

# Return of the living dead: reply to Braddon-Mitchell

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In the last volume, we resurrected the Growing Block Theory (GBT) from its grave, devising a coherent formulation of it and arguing that its burial was premature (Correia and Rosenkranz 2013). In particular, we aimed to show that properly construed, GBT has the wherewithal to explain how we might easily come to know that we are living on the edge of reality which it posits—contrary to what, in their respective ways, Bourne (2002), Braddon-Mitchell (2004), and Merricks (2006) had argued. Braddon-Mitchell remains unconvinced. In his reply, he instead sets out ‘to put a stake through the lumbering zombie of the growing block theory’ (Braddon-Mitchell 2013: 351).

We had thought we had gained firm ground. But here we are back in the mire, facing Van Helsing’s rotten stake. The mire is deep, and the attempt not to lose our foothold sees us ignoring subtle distinctions that ultimately do not matter for survival. As long as we stand firm, the creature will not crumble. It is the rotten stake that will.

1.

To set the record straight Braddon-Mitchell first contends that he did not make the mistake we charged him with, i.e.: to have misconstrued GBT as working with a tenseless, rather than tensed, notion of what fundamentally THERE IS.<sup>1</sup> He is quite content, he says, with

<sup>1</sup> Just as in our original paper, we here use capital letters for the quantifiers and the existence-predicate, ranging exclusively over things in time, whenever they are meant to express the metaphysically fundamental notions of whose nature GBT, presentism, and eternalism give competing accounts. By contrast, when used in normal font, the present-tensed existence-predicate expresses the notion of being present, the past-tensed existence-predicate expresses the notion of having been present, and the

conceding that according to GBT, what THERE IS changes as what used to be present is receding into the ever more distant past and new layers, or hyperplanes, are being added to the block (Braddon-Mitchell 2013: 352). And yet, later on Braddon-Mitchell (2013: 358) writes:

What distinguishes my version of the GBT from presentism is the genuine existence, from the perspective of each time, of multiple hyperplanes that timelessly and tenselessly exist in the way that presentists can't countenance.

This is certainly not the best way to defuse the charge. For, if at present, the hyperplane of the present time EXISTS timelessly and tenselessly, then surely in the past it is likewise among the things that then EXISTED. What else could 'timeless and tenseless existence' mean? According to GBT, however, the hyperplane of the present time is *not* among the things that EXISTED in the past. What distinguishes GBT from presentism is rather that according to the former but not the latter, some things presently EXIST that are no longer present.

The passage just quoted notwithstanding, Braddon-Mitchell acknowledges that according to the view under scrutiny, at each time we have a differently sized block, composed of more layers or hyperplanes than any of its predecessors at any earlier such moment (Braddon-Mitchell 2013: 352). For each such time, at that time, THERE IS a unique block extending into the past of that time. It is the present EXISTENCE of such a back-block, rather than its being subject to growth as time goes by, that Braddon-Mitchell thinks does all the harm (Braddon-Mitchell 2013: 352).

According to GBT, each past hyperplane and its contents still EXIST; and so we may legitimately ask, as we look back, what was going on on such a hyperplane, *now* that we are sitting on the edge of reality in the future of it. Thus, to use one of Braddon-Mitchell's own examples, consider the hyperplane about 56 years into the past of 2014, when Arthur Prior was writing the last lines of 'The Syntax of Time-Distinctions'. According to GBT, that earlier hyperplane still EXISTS, and so does Arthur Prior, and, if we allow

future-tensed existence-predicate expresses the notion of going to be present. See Section 4 for further clarification of the notion of being present at work.

ourselves an ontology of events, so does the event of Prior's writing the last lines of 'The Syntax of Time-Distinctions'.<sup>2</sup> So far so good. However, or so Braddon-Mitchell's thought continues, it would now seem that the proponent of GBT is bound to admit that, lo and behold, there is Arthur Prior, still pottering about in his study on that past hyperplane, writing the last lines of 'The Syntax of Time-Distinctions', with a pot of steaming coffee right beside him, judging that his latest thoughts are cutting-edge, while in fact but unbeknownst to him, the bleeding edge of reality lies 56 years ahead (see Braddon-Mitchell 2013: 353, 355).

This narrative is nothing that proponents of GBT should be willing to accept—and for principled reasons that we thought we had made plain. Even if Braddon-Mitchell never ignored that GBT works with a tensed notion of what THERE IS—contrary to what we diagnosed and what the quoted passage after all suggests—it now at least seems clear that he gets the nature of this notion wrong. If this is any consolation, he is not alone in doing so (see Bourne 2002: 364; Merricks 2006: 105; cf. also Blake 1925: 427).

To claim that, at the present time, Arthur Prior still EXISTS commits the proponent of GBT to the thought that Arthur Prior either presently exists (is about) or existed in the past (was about). Since Arthur Prior does not presently exist (is not about), he accordingly existed in the past (was about). Similarly, *modulo* GBT, that the event of Prior's writing the last lines of 'The Syntax of Time-Distinctions' still EXISTS implies that this event either is presently unfolding or was unfolding in the past. As we already know, it is not presently unfolding and so must have unfolded in the past: since no one can be writing any line without being alive, neither Arthur Prior nor any of his temporal parts is presently writing the last lines of 'The Syntax of Time-Distinctions', any more than he is presently judging his thoughts to be cutting-edge. And the coffee, too, has long gone cold.<sup>3</sup>

<sup>2</sup> On the particular version of GBT which we presented in our original paper, and to which we will return in Section 4, EVERYTHING is instantaneous—just as Braddon-Mitchell's preferred salami metaphor suggests. Even so, Braddon-Mitchell's examples concern ordinary people like Arthur Prior and Julius Caesar rather than mere time-slices of them. Until Section 4, we will follow Braddon-Mitchell in this, since until then nothing much hinges on the matter.

<sup>3</sup> The coffee matters, as it is a reminder that GBT has no need for Forrest's 'highly controversial thesis' that the 'Past is Dead' according to which 'the hyperplane that is the objective present is the only one that contains consciousness' because 'consciousness is some by-product of the causal frisson that takes place on the borders

2.

Does the failure to see this have anything to do with the fact that Braddon-Mitchell prefers to think of GBT as a ‘hybrid’ (Braddon-Mitchell 2013: 352)? Yes and no.

Yes, if by ‘hybrid’ he means a view that combines a conception of the back-block as being composed of *tensed* facts with an eternalist conception of facts as both *immutable* and *ceaselessly obtaining*, in such a way that if in 1958, THERE WAS the present-tensed fact that Prior is writing the last lines of ‘The Syntax of Time-Distinctions’, then presently, THERE IS the present-tensed fact that Prior is writing the last lines of ‘The Syntax of Time-Distinctions’ which continues to obtain. However, proponents of GBT—if they acquiesce in fact-talk at all, which they need not do—will either systematically distinguish between the continued EXISTENCE of tensed facts and their continued obtaining—in such a way that even if, presently, THERE IS the fact that Prior is writing the last lines of ‘The Syntax of Time-Distinctions’, this fact no longer obtains. Or else, they will insist that such facts change over time in that the same fact that in 1958 was the fact that Prior *is* writing the last lines of ‘The Syntax of Time-Distinctions’, now is the fact that, 56 years ago, Prior *was* writing the last lines of ‘The Syntax of Time-Distinctions’, and as such still obtains. We have explored these two conceptions of tensed facts in some detail elsewhere (Correia and Rosenkranz 2011 and 2012). However, our earlier presentation of GBT made no play with facts at all, which is why we will not expand on these issues here.

No, if by ‘hybrid’ Braddon-Mitchell means a view that agrees with eternalism on the correct tensed description of what it is that happened 56 years ago. For, even the eternalist will deny that by

of being and non-being’ (Forrest 2004: 359; Forrest 2006: 162; Braddon-Mitchell 2004: 201). The coffee still EXISTS, and so does the event of its cooling down, but neither is the coffee still about nor is it still cooling down nor is, therefore, the event of its cooling down still in the process of unfolding. That difference has evidently nothing to do with the correct observation that the coffee and other sundries from 1958 are not, at present, alive or sentient or conscious: they never were. The equally correct observation that Arthur Prior, though he still EXISTS, is no longer conscious or sentient or alive has no more relevance in the current context than the observation that his weight is no longer indenting the cushion of his office chair. There is nothing ‘highly controversial’ about any of *this*, not even for the eternalist. It is unclear what further work Forrest’s hypothesis is meant to do.

claiming the event of Prior's writing to EXIST eternally, and a fortiori to EXIST at present, she is bound to hold that it is presently unfolding. The event is unfolding in 1958, for sure, and so it is presently the case that, in 1958, it was unfolding. But it is not, at present, unfolding—its present EXISTENCE notwithstanding. To recall the Priorian thought we already quoted in our original paper, one ought to distinguish—and in ordinary thought does distinguish—'between the history that an event *has*, and the bit of history that it *is*' (Prior 2003: 10). Not even eternalists will be prone to conflating the two.<sup>4</sup>

Past hyperplanes and their contents are *past* even if they still EXIST, and so are importantly different from the lower storeys of an apartment-block and their contents. The look back from the edge of reality on to the back-block is not like Jimmy Stewart's look out of Hitchcock's *Rear Window*. Where  $t_0$  is the present time, the truth that the past hyperplanes are presently earlier than  $t_0$  does not make them any less past, it rather reaffirms their pastness: a hyperplane  $h$  is earlier than  $t_0$  iff at some time,  $t_0$  is present while  $h$  is past (Broad 1923: 58; McTaggart 1927: § 610; Prior 1967: 4; Correia and Rosenkranz 2011: 22). Now is that time.

If a given hyperplane is past, so is ANYTHING instantaneous populating it, including, if such there be, snapshot ways for matters to stand.<sup>5</sup> However, Braddon-Mitchell seeks to forge a distinction between talk about what is the case at a given past *time*, on the one hand, and talk about what is the case at a past *location*, or *on* a past hyperplane, on the other (Braddon-Mitchell 2013: 354–6; cf. also 357 where he speaks instead of what is the case *in* a time as opposed to what is the case *at* that time). If 'On a past hyperplane' is meant to function like a tense-operator that shifts the circumstances of evaluation to an earlier position in the A-series, it is unclear what is gained, for plausibly, 'On  $h$ ,  $p$ ' will then be equivalent to 'At the time at which  $h$  is located,  $p$ '. It would rather seem that, at least for the dialectical purpose for which Braddon-Mitchell introduces the distinction, 'On  $h$ ,  $p$ ' must be taken in a

<sup>4</sup> Blake (1925: 427) may be an exception to the rule when he writes that since 'the very nature of an event is to be an occurrence, a happening', 'it is impossible for me to understand how an event can actually exist at a time when it is *not* happening' (emphasis in the original).

<sup>5</sup> See footnote 8.

sense in which if  $h$  is past, WHATEVER, on  $h$ , was going on, still is going on, provided that despite its being located in the past, it still EXISTS—and this would indeed make ‘On  $h$ ’ quite unlike the tense-operator ‘At  $t$ ’ (see Braddon-Mitchell 2013: 354–5, where the unembedded present tense is used in order to describe what Prior did on a past hyperplane; cf. also Bourne 2002: 364; Merricks 2006: 105). However, it is very doubtful whether there is such a coherent sense that would not make all but the most boring truths of this form come out false, since it seems as plain as day that not EVERYTHING that was going on still is going on.<sup>6</sup>

### 3.

In our original paper, we claimed that proponents of GBT will inevitably understand the invitation to consider what was going on *at* an earlier time, or hyperplane, as the invitation to consider what was going on when the block of reality had grown as far as, but no further than, that time or hyperplane (Correia and Rosenkranz 2013: 336). Although this claim still strikes us as correct, it needs qualification.

We surely can, while keeping the domain of what THERE IS at present fixed, look back at what was going on at an earlier time, or on the hyperplane that corresponds to that time, and describe what we see *in terms of the quantificational resources we presently have*. The manoeuvre is familiar from the philosophy of modality. We can say, consistently, that there is a possible world in which the emperor

<sup>6</sup> If the ‘ $p$ ’ in ‘On  $h, p$ ’ is itself tenseless, then it would trivially follow from the truth of ‘On  $h, p$ ’ that it is still the case that  $p$  – but then the same holds *mutatis mutandis* for ‘At  $t, p$ ’, and the distinction between ‘On  $h, p$ ’ and ‘At the time at which  $h$  is located,  $p$ ’ collapses. It is anyway hard to see how anything troublesome would follow from tenseless truths of the form ‘Believes{Prior, (Prior is on the edge of reality),  $t$ }’, where  $t$  is some time in 1958, for the belief that they ascribe will still be true iff, at  $t$ , Prior is on the edge of reality, his being presently dead notwithstanding. We do not evaluate the belief Prior held some time in 1958 as now being false just because the tensed proposition then believed is not now true, in as much as we do not evaluate the belief in the proposition (Dean is here) that Dean holds in New York as being false in Barcelona just because Dean is not in Barcelona. If the belief-ascription ‘Believes{Prior, (Prior is on the edge),  $t$ }’ was true, where  $t$  is some time in 2014, then it would indeed follow that Prior was believing falsely. But for such a  $t$  this belief-ascription is false, if for no other reason than that Prior died in 1969. We will return to this matter in Section 4.

Li Zhu does not exist, and so in which nothing is identical to Li Zhu, without thereby saying, inconsistently, that there is a possible world in which there is something, i.e. Li Zhu, such that nothing is identical to it. Similarly, in the temporal case. In agreement with common usage, let 'now' be a temporally rigid designator of the present time, just as 'Li Zhu' is a modally rigid designator of Li Zhu.<sup>7</sup> Then we can say that, in 1958, the event of Prior's writing the last lines of 'The Syntax of Time-Distinctions' was unfolding while now did not EXIST for another 56 years—and also say that for all times  $t$  (or hyperplanes  $h$ ) later than 1958, in 1958, the event of Prior's writing the last lines of 'The Syntax of Time-Distinctions' was unfolding while  $t$  (or  $h$ ) did not yet EXIST—where all this is perfectly consistent with GBT's further claim that, in 1958, THERE WAS no time, or hyperplane, such that the event of Prior's writing unfolded before it. And just as we can say that there is a possible world in which the Tang dynasty ends with Li Ye and not Li Zhu—something we could not have truly said about that world had it been actual—we can say that, in 1958, it is the year 1958, and not now, that is on the edge of reality—something which GBT implies we could not have truly said about 1958 back in 1958.

Acknowledging this latter implication, Braddon-Mitchell (2013: 360) writes that, according to GBT as thus conceived,

it's possible for things to exist from the perspective of one part of being—2013—where from the perspective of some of those existing things, from their own perspective 2013 does not exist. Of course the idea that there might be two such events such that at one of them they both exist, but at the other only one of them does can be made technically coherent with the appropriate handling of accessibility relations in a logic.

That basically sums it up. But then Braddon-Mitchell (2013: 360) goes on to file a complaint:

But understanding the metaphysics so described is another matter. Those asymmetries of existence are not just odd. They take out the block from the growing block—we have gone far from the idea of trying to add dynamism to a block universe. It's a strange volume of spacetime that has locations at which other locations exist, but at those locations the first location doesn't! The thought would be that there is at each A-time a block universe of

<sup>7</sup> This is Braddon-Mitchell's 'indexical conception of 'now'—NOW<sub>index</sub>' (Braddon-Mitchell 2013: 351). See footnote 9 for further elucidation.

different sizes, where each of these whole blocks exists only from the perspective of its last slice. It's true of the blocks that exist at every A-time that from the perspective of almost all of its parts the entire block doesn't exist. That's a strange mereology indeed: strange enough to suggest that this is not a view which really has block universes in it at all.

This complaint is of questionable force. On the one hand, the fact that tensed theories of time are in at least *prima facie* tension with parts of current physical theory is no news; and if this was the worry, the explicit focus on GBT, as opposed to presentism, would be misleading at best. On the other hand, to 'add dynamism to a block universe' was never GBT's game—at least as long as 'block universe' is here understood to denote a universe EVERY two slices of which EXIST at each other. This is, no doubt, part of the eternalist's preferred reading of 'block universe'. But talk about block universes may well have an alternative interpretation on which GBT does not, in any objectionable way, 'take out the block from the growing block'—an alternative interpretation which denies that, FOR EVERY pair of distinct hyperplanes  $h$  and  $h'$ , at  $h, h'$  EXISTS. As C. D. Broad, the founding father of GBT, aptly put it, 'when an event, which was present, becomes past, it does not change or lose any of the relations which it had before; it simply acquires in addition new relations *which it could not have before, because the terms to which it now has these relations were then simply non-entities*' (Broad 1923: 67; emphasis added). Van Helsing is obviously trying to stake the wrong man's creature.<sup>8</sup>

<sup>8</sup> The most relevant of the relations that Broad has in mind is that of precedence (or being earlier than), which, in Braddon-Mitchell's terms, he regards as a tensed 'quasi-B-relation' (Braddon-Mitchell 2013: 352, 357). Since we endorsed Broad's position in our original paper, just as we are doing now, it becomes clear that from the very onset we were defending what Braddon-Mitchell decides to call 'PTGB' (Braddon-Mitchell 2013: 357). In continuation of the passage quoted Broad goes on to say that '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'. Some commentators have, quite uncharitably in our view, interpreted this last sentence as implying that nothing ever loses any of its properties, tensed or untensed, by becoming past (Zimmerman 2011). But if it is sufficient in order for Émilien's birth to have ceased to be present, and to have become past instead, that new slices have been added to the block, then surely such an addition should likewise be sufficient in order for Émilien no longer to be being born but to have been born in the past. Does this train of thought ultimately lead to the conclusion that presently dead people like Prior are no people but mere 'ghosts' and that past events, like the one that unfolded when Émilien was born, are no events but mere 'shadows', as both Braddon-Mitchell (2013: 358) and Zimmerman (2011)

4.

Nothing of the foregoing controverts our claim that, given knowledge of GBT, we can always easily come to know that we, or rather our present time-slices and the hyperplane to which they belong, are on the edge of reality. Since, in his reply, Braddon-Mitchell nonetheless contends that his ‘epistemic objection still survives’, we will give it another go (Braddon-Mitchell 2013: 360).

There is a sense of ‘present’ according to which, uncontroversially, always, FOR ALL times  $t$ , at  $t$ ,  $t$  and ALL and ONLY things located at  $t$  are present. In that same sense, always, FOR ALL times  $t$ , at  $t$ , ‘now’ refers to the present time (i.e.  $t$ ). By contrast, it only holds at the present time, that ‘now’ refers to now, since ‘now’—like the complex demonstrative ‘this hyperplane’—is an indexical that is temporally rigid.<sup>9</sup>

suggest? Although Williamson (2013), for one, endorses some such conclusion, it is by no means forced upon us. It all depends on whether a convincing case can be made that the categories of persons, events etc. not only require that ALL persons sometimes metabolize, and ALL events sometimes unfold, but moreover that they always do. Our ordinary ways of classifying things into persons, events etc. do not univocally suggest that this stronger requirement is in place: we still call certain past events ‘births’ (and so ‘events’) and certain dead people ‘philosophers’ (and so ‘persons’).

<sup>9</sup> It is this anodyne sense of ‘the present time’—in which always, FOR EVERY time, at that time, that time is the present time—which plays a central role in the formulation of GBT. Understood in this way, ‘the present time’ does not function like an indexical (even if there might be another use of the term in English according to which it does). It would at places seem that GBT’s critics take ‘the present time’ to function like an indexical, and so to function just like ‘now’, without noticing that this is not the sense intended in the formulation of the view they criticize (Merricks 2006: 103, 106; Braddon-Mitchell 2004: 199). Indeed, the distinction between the temporally rigid ‘now’ and the temporally flexible ‘the present time’ might easily be missed, because always, at ALL times, the two expressions co-refer. Thus both of the following hold:

- (i) Always, FOR ALL times  $t$ , at  $t$ , ‘now’ refers to  $t$ .
- (ii) Always, FOR ALL times  $t$ , at  $t$ , ‘the present time’ refers to  $t$ .

Nevertheless, these expressions are not semantically equivalent, and this is seen once we embed them in tense-logical contexts. Thus, while (1) is true, (2) is false, and while (3) is false, (4) is true:

- (1) Always, FOR ALL times  $t$ , at  $t$ ,  $t$  satisfies ‘one day hence, now = ...’.
- (2) Always, FOR ALL times  $t$ , at  $t$ ,  $t$  satisfies ‘one day hence, the present time = ...’.
- (3) Always, FOR ALL times  $t$ , at  $t$ ,  $t$  satisfies ‘one day hence, now is later than ...’.
- (4) Always, FOR ALL times  $t$ , at  $t$ ,  $t$  satisfies ‘one day hence, the present time is later than ...’.

Braddon-Mitchell's epistemic objection challenges GBT's ability ever to afford us knowledge that what is present, in this anodyne sense of 'present', is on the edge of reality. Accordingly, if we can show that GBT affords such knowledge, the challenge is met. Here it should be observed that the charge is that GBT invites scepticism—that its truth would make the sought-after knowledge hard if not impossible to attain—and not that we can have no knowledge of its own truth (Braddon-Mitchell 2013: 351–2). It is therefore perfectly legitimate for proponents of GBT to address the challenge by assuming their own theory as known.

According to presentism, always, EVERYTHING is present. Once we assume, with Broad (1923: 56), that 'EVERYTHING' and 'SOMETHING' exclusively range over things in time that are instantaneous, such as hyperplanes or time-instants, presentism accordingly implies that always, NOTHING was or will be present. According to GBT, by contrast, always, EVERYTHING either is or was present, where indeed SOMETHING is present and SOMETHING was present. GBT further implies that always, EVERYTHING that is present will always in the future be SOMETHING: the block never shrinks. Under the same ontological assumption as before, GBT accordingly implies that always, NOTHING will be present, and that always, EVERYTHING that is present always in the past was NOTHING—in stark contrast with eternalism. The latter claim captures the idea that EVERYTHING that is present belongs to the latest addition to the block. Consequently, GBT clearly differs from both presentism and eternalism.<sup>10</sup>

Similar considerations apply to individual token-utterances. Thus, although (5) and (6) are both true, (7) is true but (8) is false:

- (5) Always, FOR ALL times  $t$ , at  $t$ , if ' $a$ ' refers to  $t$ , any utterance of 'Now =  $a$ ' made at  $t$  is true.
- (6) Always, FOR ALL times  $t$ , at  $t$ , if ' $a$ ' refers to  $t$ , any utterance of 'The present time =  $a$ ' made at  $t$  is true.
- (7) Always, FOR ALL times  $t$ , at  $t$ , if ' $a$ ' rigidly refers to  $t$ , any utterance of 'One day hence, now =  $a$ ' made at  $t$  is true.
- (8) Always, FOR ALL times  $t$ , at  $t$ , if ' $a$ ' rigidly refers to  $t$ , any utterance of 'One day hence, the present time =  $a$ ' made at  $t$  is true.

<sup>10</sup> Braddon-Mitchell at some point argues that GBT might after all turn out to be no more than a notational variant of presentism. His argument would seem to assume that presentists can avail themselves of quantification over things that no longer exist (i.e. are no longer present). However, while both presentists and proponents of GBT

Provided that always, EVERYTHING in time is instantaneous, always, FOR EVERY  $x$  and EVERY  $y$ ,  $x$  is later than  $y$  iff sometimes,  $y$  is present while  $x$  will be present. Given the same proviso, it follows that, according to GBT, always, EVERYTHING that is present is such that NOTHING is later than it (see Broad 1923: 66). But for  $x$  to be on the edge of reality just is for  $x$  to be such that NOTHING is later than it.<sup>11</sup> Accordingly, if one knows GBT and what it implies, and also knows that always EVERYTHING is instantaneous, then provided that one knows in addition that  $x$  is present, one is in a position to know by competent deduction that  $x$  is on the edge of reality. So all that remains to be shown is that we are in a position to know that *this* hyperplane, i.e. the hyperplane on which we are considering the matter, is present. But this is rather easily shown.

Always, FOR ALL times  $t$ , at  $t$ , 'This hyperplane is  $F$ ' is true iff the hyperplane located at  $t$  satisfies ' $F$ '. Always, FOR ALL times  $t$ , at  $t$ , FOR ALL  $x$ ,  $x$  satisfies 'is present' iff  $x$  is identical to or located at  $t$ . Therefore, always, FOR ALL times  $t$ , at  $t$ , 'This hyperplane is present' is true iff the hyperplane located at  $t$  either is identical to  $t$  or located at  $t$ . Granted that always, at EVERY time, THERE IS a unique hyperplane located at that time, the right-hand side of this equivalence must hold always and FOR ALL times  $t$ . Consequently we arrive at the claim that, always, FOR ALL times  $t$ , at  $t$ , 'This hyperplane is present' is true. Note that the latter will hold on any of the competing views, i.e. presentism, eternalism, and GBT alike. In particular then, on anyone's count, at present 'This hyperplane is present' is true; and since at present 'This hyperplane' refers to *this* hyperplane, we can conclude that *this* hyperplane is present—and so, by the foregoing, that it is on the edge of reality. By analogous reasoning, we can establish that now is the present time and so on

accept that, in the past, SOMETHING was present which is not now present, the latter but not the former accept that SOMETHING is such that, in the past, it was present although it is not now present. In the light of this structural difference, it becomes unclear how plausible it is to contend, as Braddon-Mitchell does, that 'the striking isomorphisms between [GBT] and presentism make them a very likely candidate for [...] treatment [as a case of quantifier variance] if anything ever was' (Braddon-Mitchell 2013: 358–9).

<sup>11</sup> This is Braddon-Mitchell's 'objective' conception of 'now' which he labels 'NOW<sub>ls</sub>', where the subscript stands for 'last slice' (Braddon-Mitchell 2013: 351).

the edge of reality. It accordingly seems that the epistemic challenge has been met head-on.

However, Braddon-Mitchell keeps asking: 'How do we know that here in spacetime the events are present?', where 'here in spacetime' is equivalent to 'on this hyperplane on which we are when asking this question' and 'present' is here intended to mean 'on the edge of reality' (Braddon-Mitchell 2013: 356). The foregoing considerations, that basically summarize the argument given in our original paper, show how we can know this. And in this respect, Caesar would not have been any worse off when, back in 60BC, he had asked himself whether his very thinking was on the edge of reality.

Yet, undeterred by such considerations, Braddon-Mitchell (2013: 358) writes:

But I'm allowed to say that he [i.e. Caesar] EXISTS<sub>2013</sub> in 60BC. So why can't I ask whether he BELIEVES<sub>2013</sub> that he is PRESENT<sub>2013</sub> in 60BC? That would be a false belief. To deny that, at 2013, Caesar BELIEVES<sub>2013</sub> anything treats existence very differently from other attributions when we look back at the past: at 2013 Caesar EXISTS<sub>2013</sub> in 60BC, but Caesar does not BELIEVE<sub>2013</sub> that he is PRESENT<sub>2013</sub> at 2013.

Presumably, what is here meant by 'Caesar EXISTS<sub>2013</sub> in 60BC' is that, in 2013 when Braddon-Mitchell was writing, Caesar EXISTED by virtue of having been present 2,073 years earlier; and what is meant by saying that 'Caesar BELIEVES<sub>2013</sub>' a given thing is that, in 2013, Caesar either was believing that thing or had been believing that thing in the past. Similarly, for Caesar to presently BELIEVE a given thing is for Caesar either to be presently believing that thing or to have believed that thing in the past. And yes indeed, Caesar did believe something when 60BC was present, without believing anything at present (or in the year 2013, for that matter). For, again, no one can be believing anything without being alive; and if we know anything about history, we know that Caesar is not presently alive (nor alive in 2013, for that matter).

What was that thing that Caesar believed back in 60BC? Was it the present-tensed proposition that the time of his believing is *now*? This is a singular proposition about now, and given that *ex hypothesi*, in 60BC, now did not yet EXIST, Caesar could not have believed this proposition back in 60BC. Unlike 'now', the description 'the edge of reality' is not a temporally rigid term. So back in 60BC, Caesar did not think of now by thinking about the edge of reality.

Neither did Caesar believe, of now, that the time of his believing is *it*, in virtue of having believed the present-tensed proposition that the time of his believing is on the edge of reality. Provided that Caesar had the concept of being on the edge of reality at all, in 60BC he at most believed—knowledgeably if the aforementioned considerations are correct—the present-tensed proposition that the time of his believing is on the edge of reality, without believing anything at all about now.

Braddon-Mitchell uses terms such as 'PRESENT<sub>2014</sub>' rather than temporally rigid designators like 'now'. It is unclear what reading of terms such as 'PRESENT<sub>2014</sub>' he has in mind. Let us suppose, on his behalf, that 'PRESENT<sub>2014</sub>' involves no singular reference to now, but is rather equivalent to 'on some hyperplane 2,074 years in the future of *t*', where '*t*' names 60BC. Might Caesar have believed, back in 60BC, the present-tensed proposition that his believing is PRESENT<sub>2014</sub>, in this sense of 'PRESENT<sub>2014</sub>'? Perhaps. For Caesar might not have known what time it was, i.e. that back then, *t* was present; or he might not have accepted GBT which, back in 60BC, would have informed him that no hyperplane 2,074 years in the future of *t* EXISTED then. But none of this poses any problem for GBT. It is certainly no part of GBT's job description to ensure that people, or their temporal parts, always know what time it is, or that they have the knowledge that knowledge of the theory affords. In any case, in 60BC, Caesar did not believe the present-tensed proposition that his believing is PRESENT<sub>2014</sub> by believing the present-tensed proposition that his believing is on the edge of reality: while the first was false 2,074 years ago, the second was true 2,074 years ago. So although Braddon-Mitchell's question makes perfect sense, and Caesar would indeed have believed falsely if, implausibly, in 60BC he had believed to be PRESENT<sub>2014</sub>, in the aforementioned sense of 'PRESENT<sub>2014</sub>', this shows nothing of interest.

## CONCLUSION

One may have qualms about the ontology of things in time as instantaneous that our version of GBT accepts. One may also wonder how GBT, and its postulation of a present edge of reality, might survive in the light of what certain parts of current physics suggest—a worry that equally afflicts presentism. All this would

be fair comment. However, if what we have argued is correct, as we submit it is, the suggestion that even if known to be true, GBT cannot account for our knowledge that we are presently on the edge of reality turns out to be nothing more than a sophism. As such it is powerless to send GBT back to its grave. And so ultimately we hold our ground, the creature prevails, and it is Van Helsing's rotten stake that turns to ash.

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