

Living on the Brink, or Welcome Back, Growing Block!

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In this paper, we clarify what proponents of the Growing Block Theory (GBT) should and should not say, and what they consistently can say. At some stage, our discussion will be premised on a simplifying ontological assumption, viz. that when it comes to metaphysics all we ever quantify over, besides purely abstract objects such as numbers, are *instantaneous* entities. Its controversial nature notwithstanding, this ontological assumption is not a priori incoherent and so in order to show that GBT is a tenable view it will do to consider a version of GBT that subscribes to it. In fact, talk about a block to which more and more layers are added as time goes by strongly suggests that such a version of GBT is very much in the spirit of C. D. Broad's original proposal (Broad 1923). Since this ontological assumption is likewise open to GBT's main rivals, presentism and eternalism, we prejudge no issues in our attempt to bring out what is distinctive of GBT.

Once all the central tenets of the view are on the table, we address both David Braddon-Mitchell's and Trenton Merricks's recent eulogies for GBT, based on what is representative of a certain type of argument meant to show that GBT is internally incoherent (Braddon-Mitchell 2004, Merricks 2006; cf. also Bourne 2002). This type of argument at no stage presupposes that our simplifying ontological assumption is false, and so it should retain its dialectical force, if any, even after this ontological assumption has explicitly been made. However, we argue that this type of argument proceeds from a mistaken assumption about GBT's core, something which becomes most obvious in the light of the particular version of GBT we consider. We conclude that this type of argument misfires and that for all we know, we might be living on the brink of reality.

I

We conceive of the debate to which GBT and its rivals, presentism and eternalism, contribute as centring on the question of what *THERE IS*, where this question is couched in terms of the, meta-physically speaking, most fundamental notion of quantification (hence the small caps). This is quite consistent with the idea that GBT, presentism, and eternalism disagree about the facts that make up reality, and not just about the objects populating it. For, any such disagreement can be recast as one about what facts *THERE ARE*.

Thus, 'what *THERE IS*' is meant to refer to what there fundamentally is, or what there is in reality, and is meant to be absolutely unrestricted (at least as far as things in time are concerned, see next paragraph). This meaning is common to all the uses made of it, whether they are made by proponents of GBT, presentists, or eternalists. The parties disagree, though, on principles essentially involving such quantification. In other words, they tell different stories as to what there fundamentally is.

The disagreement does not turn on whether in reality there are any purely abstract objects and, if so, what ontological status they enjoy at different times, where purely abstract objects are those abstract objects, like numbers but unlike certain sets, that do not depend for their existence on any concrete things. After all, GBT, presentism, and eternalism disagree about what *THERE IS in time*; and most plausibly (and intuitionistic considerations aside), purely abstract objects, if any, are not in time. Consequently, our discussion of their disagreement will not in any way be affected if, for the sake of simplicity alone, we take the most fundamental notion of quantification, whatever its proper conception, to exclude purely abstract objects from its range. This restriction will come in handy later, when we use metric tense-logical operators and quantify over numbers to measure temporal distances. We hasten to add that quantification over numbers for such purposes alone may well be conceived not to involve any serious ontological commitment (cf. Prior 1971).

The disagreement between GBT, presentism, and eternalism over what *THERE IS* is best formulated in terms of a tensed notion of *present existence* (or *being present*). All parties agree that *THERE ARE* entities which presently exist. Presentists hold in addition that

THERE ARE *only* presently existing entities. Proponents of GBT and eternalists alike deny the presentists' claim: eternalists hold that THERE ARE entities which were present but are no longer so, as well as entities which will be present but are not yet so, while friends of GBT accept the first but reject the second of these two eternalist claims. As we shall see in due course, characterizing GBT by means of a tensed notion of present existence will have the consequence that on this view (just as on the presentist view), the metaphysically most fundamental notion of quantification is likewise tensed. This, as we shall now argue, is indeed a welcome consequence that is faithful to the basic idea behind GBT.

The basic idea behind GBT is the combination of two thoughts: reality constantly grows so that (i) at any moment in time, a new layer is added to it that did not form part of it before, and (ii) at any moment in time, there is no layer of reality in the future of the layer added to reality at that moment. Consequently, at any moment in time, there is a last layer of reality that is, as it were, *on the edge of reality* (Broad 1923: 87–9).¹

Often, the view is merely presented as holding that reality consists of all the layers added to it up until the present moment and of no other layers. This claim, while certainly part of GBT, fails to capture the idea that the block is *constantly growing*. It at most captures the idea of a grown block, and not that of a block that continues to grow. But on closer inspection, it even fails to capture the idea that the block *has grown* to be what it is at the present moment, for it is so far consistent with the contravening thought that at any past moment, reality is exactly as it is today, never mind that the addition of layers occurs at different moments.

Thus, to capture the dynamic aspects of the view, GBT must be conceived to operate with a tensed notion of reality and so of what THERE IS.² This should already make plain that, contrary to what

¹ (Page references are to the reprint; see References section.) On pages 87–8, Broad (1923) speaks of 'fresh slices of existence' being added to 'the total history of the world' and defines the present as 'the last thin slice' added to it 'that is succeeded by nothing'. For more pertinent quotes, see next footnote.

² On page 88, Broad (1923) explicitly states that on his view of becoming, 'the sum total of existence is always increasing' so that 'when we say that the red section [of a signal lamp's past history] precedes the green section, we mean that there was a moment when the sum total of existence included the red event but did not include the

authors like Braddon-Mitchell and Merricks suggest, GBT does not appropriate eternalism with respect to the present and past layers of reality that it posits: unlike GBT, eternalism operates with a notion of what THERE IS that is untensed.³

Eternalists often speak of their conception of reality as that of a *block universe*. This terminological coincidence might be taken to suggest that proponents of GBT and eternalists agree on their conception of the past (see Braddon-Mitchell 2004: 199–200; Merricks 2006: 104). But block isn't block. If we think of past world-slices as those succeeded by others, then according to GBT, we can look back at a world-slice that has become past ever since the block continued to grow beyond it and can correctly identify it as past in this sense. What according to GBT we cannot do, however, is perform the mental operation of 'going back' to that past world-slice and once we have done so, 'back there' correctly identify it as past in this sense. But neither should we want to, if we believe in GBT: on this view, unlike the eternalists' view, in performing that mental operation we consider what reality was like at a time *when the block still had not grown beyond that world-slice*, and evidently, reality was then such that that world-slice was on its edge and so was not succeeded by any other.

It might be complained that a catalogue of all that THERE IS should not, on anyone's conception of it, come with a sell-by date. But any such complaint would not be suasive. For, as long as it is part and parcel of the view under discussion that reality changes over time in the sense that always, reality comprises more than what, at some

green one, and that there was another moment when the sum total of existence included all that was included in the first moment and also the green event'. This is clear evidence that Broad had a tensed conception of what THERE IS. See also footnote 12.

³ Here a comparison with the debate between actualism and possibilism might be helpful. It is standard to characterize these views by saying that the actualist claims that absolutely everything there is is actual, whereas the possibilist says that there are things which are not actual—where the quantifiers are understood as absolutely unrestricted. Now the typical possibilist will hold that 'there is', taken in this sense, is not 'modally tensed', where this means that the quantifier is not sensitive to embedding by modal operators (e.g. she will hold that 'There is an x such that possibly p ' is equivalent to 'Possibly, there is an x such that p '). By contrast, the typical actualist will claim that 'there is' is modally tensed (e.g. she will hold that possibly, there is a human being which is four meters tall, but deny that there is a human being which could have been four metres tall).

past moment, was real, such a complaint will beg the question against that view and so already presuppose that the view is incorrect. Accordingly, one might ask back on what grounds that presupposition can legitimately be made.

II

In what follows, we lay down principles governing the tensed notion of what THERE IS at work in GBT. We will use 'SOMETHING' and ' $\exists x$ ', ' $\exists y$ ', etc., in order to express this notion, and 'EVERYTHING' and ' $\forall x$ ', ' $\forall y$ ', etc., as their respective duals. The principles further involve quantification over numbers suitable for measuring temporal distances. In line with our policy to exclude purely abstract objects from the range of what THERE IS, we will use different quantifiers and variables for this purpose, viz. ' Σn ', ' Σm ', etc., for existential quantification over numbers, and ' Πn ', ' Πm ', etc., for universal quantification over numbers.

As already adumbrated, the principles also involve a tensed notion of present existence, which we express by using the verb phrase 'presently exist' or sometimes simply the verb 'exist', as well as the predicate symbol 'P'.⁴ Given an additional assumption about the *kinds* of entities quantified over, which we make explicit in due course, this tensed notion of present existence neatly corresponds to the notion of being on the edge of reality. It will prove useful to work with quantifiers defined by restricting the metaphysically most fundamental quantifiers to presently existing entities. The restricted existential quantifier will be expressed by means of 'something', 'there is', and variants thereof (all in normal font), and is defined as follows:

Something ϕs iff_{df} SOMETHING which presently exists ϕs .

The restricted universal quantifier is simply the dual of the quantifier just defined, and it will be expressed by means of 'everything', 'for all', and variants thereof (again, all in normal font). It is defined thus:

Everything ϕs iff_{df} EVERYTHING which presently exists ϕs .

⁴ Note that 'presently exist' does not function in the way 'exists now' does, where 'now' is a *temporally rigid* indexical which is insensitive to tense-logical embedding.

The restricted existential quantifier will be symbolized by 'Ex', 'Ey', etc., and its dual by 'Ax', 'Ay', etc.

In order to state the principles characterizing GBT's conception of what THERE IS, we shall adopt the following convention governing the metric tense-logical operator '*n* days from the present': it is equivalent to 'presently' if $n = 0$, to ' $-n$ days ago' if $n < 0$, and to ' n days hence' if $n > 0$. We symbolize '*n* days from the present' by ' D_n '.

As advertised, we will make the simplifying ontological assumption that at least in the context of metaphysics, all we ever quantify over by means of 'Ex', 'Ey', etc., or 'Ax', 'Ay', etc., are entities that are *instantaneous*. So in particular, the following will be assumed to always hold:

$$(0) \quad \neg \Sigma n \Sigma m \neq 0 D_n Ex D_m P(x).$$

Needless to say, this assumption is controversial. However, it is not a priori incoherent, and it is likewise open to both presentists and eternalists.⁵ Accordingly, for the purposes of showing that GBT is a consistent view, it will do to focus on a particular version of it that is committed to (0); and for the purposes of bringing out what is distinctive of GBT, it will do to contrast that version with versions of presentism and eternalism that are likewise committed to (0).

According to GBT, EVERYTHING is such that for some n , with $n \leq 0$, n days from the present, it then exists:

$$(1) \quad \forall x \Sigma n \leq 0 D_n P(x).$$

⁵ The claim that everything is instantaneous can be formulated by an eternalist as follows:

- (a) For ALL x , THERE is a unique moment t at which x exists (or 'is located', as stage theorists like to say).

An eternalist will typically hold that (0) is true at a moment t_0 iff (b) is true:

- (b) $\neg (\Sigma n \Sigma m \neq 0$ such that at the moment t n days from t_0 , THERE is an x which exists and at the moment m days from t , x also exists).

For her, (b) will be equivalent to (c), which is in turn equivalent to (d):

- (c) $\neg$ (THERE is an x and $\Sigma n \Sigma m \neq 0$ such that at the moment t n days from t_0 , x exists and at the moment t' m days from t , x also exists).
 (d) $\neg$ (THERE is an x and THERE ARE two distinct moments t and t' such that at t , x exists, and at t' , x also exists).

(d) is clearly acceptable to an eternalist.

This at most tells us that EVERYTHING either exists or used to exist, but is as yet silent on whether all that either exists or used to exist is SOMETHING. According to GBT, however, reality certainly is not less than what exists or used to exist. So according to GBT, for all n , with $n \leq 0$, n days from the present, anything that then exists is, $-n$ days from the then present, SOMETHING:

$$(2) \quad \Pi n \leq 0 D_n A x D_{-n} \exists y (y = x).$$

The idea of a grown *block* certainly also suggests that reality is such that at any moment present or past, something then exists that forms a layer of it. So we take it that the following too is an essential ingredient of GBT:

$$(3) \quad \Pi n \leq 0 \exists x D_n P(x).$$

It follows from (1) that NOTHING is such that for some n , with $n > 0$, n days from the present, it then exists but for no $m \leq 0$, m days from the present, it does—more perspicuously, that NOTHING will exist that neither already exists nor already existed in the past:

$$(4) \quad \neg \exists x (\Sigma n > 0 D_n P(x) \ \& \ \Pi m \leq 0 \neg D_m P(x)).$$

In conjunction with (0), (4) implies that NOTHING is such that for some n , with $n > 0$, n days from the present, it then exists—i.e. that NOTHING will exist:

$$(5) \quad \neg \exists x \Sigma n > 0 D_n P(x).$$

We now claim that ‘alwaysations’ of (1) to (3) are quite sufficient to express the core of GBT.⁶ These ‘alwaysations’ are obtained by prefixing either principle with ‘ $\Pi k D_k$ ’, where this operation can be reiterated.⁷ Unlike (1) to (3) themselves, these ‘alwaysations’ nicely capture

⁶ The ‘alwaysation’ of (3) implies that for any n , n days from the present, SOMETHING exists. This is a substantial claim, but the issue of whether this claim is true is orthogonal to the debate between GBT and its rivals, and hence we do not prejudge any issues by conceiving of GBT as implying it.

⁷ The principle that what always holds always always holds, though plausible, is not uncontroversial. However, any doubts about its validity will be independent from the controversy between GBT and its rivals, presentism and eternalism. So we prejudge no issues by here assuming it.

the dynamic aspects of the view. The version of GBT we will consider when responding to Braddon-Mitchell's and Merricks's objections includes the core of GBT, and in addition the 'alwaysation' of (0).

However, given only minimal factual assumptions, (1) to (3) themselves are already sufficient to mark the contrast with both presentism and eternalism. Thus, assuming that sometimes in the past, SOMETHING existed which does not now exist, presentists will deny (2), and assuming that sometimes in the future, SOMETHING will exist which neither exists now nor existed before now, eternalists will reject (1).

The 'alwaysations' of (1) to (3) furthermore entail that always, whatever was SOMETHING still is SOMETHING:

$$(6) \quad \Pi k D_k \Pi n \leq 0 D_n \forall x D_{-n} \exists y (y = x),$$

which is precisely what one would expect GBT to imply.

Once the 'alwaysation' of (0), and so of (5), is added to GBT's core, the resulting view furthermore entails that always, there is SOMETHING which was NOTHING earlier than then:

$$(7) \quad \Pi k D_k \exists x \Pi n < 0 D_n \neg \exists y (y = x).$$

It likewise follows that the open sentence ' $\Pi n < 0 D_n \neg \exists y (y = x)$ ' is always equivalent to ' $P(x)$ '. Accordingly, given the 'alwaysation' of (5), whenever SOMETHING presently exists, it was NOTHING earlier than then and NOTHING exists later than then, and vice versa. Thus, there is a clear sense in which whenever SOMETHING presently exists it is on the edge of reality but was not on the edge of reality before, and vice versa. The latter equivalence will prove an asset when it comes to defusing Braddon-Mitchell's and Merricks's arguments.

III

Before we turn to these arguments, however, let us make clear what GBT does *not* involve. To begin with, note that (2) differs from the stronger claim that for all n , with $n \leq 0$, n days from the present, anything that then exists is such that $-n$ days from the then present, it likewise exists:

$$(*) \quad \Pi n \leq 0 D_n \exists x D_{-n} P(x).$$

GBT's core does not entail (*). (*) in fact negates one of the minimal factual assumptions made earlier. It is ruled out by (3) in conjunction

with (0) and so proves false on the particular version of GBT that assumes (0) to always hold.

Note also that nothing said so far implies that, according to GBT, for all n , with $n > 0$, n days from the present, nothing then exists:

$$(**) \quad \Pi n > 0 D_n \neg \exists x P(x).$$

(**) is indeed inconsistent with GBT. For (3) entails ' $\exists x P(x)$ ', and so assuming that (3) always holds, ' $\Pi n > 0 D_n \exists x P(x)$ ' will hold as well, and this is inconsistent with (**).

Proponents of GBT should not accept that NOTHING is such that, for some n , with $n > 0$, n days from the present it is SOMETHING:

$$(***) \quad \neg \exists x \Sigma n > 0 D_n \exists y (y = x),$$

which is stronger than (5) and so isn't implied by it. Actually, the negation of (***) is entailed by the claim that EVERYTHING will still be SOMETHING at any future moment:

$$(8) \quad \forall x \Pi n > 0 D_n \exists y (y = x),$$

which itself follows from (6)—which is all to the good, since plausibly, GBT implies that the block will never *erode*. That (8) follows from (6) can be shown as follows. (6) is obviously equivalent to ' $\Pi k D_k \Pi n \geq 0 D_n \forall x D_n \exists y (y = x)$ ', which entails ' $\Pi k > 0 D_k \Pi n > 0 D_n \forall x D_n \exists y (y = x)$ '. From this we can infer ' $\Pi k > 0 D_k D_{-k} \forall x D_k \exists y (y = x)$ ', and then ' $\Pi k > 0 \forall x D_k \exists y (y = x)$ ', which is obviously equivalent to (8).

So much for our characterization of GBT's core and of the particular version of GBT that accepts the 'alwaysation' of (0) and so of (5). We now turn to Braddon-Mitchell's and Merricks's swan songs for GBT. If their arguments are successful at all, they should affect all versions of GBT.

IV

Braddon-Mitchell (2004) argues against GBT as follows. Suppose that *this moment*, and all that exists at *this moment*, are on the edge of reality, where 'this moment' functions as an indexical. Then, if at some moment in time earlier than *this moment*, Caesar is crossing the Rubicon and judges his crossing to be on the edge of reality, Caesar's judgement is false. Of course, when that earlier moment

was on the edge of reality, Caesar's judgement was true; however, if *this moment* is on the edge of reality, that earlier moment no longer is so. But now, by parity of reasoning, if some moment in time later than *this moment* is on the edge of reality, then if at *this moment* we are talking philosophy and judge our talking to be on the edge of reality, our judgement is likewise false. Of course, if *this moment* is on the edge of reality, then our judgement is true. But we have no means to find out whether *this moment* in fact is on the edge of reality. We do know that *this moment* is *this moment* and also that our talking philosophy occurs at *this moment*, but to know this is not to know anything that is only momentarily the case, whereas it is only momentarily the case that *this moment* is on the edge of reality.

So, for all we know, *this moment* might be on the edge of reality, and for all we know, some moment later than *this moment* might be on the edge of reality. *This moment* is only ever on the edge of reality for the briefest of moments; and the probability that it is not so now far outstrips the probability that it is so now. In so far as, according to GBT, to be present is to be on the edge of reality, 'we should regard the hypothesis that the current moment is present as only one among very many equally likely ones' and therefore conclude 'that the current moment is almost certainly in the past'. This, however, amounts to a *reductio ad absurdum* of GBT (Braddon-Mitchell 2004: 200–1).

In a similar vein, Merricks (2006) argues that proponents of GBT must distinguish between what he respectively calls 'the subjective present' and 'the objective present'. While 'the objective present' is meant always to refer to the edge of reality as postulated by GBT, wherever it happens to be located, the reference of 'the subjective present' varies across time in that at any moment of time, that moment is the subjective present. Merricks's reason for saying that GBT forces this distinction is that, on the one hand, Nero's judgement *e*, that *e exists at the present*, which occurred sometime in the past, does not exist on the edge of reality, while on the other, there is also a clear sense in which *e* is true. Now, if *e* related to the objective present, then we would have to conclude that *e* is false. Therefore, *e* is best construed as being about the moment at which Nero makes that judgement—what, at that moment, is the subjective present as opposed to the edge of reality. By parity of reasoning, or so Merricks argues following Braddon-Mitchell (2004), our own

judgements *j*, made today, to the effect that *j* exists at present, are best construed as being about our subjective present *and not about the edge of reality*: since our judgements are located on the edge of reality only for the briefest of moments, the probability of their being true would be 'vanishingly small' otherwise.

But now, once the objective present is thus dissociated from what, at any given moment including today, is the subjective present, it becomes entirely unclear what the objective present *is* and so where the edge of reality is located. For all we know, it might lie in the future of today. Thus, it now becomes difficult to see on what grounds we can distinguish between GBT and what Merricks calls the theory of *the unmotivated growing hunk* according to which the edge of reality lies ten years ahead. Merricks concludes that, therefore, GBT ultimately proves to be incoherent (Merricks 2006: 105–10).

Since Braddon-Mitchell is ready to concede to the proponents of GBT an ontology of world-slices, his argument is clearly intended to refute the particular version of GBT which is committed to the 'alwaysation' of (0) and which we outlined in previous sections (Braddon-Mitchell 2004: 199). Although Merricks considers the failure of (0) in a footnote, his reasoning nowhere presupposes that (0) might fail: for argument's sake, the judgements in question are treated as instantaneous (Merricks 2006: 105n). So if successful at all, it too ought to count against that particular version of GBT.⁸

It should be evident that Braddon-Mitchell's and Merricks's swan songs are variations on an identical theme. However, if our characterization of GBT is correct, nothing of this should carry any conviction. To begin with, note that according to GBT as characterized, always, THERE ARE past moments which we can continue to refer to by means by which we could likewise refer to them when they were on the edge of reality. Tenseless date terms are a common means to that end. What we can never do, though, is continue to refer to past moments by means of 'this moment', by means of which we could

⁸ Our response to Braddon-Mitchell and Merricks on behalf of GBT will be premised on an ontology of instantaneous entities. But for all we can see, ultimately, all that is strictly speaking needed is the assumption that judgements can be instantaneous; and as long as there can be trivially correct judgements of the form 'The present moment is present', this assumption should not be contentious.

refer to them when they were on the edge of reality. For, always, 'this moment' refers to the present moment, and to no past moment. This is a semantic platitude, on anyone's account. The same applies, *mutatis mutandis*, to 'what exists at this moment': always, 'what exists at this moment' refers to all and only those things that exist at the present moment, and not to all and only those things that exist at some past moment. Now, it may readily be agreed that we might not now know truths of the form ' d is the moment on the edge of reality' (or of the form 'What exists at d exists at the moment on the edge of reality'), where ' d ' is some tenseless date term that refers to t_0 , where t_0 is *this*, the present, *moment*. But it does not follow from this that we do not know, of t_0 and all that exists at t_0 , that they are on the edge of reality under the modes of presentation respectively encoded by 'this moment' and 'what exists at this moment'. For that to follow, it must furthermore be assumed that it is epistemically possible that sometimes 'the moment on the edge of reality' does not refer to what then is the present moment.

Both Braddon-Mitchell and Merricks suggest that, on condition that GBT holds, we might indeed be in a position in which we are left to wonder whether *this moment* is the moment on the edge of reality or is rather earlier than the moment on the edge of reality. Given the triviality that if t is on the edge of reality, at t , 'the moment on the edge of reality' picks out t , this makes sense only if GBT allows that at *this moment*, 'the moment on the edge of reality' might refer to a moment it could likewise refer to at a later moment. Both Braddon-Mitchell and Merricks furthermore assume that according to GBT, for ANY moment t , if t and all that exists at t are on the edge of reality, then for ANY moment t' earlier than t , at t' , t and all that exists at t are on the edge of reality. For unless this was so, t 's being on the edge of reality would not imply that if at an earlier moment t' , one judged t' or something that exists at t' to be on the edge of reality, one would be making a false judgement; and the basis for the authors' negative induction would crumble.⁹

Yet, according to GBT, and in stark contrast with eternalism, if at some moment t , we 'go back' in thought to an earlier moment t' and ask what is the case at that earlier moment t' —an operation effected

⁹ Throughout, we treat 'at t ' as equivalent to 'it is the case at t that'. This is a tense logical operator (of the sort used in so-called hybrid logic, for instance) which one could in the present context define as 'Always, if t is present, then'.

by the use of 'at t' '—we ask what the block included when t' was sitting on its edge; and always, when SOMETHING is on the edge of reality, there is NOTHING which exists later than then. A fortiori, at t' , t does not EXIST and so is not on the edge of reality. It is only if one assumes that what, at t' , THERE IS includes what THERE IS at t , that one might think otherwise. Accordingly, both arguments presuppose that GBT operates with an untensed notion of what THERE IS. As we have argued, this is a mistake.

Proponents of GBT do want to say that SOMETHING is on the edge of reality and that SOMETHING, e.g. Caesar's crossing the Rubicon or Nero's past judgement e , used to be on the edge of reality but no longer is. But they do not want to say that THERE IS any edge of reality such that SOMETHING used to be on it but no longer is. Nor is GBT helpfully construed as claiming that THERE IS some edge of reality on which SOMETHING was which no longer is on ANY edge of reality today. To say that SOMETHING used to be on the edge of reality but no longer is, while SOMETHING is on the edge of reality today, need not commit one to the claim that THERE ARE many edges.

Instead, on any version of GBT committed to the 'alwaysation' of (0), *being on the edge of reality* is best conceived as a property such that always, SOMETHING has it but did not have it before, always, SOMETHING used to have it but no longer does, and always, NOTHING is going to have it. This property is obviously tensed and, most plausibly, versions of GBT committed to the 'alwaysation' of (0) will identify it with the property of present existence which we expressed by means of ' $P(x)$ '.¹⁰ Even those who reject GBT may accept that there is a tensed property of present existence, but they will anyway deny that it satisfies the description GBT gives of it. But this is no surprise, because that description involves use of the metaphysically most fundamental notion of quantification and whether the property of present existence satisfies it will depend on the principles which GBT claims to hold for that notion.¹¹

¹⁰ Of course, to say that NOTHING is going to presently exist is not the same as to say that there is going to be NOTHING that presently exists. According to the version of GBT under consideration, the former holds, while the latter fails to hold.

¹¹ Proponents of the version of GBT under consideration may wish to hold that THERE ARE facts involving this property which, in the past, made Nero's judgement true and so existed back then, but do no longer exist today. But as long as proponents of that version of GBT are not committed to (*), and they aren't, this claim is quite consistent with anything they are in fact committed to. See footnote 14.

In fact, we can *prove* that on the version of GBT we characterized, 'The present moment and all that exists at the present moment are on the edge of reality' is always true. The proof makes use of two principles both of which are acceptable to friends and foes of GBT alike, viz.

- (P) Always, THERE IS a unique moment which is present.
- (Q) Always, for ALL moments z and z' , if z is present and z' is later than z , then z' will be present.

On the version of GBT we characterize, we can take ' x is on the edge or reality' to be always equivalent to 'It is not the case that THERE IS a moment y such that y is later than x '. This said, let us turn to the proof.

By (P), THERE IS a unique present moment. Let then t_0 be the present moment. Assume, for *reductio*, that t_0 is not on the edge of reality. Then for SOME moment y , y is later than t_0 . Let then t_1 be such a moment. By (Q), it follows that t_1 will exist, and so, that SOMETHING will exist. But given our principle (5), NOTHING will exist. Contradiction! We can therefore conclude that t_0 is on the edge of reality. Let now a be SOMETHING which exists at t_0 . Notice that, by (0), since t_0 is present, a will not exist anymore in the future. Assume, again for *reductio*, that a is not on the edge of reality. Then for SOME moment y , y is later than a . Let then t_1 be such a moment. Since a exists at t_0 and will not exist anymore in the future, then t_1 is not only later than a , it is also later than t_0 . But, as we saw before, this is impossible. Therefore, a is on the edge of reality. Since a was arbitrary, we can conclude that all that exists at t_0 is on the edge of reality. Thus, we have proved that 'The present moment and all that exists at the present moment are on the edge of reality' is true.

Notice that besides (P) and (Q), the only other metaphysical principles at work in this proof are principles which our version of GBT assumes to always hold, viz. (0) and (5). The logical principles used in this proof can safely be taken to always hold as well. As a consequence, what the proof establishes is not only that 'The present moment and all that exists at the present moment are on the edge of reality' is true. The proof furthermore establishes that this statement is *always* true.

With this result being in place, the answer to Braddon-Mitchell's question 'How do we know that it is now now?' is straightforward.

For if I know that GBT is true, on the particular version of it that we have characterized in this paper, then I know, or at least am in a position to know, that 'The present moment is on the edge of reality' is always true, and hence presently true, which is to say that I know, or am in a position to know, that now (i.e. the present moment) is now (i.e. the moment that is on the edge of reality).

Suppose I am now making judgement *j* to the effect *that j is on the edge of reality*. Can I exclude the possibility that the proposition I thereby judge is false? This is to ask whether it is *epistemically possible* for me at the time of making judgement *j*, that SOMETHING earlier or later than that time is on the edge of reality. Again, the answer is now straightforward. Suppose that I know GBT, on the version of it we suggest. Then I know, or at least am in a position to know, that always, the present moment and all that exists at the present moment are on the edge of reality. Given that I know that *j* is present, I know that *j* exists at the present moment. Putting these two pieces of knowledge together, I am accordingly in a position to know that *j* is on the edge of reality. Therefore, it is *not* epistemically possible for me at the time of making judgement *j*, that the proposition I thereby judge is false.

Both arguments presuppose that I can be credited with knowledge of the relevant version of GBT. But this presupposition should be considered harmless, if the task is to show how GBT can ensure that one might know that the present moment and one's present judgements are on the edge of reality.

Where does this leave Nero? According to the particular version of GBT under consideration, to say that SOMETHING, e.g. Nero's past judgement *e* to the effect *that e exists at present*, does not exist at present, amounts to saying that *e* is *not* such that NOTHING exists later than the moment at which it exists. But this is quite consistent with saying that at the moment Nero made his judgement, he related to what then *was* on the edge of reality and so judged the moment at which *e* was made to be such that NOTHING *existed* later than it. The fact that even today, both Nero and *e* are SOMETHING evidently does not imply that even today, Nero *is* judging the moment at which *e* was made to be such that NOTHING *exists* later than it.¹² Nero's judgement is about the time it is made, and as Prior

¹² Although, presently, Nero's judgement *e* still is a judgement made by Nero and so has not changed in this respect, still, *pace* Merricks 2006: 105 (cf. also Bourne

reminds us, even if the time it occupies is an instant, one should not conflate the history an event *is* with the history that event *has* (Prior 2003: 10). Evidently, the same considerations apply to Caesar's past judgement that his crossing of the Rubicon existed (!) on the edge of reality.

Call the proposition *that e exists at the present* 'Eddie', and take Eddie to say of *e* that it exists at the objective present in Merricks's sense (i.e. that it is on the edge of reality). Eddie is a tensed proposition which is true at the moment at which *e* occurs and false at all others. So Eddie is false most of the times. Does this imply that *e* is a false judgement most of the times at which *e* is SOMETHING? No, because for all present-tensed propositions *p* of the kind Eddie exemplifies, the following principle may be assumed to (always) hold:

$$(9) \quad \forall x(x \text{ is a judgement that } p \rightarrow (x \text{ is true} \leftrightarrow \Pi n D_n(P(x) \rightarrow p))),$$

where it is presupposed, in line with the 'alwaysation' of (0), that always, for EVERY judgement, there is a unique *n* such that *n* days from the present, it then exists. Accordingly, unlike Eddie, *e* never ceased to be true.¹³ So from the fact that Eddie is false most of the

2002: 364) *it is no longer presently the case that Nero is making that judgement*. One should not lump these things together. Sure, Nero is still the author of the judgement and will forever be the author of that judgement. But in order for it to be presently the case that Nero is making that judgement, Nero would have to be presently alive and that judgement would have to be such that, presently, NOTHING succeeds it—neither of which is the case. According to Broad, changing from present to past involves a *change in relational properties*: '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: 87). Accordingly, the tenses can be understood to encode possession of, lack of, or a change in, relational properties of this kind. (Note that what Broad (1923: 87–8) lists as the fundamental third type of change besides change in attributes and receding into the past, i.e. *Becoming* (present), can also be counted as a change in relational properties of this kind, because if SOMETHING is becoming present which, before, was NOTHING, it is entering into the relation of succession to SOMETHING ELSE.)

¹³ Here an analogy might help. Suppose passing through Chicago on a train to New York, I judge *that I am presently passing through Chicago*. Then I arrive at Grand Central. Even if my judgement does not cease to EXIST in New York, and even if the egocentric proposition *that I am presently passing through Chicago* is false in New York, it would be rather unorthodox to conclude that my judgement is false in New York. This is not how we evaluate judgements of that type. Perhaps a different example

times, it does not follow that most of the times at which *e* is SOMETHING, *e* is false.¹⁴

These considerations likewise confute Merricks's and Braddon-Mitchell's suggestion that since my present judgement *j*, to the effect *that j exists at present*, is located on the edge of reality only for the briefest of moments, the probability of its being true would have to be regarded as vanishingly small should it be understood to attribute to *j* that it is on the edge of reality.

At last, what about Merrick's theory of the unmotivated growing hunk? Given that the block constantly grows, at any moment the subjective present coincides with the objective present. So given the 'alwaysation' of (5), at no moment does ANYTHING exist ten years later than then. Consequently, the theory of the unmotivated growing hunk is always false. If some version of GBT implies that that theory is always false, it is hard to see how that version of GBT might nonetheless be indistinguishable from it.

We conclude that neither Braddon-Mitchell nor Merricks succeeds in showing that GBT is incoherent. At least pending further

involving spatial indexicals might make things even clearer. Suppose the present moment is *t*, that I am currently in Chicago and make a judgement whose content is the indexical proposition *It is raining at t here*. Call the corresponding judgement '*k*'. *k* is an event that is located (exists) in Chicago and not in New York; still, we assume that in New York, THERE IS such a thing as *k*. Also assume that it is not raining in New York. Then the proposition *It is raining at t here* is not true in New York. What about *k*? Judgement *k* is true *simpliciter*, and so—if we want to talk about judgements being true at places—true at all places, in particular in New York. The same applies, *mutatis mutandis*, to judgements of the type exemplified by Nero's judgement *e*: they too retain their value, true or false, *depending on the circumstances that obtain simultaneously with their being made*, even if the tensed propositions that are their contents do not retain their truth value, and everyone should agree that it is not the case that everything is simultaneous with EVERYTHING ELSE. (9) corresponds to what John MacFarlane (2003) calls 'the absoluteness of utterance-truth', which is, as he points out, the orthodox view.

¹⁴ Assume that if *e* is true THERE IS a fact that made *e* true at the moment *e* occurred and so existed back then. Call that fact 'Fred'. In so far as Fred still is SOMETHING, the question arises of how to describe Fred today. We know that at the moment *e* occurred, Fred was the fact that *e* exists at present. We now face two options: we may either say that, today, Fred still is the fact that *e* exists at present, or we may say that, today, Fred is the fact that *-n* days from the present, *e* exists, where *e* occurred *n* days ago (cf. Correia and Rosenkranz 2011: 55–70 and 2012). In either case, (0) forces us to deny that, today, Fred exists; and since Fred can make statements true only as long as Fred exists, on either reading, Fred does not make Eddie true today. See footnote 11.

argument, we might, for all we know, be living on the brink of reality.¹⁵

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