

## Chapter 5

# The Irrelevance of the Presentist/Eternalist Debate for the Ontology of Minkowski Spacetime

Mauro Dorato

*Department of Philosophy, University of Rome Three, Via Ostiense 234, 00146 Rome, Italy*

### Abstract

I argue that the debate between the so-called presentists and eternalists either lacks substance or is merely pragmatical. Consequently, I show that such a debate has no implications whatsoever both for our understanding of Minkowski spacetime and for notions like change, persistence and becoming. In particular, becoming should *not* be construed as presupposing an *ontological* asymmetry between past (or present) and future, but as the successive occurrence of timelike-related events, an issue related to the various arrows that have been taken to mark the asymmetry of time.

### 1. The presentism/eternalism Debate and its Ramifications in Current Philosophy of Time

First and foremost among the examples of a misguided metaphysical use of an apparently meaningful notion is given by the *pseudo-predicate* “is real”, which, in current philosophy of time, is very often invoked to create distinctions or

Minkowski's, that is still regarded as the arena for all processes described by contemporary quantum field theories (except for the gravitational interaction)<sup>3</sup>.

In the following, I will argue that the debate between presentists and eternalists either lacks a clear formulation or is merely *semantical*. In any case, my conclusion is rather skeptical and antimetaphysical, since I submit that the presentism/eternalism debate should be regarded as having no implications whatsoever both for our understanding of the ontology of Minkowski spacetime and for notions like *change*, *persistence* and *becoming*, which, if they have to be mind-independent, must certainly be regarded as being *ontological* notions. Consequently, we should resist the temptation of invoking the special theory of relativity or the structure of Minkowski spacetime in order to try to adjudicate between a metaphysical view in which only the present is real and a view in which past, present and future are equally real.

## 2. The lack of contrast class for the expression “the reality of the future (past)”<sup>4</sup>

As I see it, the main trouble raised by the claim that “the future is real” is that this claim has no “contrast class”. What I mean by this expression has been wonderfully clarified by Austin more than 40 years ago: “the function of the word ‘real’ — he wrote — is not to contribute positively to the characterization of anything but to exclude possible ways of being not real — and these ways are both numerous for particular kinds of things, and liable to be quite different for things of different kinds” (Austin, 1962, p. 70)<sup>5</sup>. Taking Austin's hint, the important question to be answered in order to ascertain the existence of a genuine, ontic disagreement between presentists and eternalists is the following: “how could the future or the past *fail* to be real”? If, as Sider has it, according to the presentist “only currently existing objects are real”, it follows that there must be a clear sense in which non-currently existing objects are unreal. (What above is referred to as the contrast class of “is real”). But what, exactly, is being denied by the presentist's implication that the future “is not real” or simply “does not exist”, above and beyond the platitude that it does not exist *now*?

Let us look at some cases in which there is a clear contrast class between “real” and “not real”. We understand the difference between: “this is real

<sup>3</sup>General relativity is of course more fundamental than the special theory, but we still do not know how to connect it with quantum field theory.

<sup>4</sup>For simplicity and in discussing the presentist's position in relation to the issue of becoming, I will limit my considerations to the ontological status of the *future*, but the same considerations apply, symmetrically, also to the past.

<sup>5</sup>Reference to Austin in this context has been brought to the fore also by Yuval Dolev, who, independently of me, has argued on a similar line in the paper presented at the Montreal conference. See also Savitt, this volume, and Dolev, this volume.

mind-independent feature of the universe, it is not legitimate to conflate a “static” representation with the thing (time) that is being represented<sup>8</sup>.

The antecedent of the conditional *must* be granted simply because also in Minkowski spacetime timelike-separated events are objectively, invariantly timelike-related, and events, *by definition, occur or happen*. They do so, so to speak, *a priori*. If any two events *are* tenselessly timelike separated, and a reasonable arrow of time can be assumed, one event will happen after the other, and this suffices to assume the mind-independence of (tenseless) becoming: the fact that in a block-view pairs of timelike-separated events *exist at their location*, as one often hears, does not mean that they are all simultaneous, but simply that one event of the pair occurs and then the other does. And the events’ very being is their occurring.

Summarizing, the representation in which all events are given, and time is like an extra-dimension of space is a mere picture; the thing being represented, however, is the “real” world or the real spacetime, characterized by events objectively and mind-independently following one another in time. No sensible eternalist will argue that the events along the temporal dimension of the universe are all simultaneous with each other (as in a *Totum Simul*), *because otherwise such events could not occur, as they actually do, in temporal succession*. But if events occur in succession, then there is form of becoming consisting of such successive occurrence, and events cannot coexist simultaneously as they do in space.

I want to suggest that it is only a misleading interpretation of the “as-real-as-claim” in Sider’s quotation above that creates the impression of a “real” difference between eternalism and presentist<sup>9</sup>. In other words, *it is only if the eternalist interprets the “future-as-real-as-the-present-claim” as the absurd view that all events are simultaneous with each other that a difference with the presentist would be available*. Once this absurdity is rejected, how can the presentist avoid any form of existential commitment to future events? We have seen that if the presentist accepts as true that “it will be the case that some object or other exists”, where “exists” is present tense, then she will be committed to the same view allegedly defended by her enemy, the eternalist, namely, “the reality of the future”. The only way to avoid a collapse of the presentist’s position on the eternalist one seems to consist in arguing that “it will be the case that something or some event *E* exists” does *not* amount to an existential commitment to that something, because the quantifier is inside the scope of the tense operator **F** (“it will be the case that”). It is not by chance that this is exactly the line taken by Sider (2004)<sup>10</sup>, which will be discussed in the following.

<sup>8</sup>In a paper presented at the Montreal conference, a similar point has been stressed also by Richard Arthur. See Arthur (this volume).

<sup>9</sup>I am not suggesting that Sider is guilty of this misinterpretation.

<sup>10</sup>I thank Theodore Sider for permission to refer to a paper in progress.

disease. And besides, what would prevent one from using the future-tense operator to refer to the different world that will be created after the present and claim that “*there will be* an act of creation of a different world”?

If anything, this reference to occasionalism has the merit of reminding us of a possible *theological* origin of presentism (apart from the important role of tenses in ordinary language): if God creates (or recreates) the world all at once (or at each instant of time), then there must be the same objective present across all the universe.

### 3. A second blow at the debate: the pluralistic nature of existence

Another, more promising way to defend the view that there exists genuine disagreement between presentists and eternalists is resort to existential quantification, and forget about the alluring but vacuous charm of “is real”. Not by chance, Sider’s quotation above ends with the claim that for presentists, dinosaurs and Mars outpost do not *exist*. Nevertheless, Sider adds, in order to have genuine disagreement, we must make sure that presentists and eternalists do *not* mean different things when referring to existence (Sider, 2001, p. 15).

However, to use Sider’s examples, the question whether dinosaurs and human outposts on Mars are in the domain of quantification of the true theory of the world, in a broadly Quinean sense, may not admit a univocal answer, or better, it may have an answer depending on our descriptive aims. We must live with the fact that, at least in the philosophical literature, “existence”, or “there exists”, is ambiguous between tensed and tenseless existence.

Def<sub>1</sub>. Event *e* exists in a *tensed* sense of “existence” just in case it exists now.

Def<sub>2</sub>. Event *e* exists in a *tenseless* sense just in case it existed, exists now, or will exist.

Def<sub>2Alt</sub>. Alternatively, and equivalently, *e* exists in a *tenseless* sense just in case it exists at a particular time–place by occupying a region of spacetime.

Attempts at arguing that there is just a univocal sense of existence, as if we had a broadly Quinean criterion of ontological commitment with no further qualification, seem to be contradicted by the fact that, for example, for the platonist *mathematical* existence is not *physical* existence, given that the former is abstract and the latter is concrete, spatiotemporally extended existence<sup>11</sup>. If we did not distinguish between mathematical and physical existence, we would not be able to distinguish those philosophers having a naturalistic position about mathematical existence from the platonists, who believe that there are also non-natural, non-spatiotemporally extended entities (namely, the mathematical ones). The *mode* of existence is fundamental in the enterprise of

<sup>11</sup>This is a response to an objection raised by an anonymous referee.

legitimacy of its use, lies in the class of abstract, non-spatiotemporally extended entities, like sets, functions or classes, whether they exist, as platonists have it, or are just fictions. In both cases, Def<sub>2</sub> is needed because we need a distinction between concretely existing entities and abstract/fictional “entities”, which are not in spacetime.

As hinted above, a defender of the view that the contrast between eternalists and presentists is genuine could claim that “there exist dodos” is false for the presentist and true for the eternalist, because they disagree about the meaning of the existential quantifier, or put it differently, disagree about which of the two senses of “existence” is more fundamental<sup>13</sup>.

The presentists tell us that tensed existence is more fundamental (after all, in most natural languages it is certainly more entrenched) and therefore “there are human outposts on Mars” *is* false. The eternalist will immediately note that the statement in question “is false *now*” (false at a certain instant of time), but that it might be true that “there will be outposts on Mars”. The presentist will say that “is false now” is redundant because “*is false*” already presupposes “is false now”, since the italicized copula is tacitly but fundamentally *tensed*<sup>14</sup>.

Note, however, that even granting that the tensed sense of existence and the tensed copula are more fundamental than the tenseless ones will not help much against the assault of the skeptic. First of all, as long as truth is relativized to instants of time, it seems difficult to deny a commitment to the future existence of outposts for both the presentist and the eternalist (assuming there will such outposts on Mars). Of course, the presentist can deny that any past or future-tense statement is true, so the debate is now captured in terms of presence or absence of definite truth values, but we have already seen why this semantic move is not to be recommended. Second, if we recall that the presentist is committed to the unreality of *any* future (past) event, the claim whose truth-value is to be evaluated is not a particular one about the presence of human outposts on Mars, but rather one concerning whether it will be the case or not that something will occur or will exist”. In this latter case it is difficult to imagine how the presentist could consistently deny it without falling into the position that we have already refuted, namely, that there is no future because the world will end. The more fundamental character of “there exist” (tensedly) does not exclude commitment to the existence of the future (of some future event) in such a way as to dissolve any alleged ontological divide.

In a nutshell, the main problem in this second way of capturing the debate seems to revolve around the meaning of “more fundamental”. If, in a moderate

<sup>13</sup>This is the way in which, for instance, Huw Price cashes the debate between presentists and eternalists (oral communication).

<sup>14</sup>I owe this suggestion to the presentist John Bigelow, during a discussion of a version of this paper, which I presented in Sidney.

event, then we are back at step one: the presentist would deny the existence of future events that the eternalists would admit.

### 5. Platonism and presentism

Consider the following example due to Sider. An eternalist believing in sets would endorse the claim that there exists (tenselessly) a set containing a dinosaur and a computer, but the platonic presentist will reject the disjunction<sup>15</sup>: “it was the case that  $((\exists x) (x \text{ is a set containing a dinosaur and a computer}))$ , or it is the case that  $((\exists x) (x \text{ is a set containing a dinosaur and a computer}))$  or it will be the case that  $((\exists x) (x \text{ is a set containing a dinosaur and a computer}))$ ”. Since at no time computers and dinosaur coexist, according to Sider the eternalist believes in something that the presentist denies, namely the existence of the above set (Sider, 2001, pp. 15–16).

This argument is not as convincing as may appear at the outset. Sider notes that in order to give the example all its force, both parts must accept the principle that sets exist only if their members *exist* (Sider, 2001, p. 16). Otherwise, there would be no difference between the eternalist and the presentist, since both could admit the existence of sets whose members never existed. But why should presentists endorsing the existence of sets *qua abstracta* accept the *highly restrictive principle* according to which such an existence depends on the *temporal coexistence* of their members or on the simultaneity of their time-slices? It would be strange to let sets exist only on the condition that their members coexist at the same time, since, after all, sets, *if they exist*, are abstract entities, whose members may well lack any temporal extension at all: think of sets of numbers or of functions. It would be odd to require that sets of numbers exist only if their members coexist in time, since numbers do not exist in time at all and even more *ad hoc* to introduce a criterion for the existence of sets of concrete objects, which has no correspondence in the case of sets whose members are abstract.

Summarizing, to the effect that sets are abstract entities, and the word “set” in our example does not simply stand for the concrete “object”, which results from the disconnected sum or “fusion” of a computer with a dinosaur, we seem to be introducing an implausible constraint. Since a set containing a computer and a dinosaur is neither a computer nor a dinosaur nor both, if it exists, it is *abstract*, and abstract objects are not located in time by definition. So the disjunction “there was a set composed by a computer and a dinosaur, or there is a set composed by a computer and a dinosaur or there will be a set composed by a computer and a dinosaur” looks like a misapplication of tensed language in a

<sup>15</sup>John Bigelow is an example of a presentist that is a realist about mathematical objects: this combination seems to be consistent.

First, (1) cannot be invoked to defend the legitimacy of denying ontological commitment to future existence in (2) since, despite the formal and semantical analogy, the case of the actualism/presentism dispute is *different* from the one that is our concern in this paper. While we know what it means for an actualist (or for the famous “person in the street”) to claim that unicorns do not exist (or that they are simply logically possible entities), namely, that they are not spatiotemporally extended, we still lack a clear meaning for the claim that the future (the past) does not exist, except the “apocalyptic” interpretations rejected above. In a word, using the terminology introduced above, (1) has a contrast class that (2) lacks and this suffices to show that the two cases are to be treated differently: (1)’s existential commitment, unlike (2)’s, depends on a clearly describable metaphysical difference.

Second, if the meaning of  $F((\exists x)(Ox))$  can be spelled out as “there will be a moment of time in which there are outposts on Mars”, the commitment to the future instant is unavoidable. This claim seems to express the following intuition: the presentist still needs to refer to past (future) objects by claiming, for instance, that Newton lived in England and wrote the *Principia*, or that “Uncle Robert will ring the bell at noon”. Frankly, I cannot see how one can use this tensed language in ordinary language without implying that Newton existed or the event in question will occur (it will be the case that it occurs). And even if we decided to change or revise the standard implications or implicatures of ordinary tensed language — by trying to argue that they do *not* imply what they seem to imply, namely, the tenseless existence of future and past events, that should therefore be accepted by “presentists” and “eternalists” alike — the argument that tenses are more natural and fundamental because more entrenched in our linguistic practice would boomerang against the presentist. This language, in fact, does entail commitment to at least some past and future events: “Newton wrote the *Principia*” as well as “Uncle Robert will ring within 10 minutes”.

A second argument that Sider uses in order to show that  $F(\exists x:Gx)$  (there will be an  $x$  such that  $Gx$ ) is not existentially committing to future events is given by the fact that while two restricted “eternalist” quantifiers over future events commute, two iterated tensed operator do not, because they presuppose an evaluation point in time (Sider, 2004, p. 9). If we say that at some point in the future, there will exist an  $H$  and that at some moment after that there will exist a  $G$  such that  $\phi - F((\exists x:Hx) F(\exists y:Gy))\phi$  — we are clearly not claiming that at some point in the future, there will exist a  $G$  and that at some moment after that, there will exist an  $H$  such that  $\phi - F((\exists y:Gy) F(\exists x:Hx))\phi$ . Suppose that  $(\Sigma_F x:Gx)\phi$  stands for “Some future  $G$  is  $\phi$ ” and  $(\Sigma_{FX}:Hx)\phi$  stands for “Some future  $H$  is  $\phi$ ”, then  $(\Sigma_{FX}:Gx)(\Sigma_{FX}:Hx)\phi$  is logically equivalent to its commutated expression  $(\Sigma_{FX}:Hx)(\Sigma_{FX}:Gx)\phi$ .

From the fact that the corresponding restricted tenseless quantifiers commute, Sider concludes that the tensed operator  $F$  and  $P$ , when they precede an

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