How do we know it is now now?

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Many philosophers have found a theory of time that shares features of four dimensionalism with an account of the genuine passage of time to be attractive. C. D. Broad (1923), Michael Tooley (1997) and Peter Forrest (forthcoming), for example, defend a view that has at least these features in common. The future is unreal: it does not exist. The past however does exist – it is a space-time volume of the kind that orthodox four dimensionalists think that the universe is as a Parmenidean whole. The present is a kind of hyperplane that borders reality; it is the edge of Being. As time goes on, the volume of the universe increases. Think of it as a kind of (four-dimensional) growing salami. The universe starts out with a single slice, and as time moves on slices are progressively added to it. Such a view shares with any genuine passage of time view difficulties in understanding in what dimension the change happens (Smart 1964, 1980; Grünbaum 1973); it seems there are two kinds of time: time understood as location in the four dimensional manifold that is the present and past, and objective time which tells you where the border is. This second kind of time seems to need another, problematic dimension to move in. There are various solutions to such problems (Markosian 1993; McCall 1994), and I think that the jury is out on whether genuine passage is coherent. But there is a problem with the growing salami view that seems insuperable. I argue that on the growing salami view, it is almost certainly not now. It is not now now; or less tendentiously, the current time is probably not the present.

What do other theories of time tell us about how we know that the current time really is the present? If you are a presentist then the genuine passage of time poses no epistemic problems. For according to the presentist all that exists is the present, so the fact that we know we exist guarantees that we are in the present. The presentist has an objectively characterized conception of the present, but it is one we have simple epistemic access to. If you are a four dimensionalist, it is equally easy to say why we know the current moment of time is the present. For most four dimensionalists have an indexical conception of 'now'. 'Now' just means the moment at which it is thought or uttered. So people at any location in space-time who believe that they exist in the present, will believe correctly. There is a little more to be said about the present in such a model: the indexical element tells you only that at each location in space-time the present is a hyperplane of simultaneity that includes that location,

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but it underdetermines which hyperplane that is. A further relativization to a frame of reference is required, but that does not add any substantial difficulty.

At this point we can begin to see what the trouble will be for the growing salami view. It shares with the presentist the view that there is an objective fact about which hyperplane is the true present. But it shares with the four-dimensionalist the view that there is much more to space-time that just this one hyperplane. So the growing salami view cannot explain that we know that the current moment is the present by the fact that the current moment is the only moment, for there are very many perfectly real past moments. Nor can it help itself to the indexical view, for it holds that there is an objective fact as to which of many regions in space-time is present, so being the present is not an indexical matter. Anyone in the past portion of space-time volume who believes they are in the present believes falsely.

Suppose that as I write this paper early in October 2003 it is the present. On the growing salami view, all of the past is a volume of space-time. A little over 2000 years ago Caesar is crossing the Rubicon, believing he is doing so in the present. He is wrong. Of course once he was right: there was a time when that moment was the last moment of being, and then he was crossing the Rubicon in the present. But that time is gone. Note here that the growing salami view separates 'what the time is' in the sense of our location in the objectively existing volume of space-time, from 'what the time is' is the sense of which part of that volume is the objective present.

That then should lead us to wonder how we know that the current moment is in the present. From my current perspective I know that Caesar is in the objective past. But do I have any reason to believe that I am in the objective present? What if the objective present is in 2004, when you, dear reader, are reading this paper. Here I am toiling in the past, to write something for you to read on the cutting edge of reality. Or perhaps the objective present is in 2017, or perhaps the universe is almost dead and the objective present is five billion years beyond 2003, and I am ancient history indeed. While we can tell that the objective present is not located in the past-directed volume of space-time from our perspective, there is no reason on the growing salami view to think that the objective present is not located at any particular point in some volume of space-time that may lie in the future direction from us. Of course, if our current location *is* the objective present, then there is no future volume, but to *know* that our current location is the objective present we would need to know that there is no future-directed volume, and we have no independent access to this. So by a principle of indifference we should regard all alternatives as equally likely. So we should regard the hypothesis that the current moment

is present as only one among very many equally likely ones. So we should conclude, therefore, that the current moment is almost certainly in the past. This is absurd, and so by *reductio* we should reject the growing salami view.

Barry Dainton (2001) has considered an objection like this and considers it flawed. It is a feature of the view (he calls it the growing block world) that 'we can be certain that we exist at a moment that is present, since every event is present at the time that it occurs, for any event E at *t*, as of *t*, E is present' (2001: 79).

This is indeed true, but what do we learn when we are told that for any event E at *t*, as of *t* E is present? We learn that if it is 2003, then 2003 is present. We learn that if it is 5BC, then 5BC is present, and so on for each moment of time. We know that it is not 5BC. But do we know that it is 2003? The point is that on the growing salami model, there is an ambiguity in what it might mean to say 'it is 2003'. One disambiguation is to indexically point out the location at which a speaker is located in the blocklike universe. In this sense of 'it is 2003' any time-slice who is simultaneous with me as I write this speaks truly in claiming it is 2003. This becomes true when 2003 comes around, and stays true as more slices pile up on top of them. So this gives one gloss on 'at *t*'. The other thing that might be meant by 'it is 2003' is to say that 2003 is at the border of being and non-being: 2003 is the last slice of the salami. This is only momentarily true of 2003, at the point at which is comes into being. It is in this second sense of 'it is 2003' that we can create a substitution instance of Dainton's schema and say truly that at 2003 it is true that 2003 is present. But it is not enough just to say that at 2003, 2003 is present. This tells us only that if 2003 is the objective present that it is present. Instead we want a guarantee that *this location in space-time* (if our theory countenances space-time) *is the present.*[1] And this is precisely what such theories cannot offer.

There is one approach that the growing salami theorist might adopt which can block this conclusion (Forrest forthcoming). Suppose that the hyperplane that is the objective present is the only one that contains consciousness. Some hold that consciousness is some by-product of the causal frisson that takes place on the borders of being and non-being. If this were the case it would restore our confidence that the current moment was the present, because it would become a priori in the manner of

[1] Compare this thought with another strange consequence of the view: there are two ways of conceiving of backwards time travel, if such be possible. On one conception when we go back to 5BC, we really go back to a time when 5BC is the present. On the other conception we travel to the '5BC location' in a space-time which still extends until 2003, the objective present.

Descartes' *cogito*. In so far as we know we are conscious, we would know that the current location in space-time was in the present, since as soon as that location in space-time was past, its occupants will be Zombies and thus we would have no awareness.

This solution does solve the epistemic problem, but at great cost. It inherits all the problems of the 'moving spotlight' views of those who are eternalists about reality, but think that the objective now is given by the progressive 'lighting up' of volumes of space-time with consciousness. A fatal objection is that relativistic worries that are perhaps innocuous without the moving spotlight become very disturbing. Consider the following. Suppose that there is an objective now, and suppose that, somehow or other, I know that I am in it. What else in reality is also in the objective now? Well I am located in many different hyperplanes of simultaneity depending on the frame of reference. Which of these is the objective now? I cannot tell, for the objective now is a preferred plane, and there is no way to be sure which of my world-mates are present and which past. This is a worry, but perhaps a palatable one. All we are ignorant of is a relatively recherché metaphysical matter: the presentness or pastness of those who seem to be simultaneous with us. But if objective presentness is required for consciousness, then unless we know which the preferred frame of reference is, we do not even know whether our apparent colleagues are Zombies; for perhaps the preferred frame is one in which none of these colleagues are simultaneous with me. There is a further concern: what guarantees that the borders of being are topologically nice enough so that there is *any* frame of reference from which all the points in the objective now – the border of being and non-being – are simultaneous? There is no constraint to prevent it turning out that as a matter of fact, that at one point in 'objective' time, the space-time locations which are objectively now are not simultaneous with each other from any frame of reference. This fix, which doesn't strike me as independently attractive, is beginning to look very costly indeed.

A final diagnosis, then. There are two very different conceptions of 'now', each coherent. According to one of them, the time which is now is a matter of metaphysics. If so we had better have a good story about how we know that we exist now. Presentism provides just such a story. According to the other, 'now' is a mere indexical, in which case the semantics of 'now' provide a good account of how we know it is now 'now'. The growing salami view has the costs of both and the benefits of neither. Like four-dimensionalism it countenances volumes of space-time in which individuals are located at different times thinking that they are in the present. Unlike four dimensionalisms with an indexical now, thinking it is not a reason for believing it. Like presentism it has an objective now; but unlike presentism the existence of past agents

undermines any reason those who are present might have for believing they are present.[2]

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[2] Thanks to Michael Tooley, a long past discussion of these matters was the origin of this paper. More recently I am indebted to Peter Forrest, Huw Price and Kristie Miller for helpful discussion.

The twins' paradox and temporal passage

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In a recent paper in this journal, McCall and Lowe (2003) argue that an understanding of Special Relativity reveals that the A theorist's notion of temporal passage is consistent with the B theory of time. They arrive at this conclusion by considering the twins' paradox, where one of two twins (T) travels to Alpha Centauri and back and upon her return has aged 30 years, while her earth-bound twin (S) has aged 40 years.

The usual explanation of this differential ageing is in terms of Minkowski geometry. The twin who remains on earth travels a direct world-line between st_1 (the spatio-temporal location at which twin T departs) and st_3 (the spatio-temporal location at which T returns). Picture this line as the longest side of an isosceles triangle. In travelling out to

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