities that endurantists countenance. There are many who think that whilst *objects* endure, concerts, avalanches and football matches are temporally extended entities with stages or phases.²⁵ And just as we talk of the

²⁴Barker and Dowe later claim that “lives are instances of a broader ontology of events, whose existence cannot be denied since they are the relata of causation” (2003:111). An important caveat, however, is that they think lives paradoxical *on endurance* (2003:110). Their reasoning assumes that if (i) p is part of E_1 , an entity exactly located at and only R_1 , and (ii) p is part of E_2 , an entity exactly located at and only at R_2 , then (iii) E_1 is partly located at R_2 . This principle seems correct when R_1 and R_2 overlap, but Barker and Dowe apply it to successive, non-overlapping regions. Thus interpreted, the principle is somewhat strange.

²⁵See *e.g.* Mellor (1998:85–86). I shall refer to such entities as “processes”. Whilst I have no wish to be stipulative here, I suspect that few would say that processes *persist*.

early or later stages of a game, concert, *etc.*, so too do we talk of the early or later stages of Jim's life, history or career. We speak of his troubled childhood, his difficult teenage years, his life on the run, and his time in Dartmoor.

Now there may be a tendency to regard one's history as a kind of abstract 'story'. The believer in OE can acknowledge the possibility of such stories (pointing out that they are relevant to both enduring *and* perduring objects). What they must maintain, however, is that there is nonetheless something four dimensional and concrete that endurantists *do* countenance. They can mount quite a reasonable case. Let us set aside the term "histories" for any putative *abstracta*; we will deal with "lives" or "careers" (which arguably sound more concrete already). First, and for what it is worth, we may observe that the other temporally extended entities that endurantists acknowledge, such as football matches and avalanches, clearly *are* concrete. Second, certain events and processes are apparently *part* of one's life: birth and death, breaking one's leg, robbing a bank, *etc.* Such events and processes are concrete, and it is hard to see how something could have concrete parts without itself being concrete. Third, lives appear to have spatiotemporal locations, which is at least good evidence for their being concrete. One could argue for this spatiotemporality directly: talk of "my life in Prague" apparently attributes a location to (part of) my life. Or one could observe that the events and processes that make up my life are not just concrete, but also spatiotemporally located; this suggests that lives are too. And finally, lives are *temporally extended*. How could something be temporally extended without even being in (space)time?

It seems, then, that some endurantists (or perhaps some commentators on endurance) think that there are indeed four-dimensional entities associated with each and every (enduring) object. These are apparently concrete, and can be partitioned in just the way that a perduring worm is. To recap then: from McCall and Lowe we extracted the idea that what the endurantist regards as a particular instance of

a multi-located object, the perdurantist re-labels as a *temporal part* (of an extended object). The current proposal is to extend the thesis of OE so as to incorporate four-dimensional entities also. The idea is that the perdurantist's four-dimensional objects are none other than what the endurantist labels as "lives" or "careers".

If this is the case then we should expect the endurantist's lives or careers to be located just where the perduring worms are. The (limited) literature on this topic suggests that the expectation is met. Recall Barker and Dowe's talk of lives being "[i]ntimately connected with" and "located at" the spacetime region through which an enduring object is multi-located. Carter and Hestevold similarly suggest that, for the endurantist, "world-lines represent the life or history of an individual and not the individual herself" (1994:279). They quote Lockwood, who writes of the "world-line that is intended to represent the life of a human being" (1989:261). Gilmore employs a terminological variant—an object's "path"—but informally characterizes this as the region which "exactly encompasses *O*'s complete 'career' or 'life-history'" (2006:204). Finally, Balashov writes that

enduring objects pursue their careers in space, as well as time. Such careers or histories can be suitably represented by worldlines (or rather 'worldworms') in the four-dimensional space-time.
(2000a:129)

There is a clear consensus then: the life or career of an enduring object exactly occupies the object's worldtube (*i.e.* the four-dimensional sum of the regions the object exactly occupies). And it is in precisely such regions that the perdurantist locates their four-dimensional objects.

Nonetheless, a worry remains. Are not the events that are part of someone's life typically somewhat *larger* than that person then is? The event of dancing the *Bolero* at the 1984 Olympics is an important part of Christopher Dean's life, but it is implausible to think that event was entirely contained within the regions he exactly occupied during the performance. For one thing, Jayne Torvill also contributed significantly

to the event in question. Indeed this last point suggests a related objection. Certain events are part of *many* people’s lives. Given that their worldtubes have *no* part in common—for they do not overlap—how can lives be identified with worldtubes?

One who seeks to confine an object’s life to its path has a reply of sorts: when it is said that certain events are “part of my life”, what is meant is that I was involved in these events, and that they had a profound effect on me. Such a reply is fine (and even rather plausible) in itself, but if *all* talk of my life can be paraphrased into talk about me and the events in which I have participated, it will become doubtful whether the endurantist is committed to a distinct ‘life’ after all. I return to this issue in 6.4.4.

6.4.3 Extended Temporal Parts

In addition to instantaneous temporal parts and (four-dimensional) objects, the perdurantist countenances *extended* temporal parts intermediate between the two. Does the endurantist countenance anything similar?

In fact there is little here to trouble OE. Provided that a perduring (*i.e.* four-dimensional) object should be identified with the life or career of a ‘corresponding’ enduring object, then *sections* of the four-dimensional, perduring object—*i.e.* extended temporal parts—should be identified with *sections* of the enduring object’s career. Thus what the perdurantist takes to be Jim’s Oxford-located extended temporal part, the endurantist regards instead as a part of his life (*viz.*, his student years).

In fact this suggested parallel is relevant to more than just OE. Consider Van Inwagen’s (1990:252–254) criticism of perdurance. His ultimate aim is to show that the perdurantist must espouse a counterpart-theoretic analysis of modality.²⁶ Van

²⁶Is this a *criticism*? Sider’s (2001:219) view, with which I agree, is that Van Inwagen thinks he is forcing the perdurantist into an uncomfortable corner here: he believes counterpart theory to be unattractive.

Inwagen hopes to reach this conclusion from the initial observation that temporal parts are “modally inductile”, *i.e.* that they could not have been longer than they actually are.²⁷ And there is some sense to the claim that temporal parts are modally inductile: (perduring) Jim’s 1989 temporal part is obviously just a year long. How could it have been longer? The same is true for all of his year-long temporal parts.

Van Inwagen next observes that if Jim perdures then he himself “is one of his temporal parts—the largest one, the sum of all of them” (1990:253); and as already stated, temporal parts are modally inductile.²⁸ But surely Jim could have lived for longer than he actually does. Suppose he lives for fifty years. Could he not have lived for seventy-five?

Sider (2001:218–220) makes the right noises in response, for example that we do not fret about the spatial analogue of this ‘difficulty’. But what interests me more is that there is an *endurantist* analogue of Van Inwagen’s argument. Enduring Jim’s *career* lasts for fifty years (we have supposed). Each year-long section of this career could hardly have lasted for eighteen months (say); such sections are modally inductile. And since Jim’s career is made up of these inductile sections, it would follow that his career itself is modally inductile. This we would very much want to deny.

This endurantist version of the objection suggests a further response. The sections of Jim’s career that we typically discuss are not the 1989 section, or the 2001 section, *etc.* Rather, we talk of his adolescence, his time in Dartmoor, and so on. It is far from obvious that *these* sections are modally inductile. Without his remission for good behaviour, Jim *would* still be in prison.²⁹

Of course there is the worry here that the Dartmoor section of Jim’s career *is* the

²⁷Temporal parts are likewise said to be “modally incompressible”: they could not have been shorter than they actually are. Apparently the perdurantist “will want to say that temporal parts [...] have their temporal extents *essentially*” (1990:253).

²⁸In Chapter Three fn.9 I agreed that a perduring object counts as its own extended temporal part.

²⁹Sider makes the equivalent point in the perdurantist context.

section of his career that runs from, say, 23rd May 1998 to 1st March 2004. Conceived of in the former manner it seems that this could have been longer or shorter; but in the latter vein its temporal length appears immutable. This is the familiar phenomenon whereby the modal properties of an object seemingly depend upon how we refer to it.³⁰ But whilst this is doubtless an interesting topic, the important points for our purposes are that Van Inwagen's objection 'against perdurance' is equally an objection against endurance; that there are *prima facie* promising ways to respond on behalf of either doctrine; and that both the objections and the responses are exact parallels. This would be very much expected on OE. But even if one does not ultimately endorse that thesis, it seems to me that there is *enough* of a parallel between extended temporal parts and the sections of an enduring object's life to make Van Inwagen's objection seem less of a purely perdurantist worry.

6.4.4 Mereological Relations

I now consider two objections to OE based on composition. The first concerns the sheer *number* of composite entities that endurance and perdurance countenance. The second (and I think more serious) complaint centres on how the theories regard the compositional relationship between their three- and four-dimensional entities.

Compositional Restriction

Perhaps endurance and perdurance countenance entities that exactly occupy three-dimensional regions, and similarly for four-dimensional regions; and perhaps there is some sort of correspondence between these. But do perdurantists not countenance rather *more* such entities?

As Sider (2001:7–8) observes, most perdurantists embrace unrestricted composition. And it is certainly true that most endurantists do not. This need not entail a

³⁰Lewis (1986a:249–263) understands this phenomenon in terms of a context-dependent modal counterpart relation; as remarked in fn.26, Van Inwagen seems opposed to such an analysis.

dispute about what *natural* objects there are (or those we *talk* about). But it seems there may be a serious disagreement as to whether there are (very many) composite entities *beyond* the natural objects (or those we regularly discuss).

Such a disagreement is in fact orthogonal to the endurantist-perdurantist dispute.³¹ The kernel of perdurance—that objects are temporally extended with parts for every subdivision of their duration—is consonant with the claim that (a) not every set of simultaneous temporal parts composes a temporal part of a (four-dimensional) object; and also with (b) not every succession of temporal parts composes a (four-dimensional) object.³²

As to endurance, it seem consistent to claim that objects exactly occupy multiple spacetime regions, and yet that (a') every set of simultaneous simples composes *some* object as at that time (no matter how strange); and that (b') every succession of objects-as-at-times corresponds to the development of *some* object (no matter how strange).³³ Of course I should not understate how bizarre such entities might be. In fact I think unrestricted endurance a *crazy* doctrine. But I think it no more crazy (and indeed no *less* crazy) than the corresponding perdurantist thesis.

Three- And Four-Dimensional Entities

A more serious problem for OE is the following. Perduring worms are *fusions* of the instantaneous temporal parts that it is suggested we should identify with enduring objects as at particular times. If this mereological relationship is to be replicated by the endurantist then an enduring object's life or career must have as *parts* the various 'instances' of that very object.

³¹As Sider admits: "One could believe four-dimensionalism without accepting unrestricted composition (and vice versa)" (2001:7).

³²McCall (1990:210–211) similarly expresses reservations about the combination of perdurance and unrestricted composition.

³³For more on unrestricted endurance, see Haslanger's "Indiscriminate Endurance" (1994:354–356), Sidelle's "Persistence Universalism" (2002:129), and no less than three similar doctrines considered by Miller (2006). (Haslanger and Sidelle do not endorse the 'endurances' they consider; Miller endorses one of her three.)

Endurantists do not usually espouse any such claim.³⁴ But then many endurantists make no mention of lives or careers; so perhaps there is room for manoeuvre here. In addition, the believer in equivalence between endurance and perdurance need not (and probably does not) hold this equivalence to be especially salient. They are more likely to take the endurantist to be unknowingly committed to certain principles that they may then exploit. Of course the more that must be foisted onto the endurantist, the less plausible the claims of equivalence will become. But still there is room for the proponent of OE to step back and ask, in the current context, just what the relationship between an enduring object and its life or career might be.

I think OE is nonetheless in trouble here. The best I can offer its proponents is the discussion of §4.3. In response to Barker and Dowe's criticisms of endurance I highlighted certain difficulties in the notion of an (endurantist) 'auto-fusion'; I wrote that "when I contemplate Jim *as at* R_1 and Jim *as at* R_2 I am less certain that these fuse to yield Jim *simpliciter*". What were the reasons for this? I observed that: (a) the fusion has an inconsistent mix of properties that we might wish to understand in terms of temporal parts; (b) the fusion weighs rather more than Jim ever does; (c) the fusion at least occupies (and perhaps exactly occupies) a sum of instantaneous regions; and (d) the fusion is not obviously a person.³⁵ From this I concluded that (e) the fusion is not obviously Jim. I did not and do not claim that these observations represent the only way of construing Jim's auto-fusion. Nonetheless, I advise the defender of OE to strongly back these observations, and moreover to propose that the fusion of an enduring object as at its multiple locations is none other than its *life or career*.

The supporter of OE might then suggest that most of (a)–(e) lend support to their

³⁴Although Barker and Dowe come extremely close when they write, of an object O and its life $L(O)$, that they think " O is a part of $L(O)$ " (2003:110). However, they then clarify that " $L(O)$ is somehow constituted out of O and possibly other entities" (2003:110; my italics). The italicized qualification, though only mooted as a possibility, is not a part of the view under consideration.

³⁵And I now confess one *extra* reason for not wishing to identify the fusion of Jim as at various regions with just plain old Jim: even in §4.3 I had an eye on what is about to emerge.

position. Regarding (a): they *would* hold that an enduring object's life or career 'has temporal parts', insofar as this is how the perdurantist labels the various 'instances' of Jim that, on the present suggestion, are indeed parts of Jim's life or career. Regarding (c): the fusion of all of Jim's 'instances' would occupy (so would it *exactly* occupy?) a temporally extended region. As to (d) and (e), Jim's life or career is neither a person nor Jim himself.³⁶

If the fusion of Jim as at various locations were simply his life, then we could also explain the exceedingly close connection between the two. The connection is partly spatial: Jim can never go where his life does not. But it is also temporal: Jim's life begins when he does, and cannot outlast him. Were his life the fusion of Jim as at his multiple locations, we could explain these spatiotemporal facts.

The close connection between Jim and his life is not just spatiotemporal though. Whenever Jim performs some act, it becomes a part of his life; and conversely, every part of his life charts an action performed by Jim. Indeed, all of these relations apparently hold of necessity. Were we to regard Jim and his life as entirely distinct, we would face some awkward Humean questions as to how distinct entities can be necessarily related. But if Jim is part of his life then it is obvious how the connections arise.

Of course the view under consideration does not answer the objection that surfaced at the end of §6.4.2. Certain events and processes are spoken of as "part of my life", yet they seem rather larger than any region I exactly occupy. There is some mileage in replying that we are currently considering a more technical sense of "life"; but the further the departure from ordinary usage, the less likely we are to countenance lives in this technical sense. The alternative reply is that, on the view that my auto-fusion *is* my life, whilst the events and processes in question are not strictly a *part* of that

³⁶(b) is more problematic. Is one's life really so *heavy*? I think the best option for the supporter of OE here is to contend that a perduring worm is extremely heavy also, since it is composed of the matter that composes each of its temporal parts.

life, the latter will typically overlap the former (since both contain me as a part). The believer in OE can point out in mitigation that our intuitions about lives and careers are admittedly somewhat vague; and at least their position goes some way towards precisifying these thoughts.

Still, my own view is that OE falls down at this point. I find it highly plausible when focussed on three-dimensional entities, but less so when it comes to talk of lives or careers (that putatively correspond to four-dimensional objects). Recent discussion notwithstanding, I remain troubled by the mereological relations (or lack thereof) between particular ‘instances’ of an enduring object and its life or career; I do not think these replicate the relations between a perduring object and its temporal parts. But I stand by the claim that one’s views on composition are independent of one’s view on persistence; and also by the claim that Van Inwagen’s argument from modal inductility troubles the endurantist no less (and no more) than it troubles the perdurantist. To my mind, OE has not vindicated the idea that the endurantist-perdurantist debate is less than genuine. Perhaps this idea can be captured in a different way though.

Chapter 7

Rotating Discs, Identity, And Genidentity

7.1 Introduction

Chapter Six considered a thesis of Ontological Equivalence (OE) which held endurance and perdurance to differ only as to how they label the world's contents. OE has already run into heavy weather. But a further problem was postponed until now: the endurantist's temporally unextended entities are (held to be) multi-located, whereas those countenanced by the perdurantist are not. How, then, could these be the very same entities?

An alternative idea was floated more briefly in §6.2: perhaps endurance and perdurance are genuinely distinct, but there is no fact of the matter as to which is correct. Multi-location again seems central here. If there are no multi-located entities in the world then endurance is clearly false. On the other hand, if there are temporally unextended entities that exactly occupy multiple spacetime regions, we will be led to reject perdurance instead.

Talk of multi-location amounts to talk of *identity*. If something exactly occupies both R_1 and R_2 then it trivially follows that the exact occupant of R_1 is identical to the exact occupant of R_2 .¹ It seems, then, that if one believes in OE or one believes

¹Or, more cautiously, that *an* exact occupant of R_1 is identical to *an* exact occupant of R_2 .

that there may be no fact of the matter with regard to persistence, one's views on identity will be crucial.

In addition and quite independently of this, it seems to me that *genidentity* provides an intriguing model for *identity*. The former is usually held to reduce to certain underlying continuities. Can the same be said of the latter?

I approach these topics *via* the Rotating Discs Argument (§7.2). That will lead us to consider and reject Hawley's (1999, 2001) suggestion that genidentity is underpinned by certain primitive relations. This will usher in a parallel discussion of diachronic *identity* (§7.3). Again I will reject primitivism, adopting a reductionist approach instead (§7.4). Having defended this approach and examined certain consequences, I return to the 'no fact of the matter' view in §7.5, where I also discuss certain traditional puzzles of identity over time.

7.2 The Rotating Discs Argument

7.2.1 Formulation

The Rotating Discs Argument (RDA) is usually taken to threaten perdurance but not endurance, and it therefore presents a *prima facie* challenge to any thesis of equivalence between the two. It aims to show that perdurance cannot capture an elementary distinction: that between a rotating and a stationary disc.²

Consider, to begin, successive microscopic 'snapshots' of a this-worldly disc. Even if the disc rotates, the vacua between its atoms allow us to 'join the dots' over time: in one snapshot there is an atomic temporal part in one place; in the next snapshot an atomic temporal part just nearby; and so on.³ The perdurantist uses these facts

²The RDA traces its ancestry at least back to Broad (1925:36–37). Recent discussion stems from Armstrong (1980) and unpublished but roughly contemporaneous lectures by Kripke.

³Even this is problematic if there is no standard of 'same place' over time. I set aside this complication; see Butterfield (2004:24–26).

of spatiotemporal continuity to trace out a binding relation that unites the atomic temporal parts into a four-dimensional atomic whole; this relation they call “genidentity”. Within a rotating disc, genidentical (but distinct) temporal parts trace out a helical worldline. Straight worldlines, on the other hand, indicate a stationary disc (or at least a non-rotating one).

Now consider an other-worldly disc composed of homogeneous, continuous matter. Surely such a disc could rotate or fail to do so. This time, however, ‘snapshots’ of the disc would not determine the worldlines for portions of the disc’s matter: whether or not the disc rotates, each snapshot is of a homogeneous, continuous, *lump*. What, in this case, determines the genidentity relations between successive parts of the disc—and thus whether it rotates?

7.2.2 Three Types Of Solution

Three types of solution are suggested in response to the RDA. I provide a brief overview before going on to consider in more detail Hawley’s (1999, 2001) variant on the third type.

Causes And Effects

Rotation has certain characteristic causes and effects. If these are present then it would seem simple to determine whether (even) a homogeneous disc rotates. For example, if a coin placed on a disc moves outwards from the centre, the disc is surely rotating.

Proponents of the RDA respond by ‘imagining away’ such effects. More than one initially appreciates must be imagined away though: *e.g.* any deformation of the disc, stress energies within it, dust particles in its vicinity, and the frame-dragging effect of rotating bodies in General Relativity.⁴ And if *all* of the standard causes and effects

⁴As Butterfield (2004:67–68) observes, rigid rotation alone takes us far from familiar physics.

of rotation are absent, we might start to doubt whether there *is* a fact of the matter as to the disc's rotation.⁵

I share these doubts, and I will ultimately (in §7.4.4) endorse a response by Sider (2001:230–236) that accommodates them. It will be seen that Sider treads a careful line between letting those causes and effects that *are* present determine whether or not a homogeneous disc rotates, and denying that there is any fact of the matter when such causes and effects are absent.

Vectorial Qualities

The second type of response to the RDA focusses on vectorial qualities. The rough idea is that each portion of matter within a homogeneous disc has an associated vector that determines where 'it' will be immediately afterwards. Smoothing out *some* of this roughness: of course the perdurantist takes the vector to determine the subsequent location, not of the portion of matter itself, but rather of its *genidentical successor*.

What are these vectors though? Perhaps they are just *velocity* vectors; certainly the velocity of a matter-portion seems apt to determine its (successor's) subsequent position. But how is velocity understood here? On the standard Russellian analysis, (instantaneous) velocity is a quotient limit: distance travelled divided by time taken. But "distance travelled" surely indicates the distance between an entity at one time and that *same* entity, or at least its *genidentical successor*, at another. As a reply to the RDA then, this proposal seems unworkable. Russellian velocities *presuppose* genidentity; they cannot also be used to ground it.

Enter Tooley's (1988) heterodox account of velocity: instantaneous velocity is a temporally *intrinsic* property that can be picked out by its role in physical theory. It is *that property*, whatever it may be, which relates to momentum, energy, change

⁵See Callender (2001).

of position, *etc.* in just the manner described by the standard laws of physics. Such an account allows velocity to not merely encode, but rather to explain and govern an object's trajectory.⁶

Tooley did not intend his instantaneous velocities as a solution to the RDA. Nor is it obvious that they are even applicable. As Zimmerman (1998b:282–284) notes, the laws of physics that specify Tooleyan velocities themselves presuppose the notion of a persistent entity, threatening circularity once more: Tooleyan velocities are used to define persistence, yet persistent entities must be antecedently supplied in order to define Tooleyan velocity.

As a result, Lewis (1999) endorses a related proposal by Robinson (1989) which seeks to define vectorial '*quasi*-qualities', not by their theoretical role, but rather in terms of that which governs the *propagation of matter*. Thus Lewis puts the idea as being that "if there is matter at a spacetime point, and if the vector associated with that matter points in a certain direction, then at the next moment matter will appear at the place toward which that vector was pointing" (1999:211). Note that Lewis does not talk of the *same* matter, or even *genidentical* matter, appearing in the relevant place. Since the vector field is to be used to genidentify persisting matter, facts about persisting matter cannot be used to define the field. Note also that the proposal must be hedged: Robinson (1989:406) observes that propagation only occurs in the absence of any relevant "destructive forces".

The problems with this proposal are twofold.⁷ First one may simply doubt the existence of anything like the vector field that Robinson and Lewis postulate. Second, one might object to the *vectorial* nature of this field. It is introduced by Robinson and Lewis as a 'fix' for Humean Supervenience, which doctrine had previously sought

⁶Or at least it does in our world, where Tooleyan velocities are nomologically correlated with Russellian (quotient) velocities. In nomologically distinct worlds, the property that *our* laws single out as playing 'the velocity role' may simply not exist, or it may exist in those worlds yet be uncorrelated with an object's trajectory. A further issue is whether it even makes sense to talk of intrinsic velocity within a spacetime with respect to which absolute velocity is not well defined.

⁷Although Zimmerman (1999) discusses a *recherché* third objection.

to found causation, persistence, *etc.* solely on intrinsic qualities. *Perhaps* there are independent reasons for relaxing this requirement, and perhaps Robinson's *quasi*-qualities are only 'hypothetically extrinsic' (insofar as they only tell us where matter will be located *if* there is a 'next time'). Nonetheless, the Humean project seems to lose some of its lustre once vectorial quantities are admitted to the basis.⁸

Non-Supervenient Causation

The final type of solution utilizes relations of *immanent causation*.⁹ Might the matter within my table be instantaneously replaced by qualitatively identical matter? Some writers believe such 'immaculate replacement' to be possible (in some sense), and moreover that my table would not survive this process.¹⁰ What would apparently be missing are (the right kind of) *causal* connections between my table and its replacement. One moral is that spatiotemporal and qualitative continuity are insufficient for causal continuity. Another is that causal connection is necessary for identity (or genidentity).

The RDA might be held only to reinforce these morals. Spatiotemporal-*cum*-qualitative relations *clearly* cannot bind successive temporal parts of the discs. Perhaps causation does so instead. To re-iterate though, the Humean basis is the same for both rotating and stationary (homogeneous) discs. In that case the postulated causal relations must be taken as *non*-supervenient.

⁸For further discussion, see Robinson (1989:407–409), Lewis (1999:209) and Butterfield (2004:51–53).

⁹See Armstrong (1980) and Zimmerman (1998b).

¹⁰See Shoemaker (1979:326–327) and Armstrong (1980:79). I return to immaculate replacement in §7.3.3.

7.2.3 Hawley's Non-Supervenient Relations

The Proposal

Hawley (1999, 2001) also proposes to answer the RDA with non-supervenient relations (NSRs), but her relations are not themselves causal. Instead, they are *sui generis* relations between temporal parts or stages, the holding of which

is not entirely determined by the intrinsic properties of those [...] stages, nor even by those intrinsic properties plus spatio-temporal relations between the stages. (2001:71)

Although Hawley is adamant that her NSRs are not themselves causal (2001:86–88), they are nonetheless

the relations, whatever they are, which underpin the relation of “immanent causation” which holds between stages of the same object [...]. (2001:85–86)

Thus it is these non-supervenient, non-spatiotemporal relations that ultimately weld temporal parts into four-dimensional objects.¹¹ In the context of RDA, such relations hold between a segment of the disc at one time, and a segment of the disc at another time. If the segments thus related are co-located then the disc is stationary; if not, it rotates.¹²

The proposed relations perform other tasks also. In addition to underpinning immanent causation, Hawley's NSRs single out from amidst the innumerable gerrymandered sequences of temporal parts those sequences that are “natural” (2001:90–94). This facilitates an explanation of how we pick out suitable referents for our terms (2001:96–98) and also helps to

ground the distinction between genuine change and mere difference over time between different objects. (2001:95)

¹¹Hawley is in fact a stage theorist (see Chapter Three fn.22), but she takes her solution to apply to perdurance also (2001:69–71).

¹²Assuming the disc has not undergone a translation.

Against NSRs I: Macroscopic Entities

As I read her, Hawley believes that NSRs hold directly between the various temporal parts of macroscopic perduring entities.¹³ I am about to argue against this idea. In the next section I shall argue against a related proposal: that NSRs hold primarily at the *microscopic* level.

Hawley's NSRs would clearly be of great help in dealing with homogeneous rotating discs. In actuality they are less help than hinderance though. Even in our world it is (alleged to be) NSRs that subvene genidentity and thereby pick out natural objects to act as the referents of our talk and the subjects of genuine change (2001:90–98). The central difficulty is then the following: how do we square these NSRs with the apparently distinct facts on which genidentity also seems to rest?

To start with, Hawley's NSRs are supposed to hold between the temporal parts of very many types of object. But this is implausible for the simple reason that, as Hawley had earlier observed,

[w]hat relations underpin the persistence of a single object may depend upon what kind of object is in question.

(2001:70)

Hawley does not mean to invoke a whole set of NSRs that underpin the persistence of different types of object. Rather, her preceding discussion reveals her to be alluding to the 'usual suspects' here: qualitative similarity, spatiotemporal continuity, psychological continuity (for persons), *etc.* A combination of *these* relations is usually thought to underpin persistence, with the precise details depending on "what kind of object is in question". But how do we reconcile these relations with the non-supervenient ones that Hawley has posited?

One would think, for example, that the temporal parts of my chair are united, not by NSRs, but rather because they are qualitatively similar and spatiotemporally

¹³Though recall fn.11.

continuous.¹⁴ But relations of qualitative similarity and spatiotemporal continuity supervene, respectively, on the qualities instantiated by, and the spatiotemporal locations of, those successive temporal parts. Such relations must therefore be distinct from Hawley's *non*-supervenient relations. We have a choice then: does genidentity follow Hawley's relations, or rather those that appear to bind the chair's temporal parts together?

Perhaps we should ask whether these relations can separate. Suppose that NSRs *can* diverge from what is usually thought to subvene genidentity. After all, with Hawley's relations being *non*-supervenient, it is hard to see what could constrain them to parallel the more traditional relations of spatiotemporal continuity, qualitative similarity, *etc.* But then if they *can* diverge, who is to say they *do not* diverge? Hawley's NSRs might hold between (what we would ordinarily describe as) my chair at t_1 and (what we would describe as) my table at t_2 . Might Blair be genidentical with Hitler?¹⁵ The NSRs that Hawley countenances are in no way observable. Connect them every which way and we would be none the wiser.

We might also worry whether, in the event of a divergence, we *should* take NSRs to ground genidentity. Suppose that, in intuitive terms, such relations link 'my chair' at t_1 and 'my table' at t_2 (and that I somehow came to know this). I would still describe this situation as I just did: a non-supervenient relation would hold between *one* object (my chair) and *another* (my table). I might think this an odd state of affairs. But I would not conclude that my chair at t_1 and my table at t_2 (partly) compose a 'natural' object, whilst my chair and my table—which entities are spatiotemporally continuous and qualitatively stable—are somehow gerrymandered and inferior.

On the other hand, suppose that Hawley's relations *cannot* cleave apart from the

¹⁴Doubtless there is a causal requirement as well, but I assume for now that this reduces to qualitative and spatiotemporal facts. More on this in §7.3.3.

¹⁵Better: might some or all of the temporal parts of what we think of a single, continuant Blair in fact be genidentical with some or all of the temporal parts of what we think of as a single, continuant Hitler?

traditional basis for genidentity. *Why* can they not? The answer would be obvious if her relations supervened on the more traditional ones; but since her relations are explicitly non-supervenient, this cannot be so. Instead it seems that her relations are not only basic, but that there are basic *constraints* upon them to parallel qualitative similarity, spatiotemporal continuity, *etc.*¹⁶ The precise constraints vary from object to object. NSRs follow: spatiotemporal continuity in the case of billiard balls; vital continuity with regard to trees; continuity of parts when it comes to an oft-repaired watch; and, at least arguably, psychological continuity for people. How does this come about?

All in all it is unappealing to think that Hawley's relations cannot cleave apart from the traditional subveners of genidentity. We are being asked to believe in relations that are utterly unobservable; that cannot but parallel the relations which traditionally subvene genidentity (even though there is no *explanation* for this parallelism); and that are neither identical with nor supervene upon those more traditional relations. On the other hand if these relations *can* cleave apart then, as discussed above, we are faced with bizarre diachronic concatenations of (what we regard as) ordinary objects as at particular times. To further endarken matters, it seems mysterious how we could ever *know* whether the two sets of relations do or do not diverge.

Against NSRs II: Microscopic Entities

I therefore reject Hawley's proposal as it stands. There is a variation on her theme though: NSRs govern genidentity only for *simples*. The genidentity of the various temporal parts of a macroscopic object might then arise, not due to NSRs between those temporal parts themselves, but rather due to NSRs that underpin the geniden-

¹⁶This assumes that it even makes sense for there to be constraints on a supposedly primitive relation.

tity of the object's microscopic parts.^{17,18}

If there are no simples, *i.e.* if everything has parts that have parts that have parts *etc.*, then this view would clearly need re-thinking. It may be hostage to empirical fortune in other ways also. What might initially appear to be simples are perhaps just fluctuations in the quantum 'soup'. Would this allow for persistent microscopic entities *at all*, let alone ones with temporal parts linked together by NSRs?

But the main difficulty is just as before. Supposing for convenience a 'billiard ball' understanding of atoms, we naturally believe that genidentity for such entities follows spatiotemporal and qualitative continuity. Can the NSRs that hold at the microscopic level part company with these continuities? Suppose that they cannot. *Why* not? There seems to be a brute constraint here no less mysterious than that previously considered at the macroscopic level. Alternatively, suppose that the NSRs and the spatiotemporal-*cum*-qualitative constraints *can* cleave apart. We might imagine two atoms in a box. How do we know they are not constantly 'switching genidentities'? Or, speaking more strictly now, how do we know we are not dealing with two atoms that are repeatedly exchanging position with correspondingly oscillating qualities? Indeed, might not the continuous trajectories and apparent smooth variation in qualities conceal a succession of *very many* atoms 'jumping in and out of' these trajectories? And might something similar be true, not of atoms in a box, but rather of 'my' atoms and 'yours'?

To these recent questions there is an answer of sorts: we should prefer the simpler

¹⁷At least this is part of the story. For many objects (*e.g.* animals, plants and artifacts) continuity of form or purpose contributes alongside mereological continuity. Even then though, continuity of parts still matters: a tree may survive the replacement of all of its cells, but not if they are all replaced simultaneously.

¹⁸Might the 'variation' about to be considered be what Hawley intended all along? (Thus: "the suitable relations which *underpin* the persistence of ordinary things are non-supervenient" (2001:71; my italics).) I think not: (i) she usually writes that NSRs hold between temporal parts *of an object* (with no suggestion that these relations hold only in virtue of more microscopic ones); (ii) her examples discuss NSRs between temporal parts that are *clearly* macroscopic (those of the segments of a disc (2001:88–89) or indeed herself (2001:89)); and (iii) in fact the idea that NSRs hold at the microscopic level, let alone that they *only* hold at the microscopic level, is never even mentioned.

story. Yes, there *could* be two spatiotemporally and qualitatively *discontinuous* atoms within the box. But it is far simpler to assume that the atoms are better behaved.

This is indeed the simpler assumption, but are we entitled to make it? Whatever the heuristic merits of simplicity when judging between theories, if the pathological worlds are entirely possible and observationally indistinguishable from our own, why assume we inhabit a well mannered world? Setting this aside though, there is something rather ridiculous about appealing to simplicity as an arbiter here. On what is *really* the simplest account, these two possibilities never arise. Genidentity for our billiard-ball particles simply consists in, and is no more than, spatiotemporal-*cum*-qualitative continuity. That is why it cannot diverge from these factors. That is why more bizarre possibilities need not even be considered.

7.2.4 Endurance And The RDA

As remarked in §7.2.1, any endurantist-perdurantist equivalence is threatened if the RDA troubles only one of these theories. Sometimes one has to read between the lines to find the accusation that perdurance is threatened but endurance is not. Thus Lewis makes no mention of endurance but does state that a possible response to the RDA is: “so much the worse for the metaphysic of temporal parts” (1999:209). Similarly, Zimmerman puts the RDA against a combination of perdurance and Humean Supervenience (1998b). Are we to conclude that endurance is immune?

Other writers are more explicit. Having briefly explained the difficulties that spinning and non-spinning homogeneous spheres would present for the perdurantist, Scala writes that the

same difficulties do not attend the view according to which objects endure through time, however, since the differences between the spheres [...] can be cashed out in terms of diachronic identity and the movement or non-movement of parts.

(2002:393)

Similarly, Hawley thinks that endurance, with its attendant notion of identity, can escape the RDA. She suggests that her proposal in terms of close-binding NSRs may be reminiscent of

the closest connection of all, that of identity. Perhaps the segment persists by enduring through time. This is certainly a possible response to the homogeneous disc argument [...]

(2001:89)¹⁹

Clearly there is a perceived disanalogy between perdurance and endurance. Whilst the former requires a “suitable” genidentity relation to connect temporal parts, Hawley thinks that endurantists

face no equivalent challenge. The transtemporal relation in question, according to endurance theorists, is just the relation of identity. [...] Nothing else needs to be said, and in this respect endurance theory is simpler than either stage or perdurance theory.

(2001:69)

Finally, Sider thinks that the

three-dimensionalist has an easy answer. There are no temporal parts, and so no genidentity relation, and so no need for an analysis of genidentity. The enduring parts of the disk will be located at different places depending on whether the disk rotates. Thus, the disks are distinguished by different patterns of occupation of spacetime points by their enduring material parts.

(2001:226)

But what exactly is it about identity that allows it to evade the difficulties associated with genidentity and the RDA? According to Butterfield, we think there is a disparity because we are tempted to say that

the endurantist can take the distinction between the correct and incorrect worldlines (straight vs. helical) as “bedrock”: no more can be said, and besides, no more needs to be said.

(2004:26)

¹⁹See also Hawley (1999:16).

This is wrapped up in

the idea that—at least for the spatial parts of a piece of homogeneous matter—diachronic criteria of identity are unnecessary, or even unintelligible: i.e. the idea that the identity over time of such parts is just “good old identity”, and is both unanalysable, and in no need of analysis—it is as clear as crystal!

(2004:26)

I agree with Butterfield when he goes on to suggest that in fact “the endurantist also has work to do” here (2004:26). But I also agree with his diagnosis: Scala, Hawley and Sider (doubtless along with others) regard endurance as immune from the RDA because they think that, for the endurantist, diachronic identity is just *primitive* (at least at some level). In other words they think that, for the endurantist, it is simply a brute fact that a particular segment of the disc at t_1 is identical to a particular segment at t_2 . The successive locations of thus-identified segments determine whether or not the disc rotates. But it is to just such primitivism that I am about to object.

7.3 Against Primitivism

I regard Hawley’s belief in NSRs as tantamount to a belief in primitive *genidentity*. We shall now discover that the arguments against her view are equally hostile to a primitivism about *identity*. Again I consider the macroscopic case before then considering the microscopic one.

7.3.1 Against Primitivism I: Macroscopic Entities

A theory of primitive identity for macroscopic objects threatens to conflict with the idea that identity depends critically on a combination of qualitative, spatiotemporal, mereological, and causal continuities (the precise details of the combination varying with the type of object in question). Thus the identity of a watch seems to depend upon the identity of its component parts, and the rate at which those parts are

replaced. With organisms, whilst mereological issues are again important, continuity of vital processes also plays a part. When it comes to persons, the standard accounts involve either bodily or psychological continuity.

How do we reconcile all this with primitive identity? I do not think we can. *Prima facie* the relevant continuities might come apart from the primitive facts of identity. But the latter are not observable, in which case for all we know Blair might be identical with Hitler.²⁰ Perhaps (what I think of as) my chair and my table are not natural objects, despite their spatiotemporal and qualitative continuities. Instead, ‘my chair’ yesterday might be identical with ‘my table’ today.

But perhaps these far-fetched scenarios are impossible. Suppose (that it is coherent that) there are constraints on primitive identity—and constraints such that identity cannot hold unmediated across spatiotemporal intervals or radical qualitative changes (at least not for the kinds of object discussed above). Indeed, identity might be constrained to exactly parallel those continuities that we expect it to follow. That would prevent the epistemological chaos which would result if these could cleave apart.

Nonetheless, we stumble from one epistemological hurdle to the next. We have no real idea how the mooted constraints might work; perhaps they too are brute. Worse still, it seems that the precise constraints on primitive identity must vary with the type of object. And how, given the unobservability of identity, have we discovered that primitive identity is constrained to follow: continuity of function in the case of ships; continuity of vital processes in the case of a tree; and—at least arguably—psychological continuity when it comes to persons? Might it not be that, unbeknownst to us, ‘tree identity’ cannot survive the loss of a single leaf? Perhaps a watch *can* survive being dismantled with its parts ground up and spread across the universe. On the primitivist view, how could we come to know otherwise?

²⁰Granted: the Hitler-Blair object would be temporally discontinuous. But if facts of identity are just primitive, what is there to prevent them from holding across such discontinuities?

7.3.2 Against Primitivism II: Microscopic Entities

Primitive identity therefore seems unattractive at the macroscopic level. But I suspect it has more adherents at the microscopic level. Such an adherent might well hold that identity for *composite* objects depends upon the kind of continuities discussed above, and in particular on the continuity of an object's *parts*. Perhaps the identity of these parts depends on similar continuities, including facts about various *sub*-parts. Ultimately though, one arrives at entities that plausibly do not possess parts; and hence it might be held that the diachronic identity of these entities must be simply primitive.

To some extent I *need* not disagree with this picture. I will argue later that the identity of an enduring object does not just depend upon, but in fact *consists of* the holding of the various continuities already mentioned. The same is true of the *genidentity* relation between instantaneous temporal parts. I thus claim there to be parity between identity and genidentity; but so long as this parity is maintained at the microscopic level, it would be no disaster should microscopic identity/genidentity turn out to be primitive. And in much of what follows I shall be concerned primarily with identity and genidentity for *macroscopic* entities.

Nonetheless, on occasion I do consider microscopic entities, taking their identity to be *non*-primitive.²¹ And if the perdurantist can get by without primitive genidentity (or NSRs) at the microscopic level, then why can the endurantist not cope without primitive *identity*? Of course if they do dispense with primitive identity then the endurantist may join the perdurantist in being threatened by the RDA.²² But still, I think the positives will more than outweigh the negatives here.

For one thing, we should surely prefer a (plausible) theory that holds a particular relation to be supervenient rather than primitive. There is perhaps a hint of ontolog-

²¹See §§7.4.4 and 7.5.1.

²²See §7.4.4.

ical parsimony about this preference: a primitive relation is surely *distinct* from any continuities seemingly connected to it, whereas a relation that supervenes on these is less obviously distinct.²³ But I believe we should be particularly loath to countenance relations that are not just primitive but also *unobservable* (both in themselves and in their consequences). Primitive identity would be just such a relation.

Identity *seems* to follow spatiotemporal, qualitative and causal continuities even at the microscopic level. Suppose we were granted omniscience with regard to such facts (and further suppose a particulate ontology). We might then know that there is a path of continuous matter-occupation between a particle at R_1 and a particle at R_2 ; that there is no such path between the particle at R_1 and any *other* particle at R_2 ; that the particles at R_1 and R_2 are qualitatively identical (and indeed that their qualities are manifested all along the path between them); and finally that there is an unbroken chain of (appropriate) causal links running between the ‘two’ particles.²⁴ In such a situation, do we really want to say that the identity of that at R_1 and R_2 is a *primitive* fact? Does their identity not hold *in virtue* of the aforementioned continuities?

Indeed, the situation is similar to that at the macroscopic level (save for the absence of *mereological* continuities). Can primitive identity part from the spatiotemporal, qualitative and causal continuities outlined above? In which case how do we know that it does not do so *all of the time*? We might revisit our earlier atoms in a box (this time from the perspective of endurance). I quote from §7.2.3:

How do we know they are not constantly ‘switching [identities]’? Or, speaking more strictly now, how do we know we are not dealing with two atoms that are repeatedly exchanging position with correspondingly oscillating qualities? Indeed, might not the continuous trajectories and apparent smooth variation in qualities conceal a succession of *very many* atoms ‘jumping in and out of’ these trajectories? And might something

²³I return the question of distinctness in §7.4.

²⁴Note that I do not say “*immanent*-causal links”, lest this commit us to the identity of the particles. See Chapter Five fn.30 for a similar point.

similar be true, not of atoms in a box, but rather of ‘my’ atoms and ‘yours’?

Of course an alternative is that primitive identity might somehow be *bound* to the continuities in question. Again we might ask whether this even makes sense; and again we might ask just *what* binds it. Are the constraints also just brute? And how, indeed, have we found out about the relevant constraints—especially given the unobservability of identity itself?

A further alternative: the endurantist might adopt primitive identity *with their fingers crossed*. In other words, they might deny any formal constraint on primitive identity but nonetheless *hope* that, in actuality, it is well behaved enough to follow whatever continuities are salient at the microscopic level. We might grant that such a world would be *simpler* than a world where primitive identity cleaves apart from the relevant continuities. Moreover, I suppose there *could* be an argument to the effect that *if* we live in a well-behaved world *then* we know that microscopic entities are not ‘constantly swapping identities’.²⁵ However, I see no reason (save for blinkered optimism) to think that we *do* live in a simple world (*vis-à-vis* identity) when there are so many other, relatively pathological worlds observationally indistinguishable from our own. And really it would provide no substantial assurance to know that, somewhere out amidst the *possibilia*, there are those who know themselves to be living in a well-behaved world (with respect to identity), when all the while there are countless others—quite possibly including ourselves—ignorant of the fact that they are not.

All in all then, I fail to see why the endurantist should take a different stance towards the diachronic identity of microscopic objects than they take towards identity at the macroscopic level. In either case they should deny the primitiveness of identity, taking it to depend on the relevant continuities instead. Apart from allowing the

²⁵The idea is inspired by those externalists about knowledge who propose analogous conditionals in response to brain-in-a-vat scepticism. See DeRose (1999:10–13) for the rough idea.

endurantist to recognize the great importance of these continuities, a rejection of primitivism dispels certain sceptical ‘possibilities’. The tethering of identity to its apparent criteria allows us to assert with confidence that our world is not one in which, unbeknownst to us, identity connects indiscriminately across the salient continuities.

7.3.3 Immaculate Replacement

Before moving on to more positive remarks about the nature of identity, I must revisit the possibility of *immaculate replacement*; for this could be thought to support the primitivism I am trying to deny. Might all of Jim’s matter be instantaneously annihilated and immediately replaced by qualitatively identical matter? We are supposed to grant, firstly, that this is in some sense possible; and secondly that *Jim* (or perhaps his matter) would not survive this process.

Cases of immaculate replacement certainly trouble what I shall call a *super-endurantist*: one who believes both that causation supervenes on spatiotemporal-cum-qualitative continuities, *and* that identity supervenes on a combination of spatiotemporal, qualitative and causal facts.²⁶ Because the replacement matter in the example is qualitatively identical to and appears in the same place as that which it displaces, the super-endurantist might seem compelled to admit that the standard causal relations *do* obtain, and hence that Jim *does* survive. This is a counter-intuitive conclusion.

How will the super-endurantist respond? The primitivist must hope that they *retain* their belief in the supervenience of causation. In that case all of the continuities that are supposedly essential to identity—*i.e.* spatiotemporal, qualitative and causal ones—*will* be present. When this is coupled with the belief that Jim does *not* survive the replacement process, it seems that the super-endurantist will be forced to backtrack when it comes to the supervenience of identity.

²⁶Note, however, that immaculate replacement would also trouble a super-*perdurantist*.

This would be a strange way for the super-endurantist to proceed though. Instead of retaining the supervenience of causation but abandoning the supervenience of identity, a more sensible option would be to abandon the former but retain the latter. *Prima facie* it seems that whilst the spatiotemporal and qualitative continuities are undisturbed, the very act of replacement guarantees that the standard causal relations do not obtain. Hence one customary moral drawn from immaculate replacement: it is the lack of *causal* connection that accounts for the lack of identity. Note that this moral suggests identity *not* to be primitive, but rather to be dependent on causal considerations.

Alternatively though, the super-endurantist might retain the supervenience of causation *and* identity, but deny the possibility of immaculate replacement.²⁷ They can nonetheless grant the possibility of *parts* of the story, and indeed of certain related stories. Most obviously, I see no reason why they cannot allow the possibility of instantaneous annihilation of matter, and similarly its creation *ex nihilo*.

They can also allow the following possibility. Merlin has been known to generate matter *ex nihilo* on several occasions. When he does so, such matter instantaneously obliterates whatever was present in the region where it appears. Merlin can control precisely what matter he generates, where he generates it, and what properties it has. In other words Merlin could indeed generate qualitatively identical matter just where Jim's matter currently is. Should he do so, there may yet be good reason, even for the super-endurantist, to judge that despite the spatiotemporal and qualitative continuities *local* to Jim, the essential causal continuities do *not* hold across the region of immaculate replacement. This is because Merlin's exploits at other times and in other places provide excellent grounds—excellent *spatiotemporal and qualitative grounds*—to regard *him* as the cause of the replacement matter in our example. So the super-endurantist can continue to uphold the supervenience of causation on

²⁷Perhaps this is the best option for the super-perdurantist also.

the *broader* spatiotemporal spread of qualities; and they may also hold that despite the *local* spatiotemporal and qualitative continuities, Jim does not survive Merlin's malevolent act.

What the super-endurantist cannot allow is that there could be two worlds that are spatiotemporally and qualitatively identical throughout, yet which differ over the patterns of diachronic identity within those worlds. If the believer in (primitive identity and) immaculate replacement really wishes to posit some powerful *outside* influence that nonetheless might 'reach into' one of the worlds to 'tweak' the facts of identity—and *only* these facts—then so be it: the super-endurantist must deny this possibility. They do this with no sense of embarrassment or shame, but rather with great gladness. It allows them to discount what would otherwise be a virulent sceptical problem. For how would we know that we are not being immaculately replaced, again and again, all of the time?

7.4 Identity Reduced

I have argued at length that (diachronic) identity is not primitive—neither at the macroscopic nor the microscopic level. Instead it critically depends on the holding of certain continuities: continuities that vary with the kind of object in question, but are broadly speaking spatiotemporal, qualitative, and-or causal. I now develop this account by claiming, in §7.4.1, that identity *reduces* to such continuities; and then in §7.4.2 that *we* play a significant part in deciding which continuities are relevant. In §7.4.3 I consider three objections to such views, and then in §7.4.4 I briefly revisit the Problem of Change and the RDA in the light of recent developments.

7.4.1 Reductionism About Identity

To begin then, consider the relation “is an uncle of”. This relation is not (both) primitive and yet mysteriously constrained to parallel the relation “is a brother of a parent of”.²⁸ Instead, being an uncle surely depends upon these other familial relations. Do we want to say, though, that “is an uncle of” is a *distinct* relation to “is a brother of a parent of”? Which is to say: are there two relations here, one of which supervenes on the other? I would have thought instead that only *one* relation is present, albeit one we may describe in different ways. The ‘uncle-ness’ relation *reduces to* or *just is* the relation “is a brother of a parent of”. Being an uncle *consists in* being the brother of a parent.

The continuity-based relations on which identity apparently depends are doubtless more complex than those on which unclehood rests. Nonetheless, I suggest that identity similarly reduces to the relevant continuities. Put another way: the holding of identity simply consists in the holding of those continuities. It is not distinct from these, and involves nothing extra. In particular it is not an additional relation that somehow ‘sits on top of’ the continuities in question. If it were, how could we have come to know of it? How would we have discovered its supervenient nature? Given the unobservability of identity itself, were it distinct from the relevant continuities then these questions would be utterly unanswerable.

In espousing a reductionist theory of identity I take myself to be adopting at least a semi-popular view. I cite two examples: Parfit since he is so very explicit on this topic, and Locke as a plausible originator of the view. The latter remarks on at least four occasions that identity “consists” in the holding of certain continuities (for both persons and for men—Locke views these as distinct).²⁹ As to the former, Parfit

²⁸I assume that a parent’s sister’s husband is not strictly speaking an uncle, but rather an *uncle-in-law*.

²⁹See Locke (1975 [1689]:328–348). Lowe (1989:2) explicitly endorses Locke’s views, and also uses “consists” (with regard to identity) elsewhere (1988a:76).

writes (on the topic of *personal* identity) that once the details of any psychological and physical continuities have been given, this

is a full description of the facts. There is no further fact about which we are ignorant. (1984:242)

In other words: there is no “further fact” about *identity*. The

fact of a person’s identity over time just consists in the holding of certain more particular facts. (1984:210)³⁰

7.4.2 Decisions Or Discoveries?

Suppose, then, that identity reduces to its apparent criteria. We might then think that personal identity consists merely in psychological continuity (say); that ‘tree identity’ amounts to no more than vital continuity; and that the identity of a watch reduces to facts about its component parts.³¹ Were these reductions simply ordained ‘on high’ though? And if they were, how did we ever discover them?

The answer is that these were *decisions* and not discoveries. Not conscious decisions, nor particularly sudden ones. But nonetheless we have established over time a practice of identifying ‘trees’ that are vitally continuous, ‘watches’ that are mereologically continuous, and so on. The fact that our practice is what matters explains how we have *any* grasp on the relevant criteria of identity for a particular object. Had we played no part in the ‘decision’ that trees can survive the loss of their foliage, or that cars may have their parts replaced, how could we have come to know these facts?³²

³⁰Parfit is similarly reductionist about other forms of identity. Thus both personal identity and the identity of nations are said to “consist in nothing more than the holding over time of various connections, some of which are matters of degree” (1984:316). And whilst he stops short of fully endorsing the view, he seems fairly comfortable with the idea that identity for a physical object “necessarily involves or consists in [...] spatio-temporal physical continuity” (1984:203).

³¹It is reductionism, rather than the complete adequacy of the suggested analyses, that primarily concerns me here.

³²As to *why* identity reduces to different criteria for different types of object, to some extent this is obvious: rocks, rivers and roadblocks can hardly be psychologically continuous over time. More subtle differences might be anthropocentric and pragmatic, being a product of what we are likely to want the concepts “person”, “penknife”, “pumpkin”, *etc.* to track.

Three further considerations support the view that facts about identity emerge from our practices. First: puzzle cases. A philosopher puts forward a particularly unlikely scenario involving a ϕ . We judge that the ϕ would (not) survive this scenario, which intuition the philosopher attempts to capture *via* a set of proposed criteria for ϕ -identity. How are we to understand this process apart from as revealing *recherché* elements within our practice with regard to (the identity of) ϕ s?

Second: personal identity. Does this consist in bodily or psychological continuity? Because these rarely if ever part, there has no been no pressure on us (or our practices) to ‘decide’ which continuity identity follows. No wonder these issues remain unresolved; there are simply no determinate answers here.³³

Third: vagueness. Arguments against vague identity notwithstanding (*e.g.* Evans (1978)), I doubt that for every possible vicissitude that may befall an object there is a fact of the matter as to whether it survives. This is brought home particularly well by Parfit’s (1984:231–243) examples involving *degrees* of physical and-or psychological change. If one thinks that facts about identity are somehow ‘out there’, independently of our practice, then it will be hard to make room for this vagueness.³⁴ On the other hand, if identity emerges from our practices, then it is obvious how vague identity arises: it simply requires our practices to be vague—as they surely are.

7.4.3 Three Objections

I now consider three objections. The first is that an extreme reductionism about identity is essentially no better than a denial. If there is no “further fact” about identity beyond the holding of the now-familiar continuities, then is this not to say that, strictly speaking, there is no *identity*?

If the complaint is really that on the reductionist view there is nothing resembling

³³Nonetheless, for expository reasons I shall continue to adopt one criterion (generally the psychological one) rather than the other.

³⁴Unless, that is, one thinks it indeterminate what we refer to by names such as “Jim”, “Kofi Annan”, *etc.* I find this hard to believe.

identity *as the objector conceives of it*, then I can happily allow this (especially if the objector is a primitivist). But if the objection is genuinely that a reductionist view does not allow for *identity*, then it is simply misguided. “Being an uncle of” reduces to other relations, yet there remain uncles nonetheless. Dogs may be ultimately reducible to quantum fluctuations; but still there are dogs. And most relevantly of all, Sider is correct to claim that “[i]t is natural to seek a reductive analysis of *genidentity*” (2001:225; my italics).³⁵ That hardly means that the perdurantist denies genidentity!

A second objection concerns the apparent *importance* of identity with regard to persons, animals, and those objects to which we are sentimentally attached. If identity amounts to no more than certain continuities, why does it seem to matter so much? I will not answer this question (and thus, to some extent, this objection). But I confess, firstly, that with regard to persons, I am attracted to Parfit’s view that “[p]ersonal identity is *not* what matters” (1984:217; my italics). Secondly I note that the primitivist is certainly no *better* placed to ground the importance of identity. At least the reductionist can *begin* to tell a story about why psychological continuity might matter to us. But why should we care about the holding of some (rather obscure) brute relation?³⁶

The third objection arises insofar as several authors reject, or at least regard as misleading, a mode of expression that I have already come close to adopting (and will certainly adopt in what follows). They regard talk of personal identity, rock identity, ship identity, *etc.* as to some extent improper. Talk about ϕ -identity should rather be understood as talk about *what it is to be a ϕ* . In this manner Quine contends that the apparent criteria of bodily identity “are not conditions on the notion of identity; they are conditions on the notion of body” (1976:860). And Noonan similarly thinks that we should

³⁵See also Lewis (1976:20–24).

³⁶Indeed, if we consider a case in which we somehow knew that (primitive) personal identity had separated from, say, psychological and physical continuity, is it clear that our sentimental attachment would follow the alleged ‘identity’ rather than the continuities instead?

deny that the *genuine* problems which philosophers are concerned with when they debate topics under the title of ‘problems of (synchronic and diachronic) identity’ are problems about *identity* at all. Rather, they are problems about kind-membership.

(1989:107)³⁷

By contrast, I am far more receptive to talk of personal identity, rock identity, *etc.* I certainly see nothing wrong with saying, of Jim at t_1 and Mr. Smith at t_2 , that iff they are psychologically continuous (say), then they are in fact the same person. *Modulo* the precise criterion, I think this is exactly what we *should* say. On the other hand perhaps we could talk more generally of persons being psychologically continuous, rather than personal identity reducing to such continuity.³⁸ But is the former a great improvement on the latter?³⁹

Perhaps it would be better to discuss kind-membership if talk of kind-identity were liable to be confused with talk of some ‘purer’ identity. Lewis seems to hint at this ‘pure’ conception:

Identity is utterly simple and unproblematic. Everything is identical to itself; nothing is ever identical to anything else except itself. There is never any problem about what makes something identical to itself; nothing can ever fail to be. And there is never any problem about what makes two things identical; two things never can be identical.

(1986a:192–193)

I can agree with much of this. But there is at least a suggestion here that identity is just *basic*: whilst Lewis does not quite say that there is *nothing* that “makes something identical to itself”, he comes close (and he does say that identity is “simple”). Recall our standard endurantist framework though, and in particular the discussion of §5.4.5. We start with a panoply of simples and qualities spread throughout space-time. Compositional considerations furnish the endurantist with objects of a certain

³⁷See also Lewis (1986a:192–193), Sider (2001:149) and Hawthorne (2003:99).

³⁸The claim that persons are psychologically continuous re-expresses the claim that psychological continuity is *necessary* for personal identity. What of the claim that it is sufficient though? Should we say that persons ‘inevitably follow’ psychological continuity? Or that *personhood* does? The expression in terms of identity arguably seems more natural.

³⁹Especially given the ‘hiccup’ of the last footnote.

type that exactly occupy various three-dimensional regions. Some of these ‘objects’ are in fact the very same object though; they are *multi*-located. The identity of the ϕ that occupies R_1 with the ϕ that occupies R_2 is not some brute fact though: that would return us to the dark doctrines of primitivism. Rather, these locations contain the very same ϕ because certain continuities run between them (the precise details of which depend on the ϕ in question).

I will therefore give little ground to Noonan, Lewis, *et al.* If they feel the need to re-interpret my talk of ϕ -identity in terms of ‘what it is to be a ϕ ’, then so be it. But really I see no shame in talk of the criteria for ϕ -identity. That seems an entirely appropriate name for those criteria that determine certain ϕ -containing regions to be exact locations of *the very same* ϕ .

7.4.4 Familiar Territory

It is worth revisiting two earlier topics in the light of reductionism about identity. The first visit will be brief: in §4.4 I expressed a good deal of scepticism about the Problem of Change. The view of identity I have now endorsed only reinforces this scepticism. According to the reductionist, identity just is or consists in the holding of those relations on which it apparently supervenes. The particular relations that count depend on the type of object in question; but it is by now familiar that paths of continuous matter-occupation, vital processes, functional continuity, *etc.* are amongst the relevant factors. Once it is accepted that the holding of identity amounts to no more than the holding of these continuities, it is obvious that there is no conflict between diachronic identity and qualitative diversity. Why should there be? Nothing subtle about the continuity of vital processes requires a tree to be qualitatively identical over time. Similarly for Lewis himself: his diachronic identity (arguably) consists in and is no more than the holding of certain psychological relations between (the mental states of) his earlier and later ‘selves’. But “being psychologically continuous

with” and “being the same shape as” are obviously unrelated. To think that the former might in any way imply the latter is just bizarre.

The consequences of reductionism about identity are less welcome when it comes to the RDA. To recap: in §7.2 I described the apparent perdurantist difficulty (§7.2.1); discussed three types of solution (§7.2.2); introduced and criticized Hawley’s non-supervenient relations (§7.2.3); and finally suggested that the endurantist escapes RDA only if their identity relation is, as Butterfield (2004:26) puts it, “unanalysable, and in no need of analysis” (§7.2.4). I have since denied that identity is “unanalysable”, and am therefore committed to the view that endurance does *not* escape the RDA. Diachronic identity is no less dependent on various continuities than genidentity is, in which case the lack of any such salient continuities within homogeneous, rotating discs troubles either doctrine equally.

Of course this apparent parity is good news for one who takes endurance and perdurance to be in some way equivalent. But it seems still more important to address the RDA now that it threatens endurance and perdurance alike. There will be no fireworks here though. My preferred solution is essentially that given by Sider (2001:230–236). This was advertised early in §7.2.2, but more recent developments mean I wish to interpret his account as applicable also to endurance.

The essential idea is that in many worlds there will be sufficient causes and effects associated with what is obviously rotation (or obviously *not* rotation) to determine, in less clear-cut cases, both the physical laws *and* the paths that continuant matter pursues.⁴⁰ Thus: in a particular world we observe that by regarding certain spatiotemporal regions as the paths of persistent objects, and by postulating particular laws that these persistent objects obey, we can achieve an optimal balance between subsuming as much empirical data as possible and doing so with the minimum number of lawlike principles. It may be, for example, that the ‘best system’ of laws

⁴⁰Of course with regard to the RDA what we need to know is what paths the *parts* of the disc pursue; but Sider’s proposal provides this too.

and continuant paths respects the conservation of momentum. In that case there will be some homogeneous discs whose parts are assigned helical paths on the basis that, for example, the disc used to have a (stationary) gap on its edge which then received a *moving* part exactly filling it (thus rendering the disc both homogeneous and rotating). Sider mentions other examples where the laws and continuant paths determine the rotation of a homogeneous disc, *e.g.* when the disc has been physically spun. One need not say that disc's current rotation is *directly* caused by this past event.⁴¹ The point is rather that, immediately after the disc has been spun, the lines of identity/genidentity for its parts will be helical. Assuming that the physical laws in this world roughly resemble our own, these parts will continue to trace out helical paths provided no further forces act upon the disc.⁴²

Two wrinkles remain with this solution (and Sider is aware of both). The first is that in sparser worlds there may not be enough data for the joint assignment of continuant paths and laws. In such worlds it is simply indeterminate as to whether a homogeneous disc rotates. For the perdurantist this means there is no fact of the matter as to which part of the (temporal part of the) disc at one time is genidentical with which part of the (temporal part of the) disc immediately afterwards. In terms of identity it would be similarly indeterminate what paths diachronic identity follows over time. Such conclusions are unusual, but they are less surprising given the situation that generates them. In a world containing homogeneous discs entirely isolated from all of the usual causes and effects of rotation, it seems far from unreasonable to deny a fact of the matter as to whether such discs rotate.⁴³

The second wrinkle is the extrinsicality within Sider's proposal: the paths of persistent matter will in some cases be partly determined by what occurs in *distant*

⁴¹Robinson protests that this would involve a kind of "action at a (temporal) distance" (1989:406).

⁴²Future developments are presumably just as significant. If, at some future time, a coin is placed on a rotating disc only for it to immediately slide outwards, then providing that developments elsewhere have established the relevant physics, the disc will be regarded as (having been) rotating.

⁴³See Callender (2001).

regions of spacetime.⁴⁴ There is no escaping this, even if we would want to. The account on offer *is* extrinsic insofar as nomological considerations determine the paths of persistent matter in those regions where such paths are not initially obvious; and the laws are indeed determined by more straightforward cases of persistence elsewhere. Extrinsicity that creeps in *via* the laws of nature I do not find particularly troubling though. And I note in addition that in worlds that are anything like ours (or at least how we take ours to be), extrinsic determinants of persistence are not necessary. Purely *local* continuities can determine the facts of genidentity, just as they can the facts of identity.

7.5 Identity and Genidentity

If identity were brute and genidentity supervenient then these two relations would surely differ markedly. However, I have argued that identity is in fact reducible to its criteria; and the same is true of genidentity. In §7.5.1 I consider the consequences of this for the view that the endurantist-perdurantist dispute might be somehow less than genuine. Then in §7.5.2 I consider the application of perdurance and-or genidentity to some traditional metaphysical puzzles involving persistence. I contend that endurance and-or identity can to a large degree mimic the perdurantist solutions.

7.5.1 No Fact Of The Matter (Again)

I have argued that identity, like genidentity, reduces to its apparent criteria. In other words the holding of identity, like the holding of genidentity, amounts to no more than the holding of certain continuities (the relevant continuities varying with the type of object).

Moreover, the continuities to which these relations reduce are for the most part the

⁴⁴This criticism could equally be put against the super-endurantist's analysis of the Merlin example in §7.3.3.

same. Recalling the thesis of Ontological Equivalence from Chapter Six, consider a three-dimensional spacetime region R_1 that is exactly occupied by what endurantists regard as a person, and by what perdurantists regard as an instantaneous temporal part of a person. Consider also spacetime region R_2 , of which the same can be said. There are in addition certain continuities that hold between the two regions, their occupants, and the states of those occupants. In particular: there is a path connecting R_1 and R_2 that consists of successive instantaneous regions each of which is occupied by persons, or temporal parts thereof, varying only gradually in their physical characteristics; and there is an unbroken chain of psychological continuity between the (mental states of the) R_1 - and R_2 -located entities.⁴⁵ All this is no more and no less than what is required for the contents of R_1 and R_2 to be *identified* by the endurantist and *genidentified* by the perdurantist. And if each relation reduces to precisely the same criteria, are they not but verbal variations on a theme?

The believer in Ontological Equivalence clearly hopes that we should answer “yes”. But there are two reasons to resist. First, identity and genidentity do *not* reduce to the same criteria; in some situations the exact occupants of two three-dimensional regions would be regarded as genidentical by the perdurantist but *distinct* by the endurantist.⁴⁶

Set this to one side though: suppose that (with respect to the exact occupants of three-dimensional regions) the endurantist regards identity as holding when and only when the perdurantist regards genidentity as holding. Still it might be thought that the endurantist and perdurantist are not merely using different vocabulary when the same underlying continuities are present; for attributions of identity carry with them substantially more than attributions of genidentity. In particular, if we *identify* the exact occupiers of two three-dimensional regions then we are committed to their being

⁴⁵Further stipulations: (i) there are no *branching* chains of physical or psychological continuity in the vicinity; (ii) the situation is ‘causally standard’, *i.e.* we have no immaculate replacement or similar disruptions.

⁴⁶Cases of symmetric fission will furnish an example in §7.5.2.

just *one* (multi-located) entity in these regions. By contrast, if the exact occupiers are *genidentical*, they are clearly *two*. How can this not amount to a genuine difference between endurance and perdurance?

It seems that if one regards the endurantist-perdurantist debate as less than substantive, one ultimately *has* to deny that there are facts of the matter about identity (and similarly about ‘one-ness’). Perhaps one adopts a thesis of Ontological Equivalence, believing endurance and perdurance to countenance essentially the same types of entity but to label these differently. Or one might think that these theories are genuinely distinct, but that there is nonetheless no fact of the matter to arbitrate between them (recall §6.2). Either way though, there is multi-location on endurance, whereas there is not on perdurance. Multi-location arises when *the same* entity exactly occupies distinct regions. If it is a nature-given fact that this never occurs, clearly there *would* be a fact of the matter with regard to persistence: endurance would be false. If, on the other hand, there simply *are* multi-located three-dimensional entities then it seems that the perdurantist is mistaken.

How might it be argued, then, that facts about identity are not ‘nature given’? We could observe that at the macroscopic level our practices could have evolved differently. Thus we might have come to regard a butterfly as an *associated successor*, or perhaps the *progeny*, of a caterpillar; the pupal stage would involve, not radical mutation, but rather death and subsequent birth. We might have said that, after a particularly extensive renovation of my laptop, what I have is in fact a new laptop. We might even have evolved a practice according to which persons do not survive sleep, but rather ‘give birth to’ a closely related descendent. Whilst to operate in these heterodox ways might be to some degree impractical, I am not convinced it would involve any substantial *mistake*.

These thoughts are based on a conception of individuation that not everyone will share though. For those who accept Quine’s (1969:23) slogan of “no entity without

identity”, there may be very little scope for talk of the *same* type of entity having *different* identity-conditions. Relatedly, an unrestricted mereologist might re-describe my ‘possibilities’ in terms of our choosing to talk of *different entities*. Thus it would not be that the identity conditions for persons (say) might have differed; it is rather that we could have spoken of things other than persons.

I will therefore approach the idea that there are no nature-given facts of identity from a different angle. I begin with the Lewisian framework to which I am attracted: the idea that “all there is to the world is a vast mosaic of local matters of particular fact”, or equivalently “an arrangement of qualities” (1986b:*ix-x*). Those qualities and their arrangement determine (*inter alia*) the paths of the persistent entities. This will be in virtue of: paths of continuous matter-occupation; qualitative similarities between successive regions; and patterns within the Humean mosaic which mean that the matter in one region is intimately causally related to the matter in another.

What I do not see is how these paths, similarities and patterns could determine whether a world contains *enduring* or *perduring* entities. Provided these two doctrines are coherent *and distinct*, it seems that the very same spread of qualities would permit either possibility. Consider two three-dimensional regions each of which contains something ‘person-like’. Suppose that all of the necessary continuities are also present; we think this is a case of persistence. But how do those continuities settle whether the two regions contain genidentical (but distinct) temporal parts of a four-dimensional person, or rather different ‘instances’ of a multiply located enduring object? To repeat: I fail to see how they could. The very same Humean tapestry would allow for both endurance *and* perdurance.

At this point an objector arrives. Although I have spoken in passing of “matter”, I have said little about what underlies the Humean arrangement of qualities. The objector might urge that such qualities must be instantiated, and that whether a world features endurance or perdurance is determined by whether the instantiating

entities endure or perdure. To this objection there are a number of replies.

First, it is clearly correct that if there are microscopic enduring entities then our world “features endurance” at least to some extent (and *mutatis mutandis* for perdurance). But it is unclear whether the endurance or perdurance of the fundamental constituents of reality would determine the nature of persistence at the macroscopic level. Many endurantists regard *processes* as temporally extended; yet they further regard these as dependent upon *enduring* entities (whether microscopic or macroscopic). Thus an avalanche is grounded in the behaviour of (putatively enduring) rocks, lumps of snow, and their constituent matter. Might it be that even though the fundamental constituents of reality endure, persons and physical objects are more like processes than we ordinarily imagine?

The converse of this—that there may be perdurance at the microscopic level but that everyday objects endure—perhaps seems strange. But it is not so far-fetched to think that endurance might be some sort of emergent, purely macroscopic phenomenon. Might *I* not be an enduring entity, exactly occupying multiple regions, even though my persistence ultimately depends on perduring particles?

The second point in response to the objector is that the microscopic world might feature *neither* endurance *nor* perdurance—because it does not feature persistence! If the sub-atomic world is just a hodge-podge of fields, flux and flow, then we may find no room in it for persistent entities. (I further take it that on some quantum theories this is quite a plausible picture.)

Thirdly, and perhaps relatedly, we might ask whether an “arrangement of qualities” *needs* to be underpinned. Could there not just *be* collections of qualities at various spacetime points? Indeed, might we not espouse a particulate ontology (say), except with particles interpreted not as *bearers* of qualities, but rather just *bundles* of them?⁴⁷

⁴⁷Note that Lewis is appropriately non-committal here. In addition to the “vast mosaic of local matters of particular fact”, he suggests that we have geometry and then “[m]aybe points of spacetime

All in all one need not be persuaded that the facts of macroscopic persistence are fixed by how things persist at the microscopic level. But for the sake of argument, let the objector have their way: grant that endurance at the microscopic level entails endurance at the macroscopic level (and similarly for perdurance). Let us further assist the objector by supposing that there are indeed point-sized *entities* that instantiate the qualities spread throughout the Humean tapestry. What then determines whether these point-sized entities endure or perdure?

I think the objector will want to say that here our spade is turned: if there are point-sized multi-located entities, this is simply a brute fact. Admittedly, this is not quite the primitivism that I considered in §7.3. It is not that *identity* is being asserted as primitive (and in fact this may even be denied). The claim is rather that it is simply *given* whether the now-familiar continuities underpin identity, or genidentity instead. Still, I am not greatly enamoured with this primitivism either. The sheer unobservability of identity *per se* would conceal from us whether there is indeed multi-location, or whether there is not. Everything would *appear* exactly the same on either alternative.⁴⁸

Moreover, if these matters are thought to be just basic then I do not see how to rule out the possibility that *some* point-sized entities are multi-located—but *only* some. One persisting table might be composed of *enduring* point-sized entities. A qualitatively indistinguishable table might be composed of (successions of) *instantaneous* point-sized entities. A third table might *initially* be composed of enduring point-sized entities, but later composed of (successions of) instantaneous ones. A fourth table might have enduring legs but a perduring table-top.

I would like to collapse these unwelcome possibilities. The way to do so is to hold that, whilst it may be given that there is matter exhibiting certain qualities

itself, maybe point-sized bits of matter or aether or fields, maybe both" (1986b:x).

⁴⁸Note that this is not a point about the microscopic world being unobservable. Even it were observable, we could still not witness facts *about identity*.

at one spacetime region, and matter exhibiting similar qualities at an adjacent and immediately subsequent region, it is *not* given whether we are dealing here with the *same* matter multi-located, or distinct matter that is nonetheless closely associated. We must choose how to talk about the world and its continuities, and whether we opt to do so in terms of multi-located point-sized entities, or a succession of distinct such entities, on neither alternative do we make a *mistake*. Of course this is still on the supposition that there *are* point-sized entities, and I certainly do not commit to the truth of this supposition. But I do hold that facts about identity and genidentity—whether of microscopic or macroscopic entities—are *not* just given to us. They depend instead on how we choose to describe the Humean spread of qualities.

7.5.2 Logical Shape And Puzzle Cases

In §7.5.1 I suggested that where the endurantist sees identity, the perdurantist sees just genidentical association. But there are certain formal discrepancies between identity and genidentity which indicate that in fact these cannot be the same relation differently labelled. In particular, genidentity can hold between a three-dimensional temporal part at one time and *more* than one such part at another time; and genidentity is also non-transitive.

Indeed, there is more than a suggestion that these formal discrepancies are what gives perdurance an edge over endurance with regard to certain ‘coincidence cases’.⁴⁹ My discussion will concentrate on three cases in particular: the Ship of Theseus, the Statue and the Clay, and symmetric fission. Even if one thinks endurance and perdurance entirely distinct, the guiding idea behind my discussion will be that by considering the various *perdurantist* solutions, we might come to appreciate what kind of replies *could* be given (perhaps even *should* be given) by an endurantist who

⁴⁹See Sider (2001:140) for the claim that (it is widely thought that) perdurance yields superior solutions to endurance. (Sider thinks his own stage theory is even better placed to deal with these cases though.)

espouses reductionism about identity.

The Ship Of Theseus

Theseus' Ship (*TS*) is very gradually renovated until none of the original parts remain. Call the resultant ship "Newie". Is Newie identical to *TS*? One is tempted to answer affirmatively. Part-by-part replacement does not destroy identity.

But suppose that the original parts are then assembled to form a second ship. Call this ship "Oldie". Is *Oldie* not *TS*? She has exactly the same parts as *TS* originally did, and to this we might add an unrealistic supposition: that when the parts were removed, they had in no way deteriorated from when *TS* first set sail. *Oldie* would then be both mereologically *and* qualitatively identical to *TS*.

My intuitions are confused only if I focus on the *end* of the story. Prior to this, the situation seems clear: there is only *one* ship present, and that ship is surely both *TS* and Newie. Moreover, ships do not change position radically and discontinuously. *If* Newie were *TS* only until *Oldie* is assembled, this impossibility would have to occur. Hence there can be no such 'transition'; Newie is *TS*.⁵⁰

I will seek to supplement this endurantist treatment by comparison with the perdurantist analysis. They claim the narrative to involve *two* four-dimensional entities, the temporal parts of which are initially shared but gradually overlap less and less (until ultimately they overlap not at all). As Sider puts it:

The only remaining question is the merely *conceptual* one of which of these spacetime worms counts as a ship.

(2001:9–10)⁵¹

⁵⁰All that remains (if anything does) is to justify the claim that only one ship is present prior to *Oldie*'s construction. That which is at sea is clearly one ship, but might *Oldie* in fact be (distinct from this ship and) present *throughout* the story—albeit with some parts ashore and others partly composing the seaborne vessel? I think we should deny this. It is arguably not possible for a ship to have her parts spread *too* widely, and certainly not possible for some of those parts to also be permanent fixtures on a *distinct* ship. (See Lowe (1983).)

⁵¹Pedantic correction: the remaining question is as to which worm, if either, is *Theseus*' Ship (or perhaps whether "Theseus' Ship" is a proper description). Maybe both worms are ships; maybe only one worm is a ship but neither worm is *TS*.

I think the perdurantist should answer that TS is the worm whose (spatial) parts are always contiguous, and which has entirely seaborne temporal parts even midway through the story. (Thus the solution is ‘all plain sailing’.)

What of the other worm? In fact this is not all that worm-like. During the period of gradual replacement, this worm is repeatedly bifurcating as more and more parts are replaced in different harbours and shipyards. The ‘worm’ is more like a river that splits into very many roughly parallel streams, only to later unite into a river once more (when Oldie is constructed). It does not correspond to a ship (especially given the considerations of fn.50), but rather a *collection of ship-parts*.

Now can the endurantist take a cue from this? A believer in Ontological Equivalence would take the analogous endurantist account to hold that there are two *careers* present: that of a ship, and that of a collection of ship-parts. (And indeed one might well believe this even if one rejects OE.) The difficulty though is that these careers, just like the analogous worms, are initially overlapping. Must the endurantist therefore admit that there are *two* co-located entities then present: a ship and a collection of ship-parts? The perdurantist countenances only one three-dimensional entity at the outset, and hence we have a problem for the believer in OE. But quite irrespective of that, the endurantist may be reluctant to admit that, initially, there is both a ship and a distinct, co-located collection of ship-parts.

I think this reluctance is admirable. In my opinion the endurantist should say that at the start of the story only *one* entity is present—namely, TS. The collection of ship parts *just is* TS, as is the corresponding mass of wood and metal, the collection of particles that compose these, *etc.*⁵² In virtue of what later befalls it, the initial object (*i.e.* TS) is the same *ship* as the subsequent, seaborne, entity (*i.e.* Newie); but it is the same *collection of parts* as that which becomes dispersed between dockyards and

⁵²Although there are apparent differences in historical and modal properties between these, we do not want to proliferate entities here. I will return to apparent historical and modal differences shortly when I address statue-clay cases.

the open sea (before being reassembled to form Oldie). And this very much echoes the perdurantist solution: their initial three-dimensional entity belongs to a sequence of temporal parts united by a *ship*-genidentity relation, and a (distinct) sequence of temporal parts united by a *parts*-genidentity relation.

If the endurantist goes along with this suggestion then they are embracing (one form of) *Relative Identity* (RI). Suppose that ϕ and ψ are kinds of object. I take a basic formulation of RI to hold that:

- (1) The following situation is possible: x is the same ϕ as y but not the same ψ as y .⁵³

In order to deal with TS though, something stronger (though not necessarily more objectionable) is required:

- (2) The following situation is possible: x is the same ϕ as y but not the same ϕ as z ; and x is the same ψ as z but not the same ψ as y .

More must be said with regard to (1) and (2). A relatively minor issue concerns how many of x , y and z are required to be ϕ s and-or ψ s.⁵⁴ More importantly though, (1) and (2) need to be motivated (especially because RI is generally quite unpopular).

I think they *can* be motivated. Indeed, I think they follow quite naturally from two beliefs: (i) that a single entity might be both a ϕ and a ψ ; and (ii) that the identity-conditions for ϕ s and ψ s might reduce to distinct, potentially divergent, continuities. With regard to (ii), if ship identity *just is* functional continuity (let us say), whereas

⁵³Geach (1967, 1973, 1980), Zemach (1974), Griffin (1977) and Noonan (1980) all endorse something roughly akin to (1). Note that (1) neither entails nor is entailed by the claim that (D): *all* identity is relativized to a kind. Whilst Geach and Zemach embrace both (1) and (D), Griffin endorses (1) but not (D), and Stevenson (1972) accepts (D) but not (1). For further discussion of RI see Dummett (1991), Noonan (1997) and Hawthorne (2003); but note that many of the criticisms ‘of RI’ in fact address (D) rather than (1).

⁵⁴(1) clearly commits to both x and y being ϕ s, but I shall understand (1) in such a manner that either, both or neither of x and y may be ψ s. (In the latter case (1) is just trivial.) With regard to (2), x must be both a ϕ and a ψ . y is obviously a ϕ and z obviously a ψ , but again I shall understand (2) such that it may hold whether or not y is also a ψ and whether or not z is also a ϕ .

the identity of a collection of ship parts requires mereological constancy, these continuities can *clearly* diverge. With regard to (i), it seems not unreasonable to think that something can be both a ship and a collection of ship parts. If this “something” is mereologically continuous with one (later) entity, yet functionally continuous with a *distinct* (later) entity, then it will be ship-identical to the former and parts-identical to the latter. All that is required is for the relevant continuities to part company—as they do so graphically in the case of TS.⁵⁵

Of course we must duly note (i), for if x cannot be both a ϕ and a ψ then it surely cannot be the same ϕ as y yet the same ψ as z . But if (i) is granted (and I will soon try to motivate it with respect to the statue and the clay) then RI seems to emerge quite smoothly given (ii).

Perhaps it is worth pausing a moment to dispel any lingering hints of contradiction though. Is identity not transitive? In which case if TS is identical to both Oldie and Newie, does this not render Oldie and Newie identical—when clearly they are not? The reply is that RI retains transitivity (and symmetry *etc.*), but restricts these to a kind-relativized identity. What would follow by transitivity is that if x is the same ϕ as y and the same ϕ as z , then y and z are the same ϕ ; but if x is the same ϕ as y yet only the same ψ as z , y and z need not be the same ϕ or ψ . And again this just seems right on the view that identity reduces to its apparent criteria. Why should continuity of form or function between x and y , together with mereological continuity between x and z , entail *any* kind of continuity between y and z ?

In summary then, I recommend RI for two reasons. Firstly, it emerges naturally

⁵⁵Note my parenthetic additions of “later” in this paragraph. These are not intended to prohibit non-diachronic applications of RI, but it would certainly be unusual to countenance multiple *simultaneous* locations of the very same ϕ . This means it is (a) hard to envisage synchronic criteria that would lead one to ϕ -identify these ‘objects’; and (b) harder still to envisage how such criteria might diverge from the criteria for being simultaneous locations of the very same ψ (say). By contrast, the idea that the same ϕ may exist at *different* times is relatively familiar, and it is likewise easy to understand how distinct criteria of identity might diverge *over time*. (I note in passing that if an object time-travelled back so as to co-exist with its earlier self then the endurantist presumably *would* identify these simultaneous ‘objects’. However, I suggest that this identification would be based largely on the usual *diachronic* criteria of identity.)

from the view of identity that I have endorsed over the course of this chapter. Secondly though, it allows us to explain any indecision as to whether it is Oldie or Newie that is TS. For in a sense, both are: the initial entity is ship-identical to Newie, and parts-identical to Oldie.

The Statue And The Clay

According to some, there is both a statue and a distinct but co-located lump of clay on my mantelpiece. Simultaneous entities with different properties are not identical, and whilst the statue is only an hour old (say), the clay has been around for rather longer. There is also an apparent modal difference: the clay would survive remoulding but the statue would not. Such considerations provide the rationale for taking the statue and clay to be distinct. As to their co-location, it is obvious that where the statue goes, the clay doth follow.

The contrasting and far more intuitive position is that the statue and clay are identical. To all appearances, and from our usual practice of counting, there is only *one* thing on the mantelpiece—or rather one maximal, statue-shaped thing. It is both a statue and a statue-shaped lump of clay. Moreover, we can support this naïve view with four quick philosophical arguments (although I do not claim they are irrefutable):

- (a) *Co-location*. Quite simply, it is unattractive to think that two seemingly impenetrable objects can overlap, let alone be completely co-located. If we can avoid saying this, we should do.
- (b) *Weight*. Prior to being formed into a statue, the lump of clay weighed *5kg*. Statues are not usually thought to be weightless. Why, then, does ‘the object’ on the mantelpiece weigh exactly *5kg* if ‘it’ is really two objects: a *5kg* lump of clay and a *distinct* statue?⁵⁶

⁵⁶Lewis (1986a:202) makes essentially this point.

- (c) *Composition.* The lump of clay is composed of various molecules arranged in such-and-such a fashion. But statues are not simples! They are also composite, and I cannot see what might compose them except the various molecules, suitably arranged, that also compose the lump of clay. This allows Zimmerman to cast doubt on the claim that the statue and clay have different modal properties (and thus on part of the argument for their distinctness): “Should not two physical objects constructed in precisely the same way out of qualitatively identical parts have the same capacities for survival under similar conditions?” (1995:87). But in addition it is mysterious how the very same molecules could even compose two distinct, co-located objects in the first place. If this *can* occur, why stop at two? Perhaps there are ten objects on the mantelpiece, or twenty, or even a million.
- (d) *Multiplicity.* There is another line of thought that would overpopulate my mantelpiece. If we think that the statue and the lump of clay are distinct but co-located, should we not say the same of the collection of statue *parts*, the sub-parts of the clay, and also the set of molecules that compose these? In other words, if there is reason to think there are two entities on my mantelpiece, then even apart from (c) above, we have reason to think there may be *more* than two entities there.

What does the perdurantist say here? They take the statue and clay to be four-dimensional entities, with the statue but an extended temporal part of the longer-lived clay. This respects the intuition that there is only one three-dimensional entity on the mantelpiece at any time, *viz.* an instantaneous temporal part that is shared between the four-dimensional statue and clay. There is also the potential to explain the difference in historical properties. More on these shortly.

With respect to modal properties though, perdurance is not enough. Our intuition is that the clay would survive remoulding, but the statue would not. However, if the

clay would survive remoulding, then surely an extended temporal part of the clay would do likewise. According to perdurance the statue *is* an extended temporal part of the clay; hence it both would and would not survive remoulding. Clearly there is something wrong here.

In response the perdurantist *could* abandon their prior claims. That is, they could (i) admit not only that the four-dimensional statue and clay are distinct, but that the four-dimensional statue is in fact distinct from any *temporal part* of the lump of clay. The statue would remain *co-located* with a temporal part of the clay, but it would still be distinct. Alternatively they could retain their part-sharing account, but (ii) interpret ‘clay talk’ in terms of the relevant *matter*, whilst understanding ‘statue talk’ in terms of the *form* of that matter. In other words claims about the statue being beautiful, or incapable of surviving certain changes, would be re-interpreted as claims about the *form* of the clay. Finally, and probably most familiarly, the perdurantist might (iii) follow Lewis (1986a:249–263) in adopting a modal counterpart theory according to which the statue is indeed a temporal part of the clay, but different counterparts of this temporal part become salient depending on whether it is conceived *qua* statue or *qua* (temporal part of a) lump of clay.⁵⁷

Note that each of these strategies is also open to the endurantist. Nothing in the notion of an object exactly occupying multiple three-dimensional regions prevents two objects from being co-located. Nothing in this notion militates against a form-matter distinction. And nothing in this notion constrains one’s modal theory.

As to the differing historical properties, the perdurantist explains these by observing that the extended temporal part of the clay that *is* the statue began after the clay itself did. Shifting to endurance, we might ask whether the *career* of the statue could be part of the *career* of the clay; and whether the career of the clay might have begun before that part which pertains to the statue. Perhaps this would be an odd

⁵⁷It may be that (ii) and (iii) are closely related though. Some of the counterparts mentioned in (iii) might be thought to be *matter*-counterparts, whilst others would be *form*-counterparts.

way to talk, but re-expressed in terms of (enduring) objects rather than careers, it corresponds to something very sensible. The idea is that the (enduring) clay *is* the statue, but was not always.

If at this point it be objected that, on pain of contradiction, the clay cannot be a statue at some times yet not others, then the objector must be referred back to the discussion of §4.4. I think a better objection is that not enough has been said by the endurantist to resolve the original difficulty with historical properties. We may grant that it is only after remoulding, firing, *etc.* that the clay becomes a statue. This doubtless explains, to some degree, why the clay has been around for longer than the statue. But recall that, once it has been appropriately sculpted, fired *etc.*, the clay is supposed to *be* the statue. It seems reasonable to ask how long this entity—the entity that is both the statue *and* the clay—has been around. Just an hour, or for somewhat longer?

This question clearly concerns identity over time. If the entity in question is identical with something four hours ago (and also with something at all times since), it is (at least) four hours old. If it is identical only with entities located in the last few minutes then it is far younger. Yet it seems that how ‘far back’ the relevant identity reaches depends on whether we conceive the relevant entity *qua* statue or *qua* clay. How can this be?

Relative Identity to the rescue! The entity in question—the entity that is both the statue *and* the clay—is statue-identical to entities only within the last hour or so, yet clay-identical to significantly earlier entities. No surprise here: the criteria of identity for lumps of clay differ from, and are much more lax than, those for statues. And note that this simply echoes the perdurantist answer. They regard a particular three-dimensional temporal part as part of both statue and clay. Is it or is it not genidentical to something that existed four hours ago? Answer: it is clay-genidentical to something then; it is statue-genidentical to nothing then.

Fission And Fusion

In fact we have already encountered what could be construed as a case of fission. In the example of Theseus' Ship, the single entity present at the start of the story later 'became two': the initial entity was ship-identical to Newie, but parts-identical to (the distinct) Oldie.

The following case of fusion can be dealt with similarly. Tibbles is a cat sat on a mat. Tib consists of all but a single hair of the feline matter that then composes Tibbles. Slightly later though, we pluck out the hair in question. Assuming we do not want to allow distinct but co-located objects, it seems we must say that, post-plucking, there is just one thing sat on the mat. But is this thing Tib or Tibbles? Whilst we feel inclined to say that it is both, we recall that these entities used to be distinct. How can what was once distinct now be identical?

RI provides the answer. Post-plucking there is indeed just one thing on the mat. It is both a cat and a lump of feline matter. But that thing then on the mat is cat-identical with the entity previously known as "Tibbles", and matter-identical with the entity previously known as "Tib". The former identity relation might plausibly reduce (at least roughly) to continuity of vital processes, whereas the latter reduces to mereological constancy.

These cases involve *asymmetric* fission or fusion though. It is when we come to symmetric cases that the endurantist struggles to keep up with the perdurantist. Because examples of symmetric fusion are hard to make plausible, I will focus on a case of symmetric fission instead. It is close to one envisaged Parfit (1984:266–267).

Suppose that Jim enters a transporter, but a malfunction occurs and he is 'twice' transported to locations equidistant to his target destination. Put less tendentiously, Jim disappears as normal at t_1 when the transporter button is pressed, but then it seems that *two* entities (K and L) appear momentarily later at t_2 . Each of these is psychologically continuous with, and physically indistinguishable from, Jim as at t_1 .

What conclusion will the endurantist draw here? It seems that there are four exhaustive and mutually exclusive possibilities:

- (1) Jim is identical to K ;
- (2) Jim is identical to L ;
- (3) Jim is identical to neither K nor L ;
- (4) Jim is identical to both K and L .

Of these, (1) and (2) are inconsistent with reductionism about identity, since the underlying relations between Jim and K are just those between Jim and L . This is not troubling; (1) and (2) are in any case the least intuitive responses. To be sure, a primitivist about identity could claim that it is simply brute that Jim is identical to *one* of K and L . But this is primitivism at its worst: we could never know which of K or L is identical to Jim.

If personal identity requires spatiotemporal continuity then teleportation destroys identity even in ‘straightforward’ (*i.e.* non-branching) cases. Hence the deviant teleportation in our example would certainly mean the end for Jim, thus vindicating (3). Alternatively, one might hold that whilst ordinary teleportation can be survived, in our case we must accept (3) because (1), (2) and (4) are so very untenable.⁵⁸ This obviously rests heavily on the arguments against (4), which arguments we will encounter before long. But note that (3) is not entirely satisfactory. The continuities between Jim and K , say, are just those that hold when a standard teleportation produces K alone; and in such a case Jim and K plausibly *would* be identical (and the same applies *mutatis mutandis* to L). It is disconcerting that something entirely extrinsic to the relations between Jim and K —namely the existence of L , potentially very far

⁵⁸At first Parfit refrains from choosing between (1)–(4) on the grounds that they are but different descriptions of the very same scenario (1984:258–260). However, he writes shortly later that “[s]ince I cannot be identical with two different people, and it would be arbitrary to call one of these people me, we can best describe the case by saying neither of these people will be me” (1984:262).

away—might render Jim and K non-identical.⁵⁹

As to (4), if Jim were identical with both K and L then by the transitivity of identity K and L would themselves be identical. Perhaps there is scope here for a revisionary theory of endurance that allows an enduring object to exactly occupy distinct simultaneous regions (even when no time travel is involved).⁶⁰ And there is certainly *some* motivation for the view that Jim is identical to K , insofar as the Jim- K relations are again just what they are in a ‘standard’ teleportation case where Jim plausibly *would* be identical to K (and we can say the same for L). Nonetheless I suspect that most endurantists will deny that K and L are identical, and are thus forced to deny that Jim is identical to both.

It seems, then, that the endurantist must accept (3). Now one might think this absolutely right: Jim does not survive ‘double’ teleportation. But if one tends instead to the contrary intuition, *i.e.* that Jim *does* (or *could*) survive double teleportation, then the endurantist position is unsatisfying.

Here the perdurantist is in their element. According to Lewis (1976), fission of the sort envisaged involves *two* four-dimensional persons *sharing* an initial set of temporal parts. Spatiotemporally, each such person is radically discontinuous: the first consists of the common set of temporal parts until t_1 , but then a certain spatiotemporally distant set from t_2 ; the second consists of the common set until t_1 , but then *the other* spatiotemporally distant set from t_2 . It is indeterminate which (four-dimensional) person “Jim” refers to, but of course this indeterminacy goes unnoticed until t_1 .

So can the endurantist somehow mimic this? A *single* three-dimensional entity at t_1 is, according to the perdurantist, genidentical to *two* three-dimensional entities shortly later at t_2 (and I do mean “two”: these entities are quite distinct). As before

⁵⁹A different reading of (3) is possible: K and L are simultaneous *parts* of a composite entity existing at t_2 ; and it is this composite entity, rather than K or L themselves, that is identical to Jim. I think this solution is simply too strange. Can Jim—a *person*—really be identical to something two-headed, four-handed, eight-limbed, and with radically non-contiguous parts?

⁶⁰See fn.55.

though, if the endurantist claims that a single three-dimensional entity at t_1 (*i.e.* Jim) is identical with two three-dimensional entities at t_2 (*i.e.* K and L), they cannot also maintain both the distinctness of K and L and the transitivity of identity. When they faced a similar problem in the context of Theseus' Ship, the endurantist could observe that TS was *ship*-identical to Newie but *parts*-identical to Oldie; the different identity-relations offered them an escape route. Jim, K and L are *all* persons though; they are the *same* type of object. Hence the solution in terms of RI is not available.

What is highlighted here (and in other symmetric cases) is that the relations I have claimed to underpin identity need not be one-one or transitive. But identity *is* one-one and transitive. It seems, then, that an additional, *non-branching*, condition is necessary for identity. When it comes to persons, we identify x and y iff they are *non-branchingly* psychologically continuous (say).

Might the endurantist try to deny the transitivity of identity? That would allow Jim to survive double teleportation; he could be identical with both of K and L . I do not think this a realistic option though. The transitivity of identity is too deeply and too obviously ingrained in our practices to be gainsaid or revised away. And when it comes to mathematical-*cum*-logical instances, qualitative identity, or the identity that holds between Cicero and Tully (*i.e.* the same entity by different names), I doubt that we can even comprehend the non-transitivity of identity.

Nonetheless the perdurantist account might inspire the endurantist to talk, not of *identity*, but rather of a different relation. Let us envisage a *quidentity* relation that, for the most part, reduces to the very criteria to which I have attempted to reduce identity. Quidentity is both reflexive and symmetric, but parts company from identity in two ways. First, there is no "non-branching" rider attached to the criteria for quidentity. Second, quidentity is not *entirely* transitive. Only if x is temporally *between* y and z does it follow that if x is quidentical to y and also to z then y is

quidentical to z .⁶¹ This allows quidentity to be a formal parallel of genidentity. Each is *almost* an equivalence relation, and *almost* always holds between a single entity at one time and a single entity at another. Only in cases of fission and fusion do exceptions to this arise.

The fact remains that Jim does not survive the malfunctioning teleporter. Post-teleportation, *no-one* is identical to Jim. If this is counter-intuitive, then so be it: endurance does not respect the relevant intuition. It can come close though, insofar as Jim is *quidentical* to two people post-teleportation, and quidentity is a relation that exactly coincides with identity in almost every other case. To conclude on a Parfittian note, I believe that Jim should care little about being merely quidentical to someone (in fact to two people) post-teleportation. It is the underlying continuities that matter, rather than whether these licence talk of identity, genidentity or even quidentity.

7.6 Conclusion

This chapter has covered much ground. Beginning with an apparent threat to perdurance, namely the RDA (§7.2), I soon came to focus on a response that posited non-supervenient relations as the grounds for genidentity (§7.2.3). I criticized this response, both at the macroscopic and microscopic level, before going on to frame parallel criticisms of what I took to be an analogous view: primitivism about *identity* (§7.3). Such primitivism fails to accord sufficient respect to *criteria* of identity, and moreover it renders our knowledge of identity quite obscure.

Instead I have proposed that identity *reduces* to its apparent criteria; the holding of identity amounts to no more than the holding of these criteria (§7.4). I take this to be true even at the microscopic level, in which case endurance joins perdurance in being

⁶¹More intuitively, this means that entities on different branches of a forked continuity may each be quidentical to an entity at or below the branch point, but may not be quidentical to one another.

potentially susceptible to the RDA (§7.2.4). Indeed, this parallelism is unsurprising; for genidentity is standardly taken to reduce, in most cases, to those continuities that (in my opinion) identity similarly reduces to. I then backed Sider's response to the RDA (§7.4.4).

Next I reconsidered an idea from Chapter Six: that the debate between endurantist and perdurantist might be less than substantive. Revisiting §6.2, I considered in §7.5.1 the Lewisian "arrangement of qualities", together with the continuities that this generates. I contended that the very same Humean tapestry could support either endurance *or* perdurance. Each option seems possible, and neither would in any way 'reveal itself'. But I then suggested that there might be genuine indeterminacy here; that perhaps the facts of persistence are not woven into the tapestry, but depend rather on how we choose to describe it.

Whether one agrees with this or not, it may yet be true that the endurantist can learn from the perdurantist when it comes to certain diachronic puzzle cases. In §7.5.2 I attempted to supply endurantist analogues of the standard perdurantist solutions, guided to some extent by my earlier discussions of (potential) equivalence. Relative Identity was a central (and undeniably controversial) feature of some of these analogues. But my contention was not just that Relative Identity might *assist* the endurantist here; I claimed in addition that it emerges naturally from (i) a desire to avoid distinct but co-located objects, and (ii) a belief that identity for different kinds of object reduces to different, and potentially divergent, criteria.

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