

## IS NOW A MOMENT IN TIME ?

### A discussion of McTaggart's argument against the reality of time from a transcendental idealist standpoint

*Michel Bitbol, CNRS, Paris, France*

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**Abstract :** In this paper, a concept of the 'actual now' is introduced. The 'actual now' is negatively characterized by the fact that it is absent from the time-series (that it is no instant of time at all). This does not mean that the 'actual now' is *outside* the time-series. For saying so would wrongly suggest the existence of an 'outside' (a sort of metaphysical eternity) where the 'actual now' could be located. Instead, one considers that the 'actual now' is just the name of 'that with respect to which' any event can be said to be past or future, yet being no event by itself. It holds the same role with respect to time as Husserl's transcendental *ego* with respect to the empirical self.

McTaggart's celebrated refutation of the reality of time is reinterpreted accordingly. To express this argument, one no longer needs to use the notions of 'change' or 'time flow', but only to point out the in-principle impossibility to refer to the 'actual now' (for, if one *now* refers to 'now', the now which is referred to is no longer the *actual* now)

#### **Introduction:**

*Now* is usually considered as a (point-like) part of time, by physicists as well as by philosophers. Most physicists would say that it is nothing more than the subjective characterization of a particular instant of time. As for the philosophers of analytic tradition, they would rather insist on the function of the word "now" in ordinary language, by ascribing it a so-called token-reflexive definition. According to them, the sentence "The event *e* is happening now" means "the event *e* is simultaneous to the utterance of the word 'now' which belongs to this sentence". Thus, *now* reduces to the instant which is simultaneous to the utterance of the corresponding word, which is another way of saying that it is a part of time.

However, this projection of now in time leads one to lose a non-negligible fraction of the content of the word. For, after all, one of the most striking components of its meaning is *self-elusiveness*: as soon as *now* is defined, characterized, localized, or merely taken as an object of awareness, it is likely to be no longer *really now*. The present paper is devoted to an analysis of this well-

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<sup>1</sup>Several arguments of this paper were first published in "The missing now", *Contextos*, VI/11, 1988, 7-31. In M. Bitbol & E. Ruhnau (eds.), *Now, Time and quantum mechanics*, Editions Frontières, 1994, the paper was just entitled "Now and Time".

known paradoxical feature of "now". First of all, I'll then define an entity which both plays a role in time relations and does not belong to any time series: the "actual now". This notion will prove useful to understand the original richness of McTaggart's celebrated argument against the "reality" of time. I'll also introduce progressively the theme of the involvement of now in many (or may be every) self-referential situations. This deep affinity between now and self-reference will appear to be the key point enabling one to go beyond the traditional opposition between a "static" and a "kinematic" view of time.

### 1) Temporal predication of events

#### a) *Levels of predication*

The introductory point I'll examine is the subtle distinction that ordinary language maintains between temporal predicates: ((is) present, past or future) on the one hand, and temporal copulas (has been, is, or will be) on the other hand. The importance of this distinction may be appreciated through careful analysis of the meaning of two simple sentences:

(a) The event  $e$  is past

(b) The event  $e$  has been present

If we reduce the time-copulas to time predicates, (a) and (b) become:

(a<sub>1</sub>)  $e$  is past, or  $Pe$

(b<sub>1</sub>)  $e$  is present in the past, or  $PNe$

( $P$  standing for 'past' and  $N$  for 'present' or 'now')

The reduction can be carried out one step further by acknowledging that '(...)the presentness of an event *is* just the event.<sup>2</sup>. ' $e$ ' and ' $e$  is present' are then equivalent. This equivalence may be displayed in sentences (a) and (b) by dropping the predicate  $N$ :

(a<sub>2</sub>, b<sub>2</sub>) = (a<sub>1</sub>)  $e$  is past, or  $Pe$

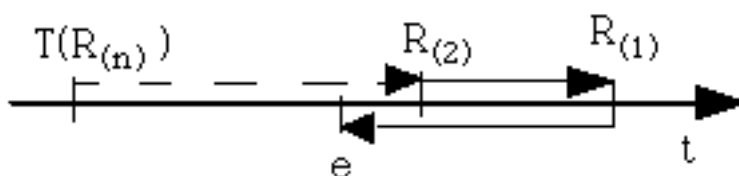
$Pe$  turns out to be the usual unique notation for both (a) and (b), since in Prior's system<sup>3</sup> the predicate  $N$  is not used.

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<sup>2</sup>A. Prior, "The notion of the present" in: J.T. Fraser, F.C. Haber and G.H. Müller (eds), *The study of time*, Berlin, Springer-Verlag, 1972, p. 322

<sup>3</sup>A. Prior, *Past, present and future*, Oxford, Oxford University Press, 1967

At this stage, any difference between the two sentences under consideration is lost. This difference is however far from purely formal. Rather, the possibility of complex tenses (such as past perfect and future perfect) relies on it. According to Reichenbach<sup>4</sup>, one needs, when dealing with complex tensed sentences, to consider both the time of utterance and the time from which the event spoken of is directly referred to; the latter is called the 'point of reference'. More generally<sup>5</sup>, one can account for any tense of higher order than past perfect and future perfect through a hierarchy of points of reference, of which the time of utterance is only a particular instance. The construction of the said hierarchy may be carried out in the following way: The time from which the event  $e$  spoken of is directly referred to is called the first-level point of reference  $R_{(1)}$ . The time from which  $R_{(1)}$ 's view of  $e$  is referred to, is the second-level point of reference  $R_{(2)}$ ; etc. The time  $T$  of utterance is then identical to the last-level point of reference  $R_{(n)}$  (see diagram).



A difference between Prior's account and the present one lies in the top of the hierarchy of points of reference. Prior indeed considers the time  $T$  of utterance as the *first*-level point of reference, whereas the time from which  $e$  is directly referred to is said to be the *last*-level point of reference. Our opposite choice is justified by the fact that  $R_{(1)}$  can easily be specified from a simple internal analysis of the complex-tensed sentence under consideration, and is thus a convenient departure point for building the hierarchy of points of reference. By contrast, the 'time of utterance' *can only be defined through a meta-reference to the sentence*. Indeed, any point of reference can *a priori* be associated with *some* utterance, just in the same way as the very point we called 'time of utterance'. What actually distinguishes this 'time of utterance' from other points of reference is the fact that it is the time of utterance *of the complete sentence itself*.

Now, let us come back to sentences (a) and (b). In (a), the only point of reference is the 'time of utterance' itself. The event  $e$  is indeed directly referred to from the time of utterance, by being ascribed the characteristic of 'pastness'. Sentence (b), on the other hand, has two points of reference. From the first one,  $R_{(1)}$ ,  $e$  is ascribed the characteristic of 'presentness', whereas from the second one

<sup>4</sup>H. Reichenbach, *Elements of symbolic logic*, London, Mac Millan, 1974

<sup>5</sup>A. Prior, *Past, present and future*, Oxford, Oxford University Press, 1967

$R_{(2)}$  (which is identical to the time  $T$  of utterance),  $R_{(1)}$ 's view of  $e$  is located in the past.

The symbolic writing of any tensed sentence should at least implicitly *display* the hierarchy of points of reference on which it is built. This can be done by using quotation marks. For instance,  $(a_1)$  would remain  $Pe$ , while  $(b_1)$  would become  $P'Ne'$ , to bring about the fact that in  $(b)$ ,  $e$  is not referred to directly from the time  $T$  of utterance, but indirectly, through a point of reference  $R_{(1)}$  for which it is present. The fact that one allows  $'Ne'$  to be equivalent to  $'e'$  then no more leads to the disappearance of any difference between  $(a_1)$  and  $(b_1)$ . Indeed, the latter sentences transform into:

$(a'_2)$   $Pe$

$(b'_2)$   $P'e'$

A meta-description of these sentences, leading to include the time of utterance into the hierarchy of points of reference, can also be denoted by further addition of quotation marks:

$(a'_3)$   $N'Pe'$  or  $'Pe'$

$(b'_3)$   $N'P'e''$  or  $'P'e''$

McTaggart did not ignore completely the distinction expressed by the quotation marks in  $(a'_2)$  and  $(b'_2)$ , even though he did not bring out its ultimate consequences. The concept of point of reference was in fact partly introduced in his 1927 treatise, where it bears the name 'moment': "When we say that  $X$  has been  $Y$ , we are asserting  $X$  to be  $Y$  at a moment of past time."<sup>6</sup>

b) *Relations and the 'actual now'*

A further clarification of the notion of time-predication can be realized if the usual one-place predicate of events is replaced by a two-place predicate relating the two components of the couple: (Point of reference, event). For instance, when the elementary sentences  $Pe$  and  $Fe$  are embedded within the

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<sup>6</sup>J.M.E. McTaggart, *The nature of existence*, Cambridge, Cambridge University Press, 1927, p. 21. Dropping the concept of point of reference, in simplified versions of McTaggart's reasoning, was denounced by Lowe and by McBeath as an "indexical fallacy". Indeed, each proposition in which a first-order time predicate is attributed to an event is meaningful only with respect to a 'now' (the indexical term) from which it can be said to be true or false. Accordingly, a proposition containing an  $n$ -th order time predicate is meaningful only with respect to the  $n$  points of reference from which each of the  $n$  constituent first order predicates can be said to be true or false. (E.J. Lowe, "The indexical fallacy in McTaggart's proof of the unreality of time", *Mind*, 1987, p. 62; M. McBeath, "Dummett's second order indexicals", *Mind*, 1988, p. 113)

metasentences 'Pe' and 'Fe', the points of reference from which e can be said to be past or future are explicitly referred to. In this case, nothing prevents one from *displaying* these points of reference ( $R_{(a)}$ ,  $R_{(b)}$ ) in the denotation of Pe and Fe:

$$\exists R_{(a)}[P(R_{(a)},e)] \text{ and } \exists R_{(b)}[F(R_{(b)},e)]$$

Or: 'There exists a point of reference  $R_{(a)}$  with respect to which e is past', and 'there exists a point of reference  $R_{(b)}$  with respect to which e is future'.

An issue must still be clarified. It concerns the nature of  $R_{(a)}$  and  $R_{(b)}$ . In our first outline of a definition,  $R_{(a)}$  and  $R_{(b)}$  are abstract entities called 'points of reference' which means that they are not events by themselves. But they may easily be defined by their simultaneity with some reference events  $e_a$  and  $e_b$  (for instance the utterance of the sentences 'e is past' and 'e is future'), in such a way that 'e is past with respect to  $R_{(a)}$ ' is equivalent to 'e is earlier than  $e_a$ ' and 'e is future with respect with  $R_{(b)}$ ' is equivalent to 'e is later than  $e_b$ '

But a major difficulty arises if one tries to express in a relational way the same sentences Pe and Fe, *when they are not embedded within some meta-sentence wherein both the sentence and its last-order point of reference are referred to*. We'll discuss this point at length, for it is the axis around which the problem of time revolves.

A first way to address the said difficulty is to deny its very existence. This denial was first formulated by J.J.C. Smart<sup>7</sup> through his token-reflexive analysis of simple tensed sentences. For him, *every* tensed sentence bearing on an event e reduces to a B-relation (simultaneity, earlier or later) between the event e and the utterance of the sentence. But, as we noticed previously, the simple fact that one speaks of the utterance of a sentence involves a meta-sentence in which the sentence is referred to. This is enough to violate our preliminary requirement ; therefore Smart's denial does not solve the problem but rather consists in ignoring it. An advocate of Smart's position could argue at this point that the case of a tensed sentence which is not embedded in a meta-sentence is after all very artificial, and that all practical uses of tensed sentences involve a meta-statement of simultaneity. This may be true, but only *ex post facto*. For, in the process of uttering a tensed sentence, the meta-statement must by necessity remain implicit: *saying explicitly* that an event e is simultaneous with 'this utterance' is not equivalent at all to saying that e is taking place *now*, nor is saying explicitly that e is earlier or later than 'this utterance' equivalent to saying that e is past or future (with respect to now). Indeed, according to the token-reflexive theory, *now* should always be defined by pointing at the meta-sentence which *is being* uttered, rather

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<sup>7</sup>J.J.C. Smart, "The river of time", *Mind*, 1949, p. 492

than at the past sentence which this meta-sentence refers to. But the new definition in turn implies a meta-meta-sentence, etc... Then, the relevant point to notice here is that the token-reflexive definition of 'now', however able to encompass the practical *a posteriori* content of the word, fails to grasp the singularity of the concept of an 'actual now'. A now which cannot be referred to without becoming part of the field of description of 'another' now which then holds its role. The reason why this concept is so rarely considered in analytic philosophy is probably due to the striking fact that the 'actual now' *cannot even be made objective* without evacuating from it most of its original meaning.

By contrast, this marginal status of the 'actual now', and the fact that it represents a boundary of thought, seems to have raised a lot of interest in continental philosophy, starting with Hegel's well-known considerations on the "here-and-now" in the *Phenomenology of Spirit*. One finds in Sartre, for instance, a striking expression of the lack of any possibility of objectifying 'the actual now' (called by him 'the present'), as opposed to a *referred to* 'now' (which he calls 'the present *instant*'): "(...)the present *is not*; the present instant emanates from a realistic and reifying conception of the for-itself"<sup>8</sup>. In other terms, the 'actual now' is nothing that can be referred to (and therefore no thing to which one can ascribe *being*); as for the referred to 'now' (namely a certain token-reflexively defined instant of time), it is just a reification and an impoverishment of the 'actual now'.

Much earlier, the conception of time which was held by many ancient philosophers could hardly be understood without making any reference to the concept of the "actual now". For instance, as Hintikka pointed out: "(...)Aristotle saw no difficulty in combining the two assumption which to a modern thinker are likely to seem incompatible, viz. the assumption that the truth value of a temporally indefinite sentence changes with time, and the assumption that the sentence may nevertheless express one and the same content"<sup>9</sup>. This difference between Aristotle and Hintikka's 'modern thinker' is likely to arise from the fact that Aristotle retained the experienced immutable and self-elusive aspect of the 'actual now' as a crucial component of meaning of the word 'now', whereas modern (analytic) philosophers tend to overlook it. Under an Aristotelian premise, the content of a temporally indefinite sentence can indeed be considered immutable insofar as it is permanently relative to the 'actual now' (or *nunc stans*).

A diametrically opposite approach to the difficulty of finding a relational expression for tensed sentences which are not part of any meta-sentence referring to their last-order point of reference, consists in declaring that this difficulty cannot be overcome in principle. Some authors indeed hold that there exist situations wherein *ascription of tensed predicates is irreducible to any relational*

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<sup>8</sup>J.P. Sartre, *Being and nothingness*, London, Methuen, 1957, p. 123

<sup>9</sup>J. Hintikka, *Time and necessity*, Oxford, Oxford University Press, 1973, p. 73.

*account*<sup>10</sup>. Their position will be challenged soon, but one must admit that it is coherent. At least, it recognizes the nature of the difficulty, by denying that one can always refer to a temporal reference point relative to which the tensed predicate holds. The only problem is that this position remains truncated. Firstly, by maintaining a distinction between two classes of tensed sentences (those which are reducible, and those which are irreducible, to a relational expression), it renounces to conceive a unified view of this category of sentences. Secondly, it evacuates the concept of the 'actual now', just as completely as the token-reflexive analysis does, by carefully avoiding any mention of it.

The approaches of the problem of giving a relational expression to tensed sentences which *are not embedded within some meta-sentence*, are not exhausted at this point. A remarkable third way of dealing with this difficulty was suggested (yet not further developed) by McTaggart: "If (...)anything is to be rightly called past present or future, it must be because it is in relation to something else. And this something else to which it is in relation must be something outside the time-series"<sup>11</sup>. One can interpret this odd reference to 'something outside the time series' as follows. When tensed sentences such as Pe and Fe are not embedded in some meta-sentence in which their last-order point of reference is referred to, their relational content can be expressed only by saying that e is past or future with respect to 'now'. Furthermore, as a result of our discussion of the token-reflexive analysis, we know that these tensed sentences are not equivalent to an explicit statement according to which e is simultaneous to, earlier than, or later than, a given event *belonging to the time-series*. If one can speak of a 'now' with respect to which e is said to be past or future, then *it does not belong to the time-series*. Claiming further that it is *outside* the time-series appears to be a metaphorical expression for its being *absent* from the time-series. The problem is that such a metaphor could be misleading if it suggests the existence of an 'outside' where the 'actual now' can be located. The 'actual now' has in fact no location anywhere, and no other property than being the abstract 'that with respect to which' an event is past or future, when the ascription of pastness or futurity does not refer to a point of reference belonging to the time-series. In a relational denotation of tensed sentences which are not part of any meta-sentence, it must then *hold the place of a point of reference, without being specified as such*. We will express it by a blank, namely to an empty place for an unspecified point of

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<sup>10</sup>K. Rankin, "McTaggart's paradox, two parodies", *Philosophy*, 1981, p. 333. See also Q. Smith, "Sentences about time", *Philosophical quarterly*, 1987, p. 37

<sup>11</sup>J.M.E. McTaggart, *The nature of time*, (op. cit.) p. 19. This paragraph of McTaggart's treatise has been rarely commented. However, a very clear account of it was given by K. Rankin, "McTaggart's paradox, two parodies", *Philosophy*, 1981, p. 333-348. According to this author, McTaggart was led to the quoted sentence by noticing '(...)first that the A-determinations may be relativized to events or position in the time series, and second, that they are cannot be exclusively so relativized, that in some applications they are ultimately mediating. Hence, instead of concluding, as he equally well might have (and indeed seriously considered) that A-determinations are not exclusively relational, he further inferred that (directly or indirectly) they are relations to something extra-temporal'

reference. When  $P_e$  and  $F_e$  are *not* part of a meta-sentence, we may thus rewrite them:

$$P( \cdot, e) \text{ and } F( \cdot, e)$$

Such a relational account of the tensed terms Past and Future can easily be generalized to the writing of any higher-order tensed sentence *which is not part of any meta-sentence*. This only requires to maintain a strict one-one correspondance between the points of reference and the events to which they are simultaneous. Indeed, if this condition is fulfilled, the two-place predicates P and F can relate a point of reference to another just as well as they relate a point of reference to an event. A n-th level complex tensed sentence then takes the form:

$$\exists R_{(i)}(i=1, \dots, n-1) [U^n( \cdot, R_{(n-1)}) \wedge U^{n-1}(R_{(n-1)}, R_{(n-2)}) \wedge \dots \\ \wedge U^2(R_{(2)}, R_{(1)}) \wedge U^1(R_{(1)}, e)]$$

Where  $R_{(i)}$  are the points of reference,  $\wedge$  stands for the logical conjunction 'and', and  $U^i$  is either F or P.

For instance, the second-level sentence 'P'Fe' writes:

$$\exists R_{(a)} [P( \cdot, R_{(a)}) \wedge F(R_{(a)}, e)]$$

But, if an n-th level tensed sentence is part of a meta-sentence referring to its ultimate point of reference, the blank in the relation  $U^n$  must be replaced by  $R_{(n)}$ .

For instance, *when it is embedded in 'P'Fe'*, the sentence 'P'Fe' writes:

$$\exists R_{(a)} R_{(b)} [P(R_{(b)}, R_{(a)}) \wedge F(R_{(a)}, e)]$$

While the *complete* sentence 'P'Fe'' writes:

$$\exists R_{(a)} R_{(b)} [N( \cdot, R_{(b)}) \wedge P(R_{(b)}, R_{(a)}) \wedge F(R_{(a)}, e)]$$

To conclude this section we must stress again the main point which was raised in it, namely that the 'actual now' is necessarily, by its own definition, absent from any tensed sentence. But the way one deals with this absence is of uttermost importance for understanding the role the absent entity plays in our account of time. We have successively described three such ways.



1) The first one merely amounts to remain silent about the existence of the 'actual now' which is the ultimate point of reference of a tensed sentence. This attitude is not incorrect by itself, and it is the most widespread. However, complete silence opens the possibility of a flat denial of any role for the 'actual now'.

2) The second one consists in making extensive use of quotation marks in complex tensed sentences, in order to display the hierarchy which constitutes the framework on which the said sentences are built. In this approach, the 'actual now' is assigned the virtual domain of what is *external* to the higher level quotation marks.

3) The third one is the most comprehensive and explicit approach of all since, in it, both the absence from the time-series and the crucial role of the 'actual now' are manifested. This was done by using a *blank* to denote the unspecified higher-order point of reference to which an event is related in a tensed sentence. The latter notation underlies a far-reaching change of perspective. As long as *now* is merely *absent and tacit*, its intervention is occult and uneasy to handle. By contrast, displaying clearly the relational position of the actual now, is likely to provide a tool allowing one to grasp its all-pervasive role. Provided it is made explicit, the "actual now" is likely to become a unifying concept in the analysis of the most paradoxical features of time.

## 2) Incompatible predicates

### a) *When is now?*

The previous reflections about the status of 'now' can provide us with a better understanding of McTaggart's refutation of the "reality" of time. Let us examine the way the ascription of incompatible predicates to one and the same event was introduced by McTaggart, as a *first* step of his celebrated infinite regress. The sentence 'e is past *and* present *and* future', which apparently involves a flat contradiction, was considered by McTaggart to be a necessary *consequence* of the tensed sentence 'e has been future, is present, and will be past'<sup>12</sup>. It is in this sense that the ascription of three contradictory tensed predicates is said by McTaggart to be a result of 'change', or time flow. But the tensed sentence also becomes, at a further point of the reasoning, the *second* step of the same regress. Indeed, using second-order time copula (i.e. tenses) is the way the contradiction involved in first-order ascription of three incompatible time predicates can be

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<sup>12</sup> "The characteristics, therefore, are incompatible. But every event has them all. If M is past, it has been present and future. If it is future, it will be present and past. If it is present, it has been future and will be past. *Thus all the three incompatible terms are predicable of each event which is obviously inconsistent with their being incompatible*, and inconsistent with their producing change". J.M.E. McTaggart, "The unreality of time", *Mind*, 17, 456-473, 1908

removed<sup>13</sup>. Eventually, the second-order time copula are *again* reduced to temporal predicates, which generates a third step in the regress, etc. Is then the first step of the infinite regress only a consequence of its second step, as Prior<sup>14</sup> showed it is the case provided one takes literally McTaggart's formulation? If this were the only way to get the crucial first step of the regress, the whole reasoning would be undermined at a very elementary level, since it would be a mere *petitio principii*.

But the whole subtlety of this part of the argument lies in the loose use of the meaning of tensed expressions by McTaggart. I shall argue in the following that 'will be' and 'has been' does not mean exactly the same thing when they are used by the author as an *introduction to the first step* of the regress as when they constitute the basis of its *second step*.

At the very beginning of the argument, McTaggart states:

Ma: 'If M is past, it has been present and future. If it is future, it will be present and past. If it is present, it has been future and will be past. Thus, all the three characteristics belong to each event.'<sup>15</sup>

Here, the meaning of the tensed forms 'has been' and 'will be' is taken for granted by the author. But when he comes to his second step, this meaning is made explicit, through the use of the concept of 'moment' which corresponds to what we have called (after Reichenbach) a 'point of reference':

Mb: 'Thus, our first statement about M - that it is present, will be past and has been future - means that M is present at a moment of present time, past at some moment of future time, and future at some moment of past time.'<sup>16</sup>

A straightforward interpretation of the latter quoted sentence (Mb) allows us to write the conjunction of statements about the event M in the following way:

MT2 (Mb):

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<sup>13</sup> "It is never true ... that M is present, past and future. It is present, *will be* past, and *has been* future. Or it is past, and *has been* future and present, or again is future and *will be* present and past. The characteristics are only incompatible when they are simultaneous, and there is no contradiction to this in the fact that each term has all of them successively. But this explanation involves a vicious circle. For it assumes the existence of time in order to account for the way in which moments are past, present and future. Time then must be pre-supposed to account for the A series. But we have already seen that the A series has to be assumed in order to account for time. Accordingly the A series has to be pre-supposed in order to account for the A series. And this is clearly a vicious circle". J.M.E. McTaggart, "The unreality of time", *Mind*, 17, 456-473, 1908

<sup>14</sup>A. Prior, *Past, present and future*, Oxford, Oxford University Press, 1967, p. 5

<sup>15</sup>J.M.E. McTaggart, *The nature of existence*, Cambridge, Cambridge University Press, 1927, p. 20

<sup>16</sup>Op. cit. p. 21.

$$\exists R_{(1)}[N( ,R_{(1)})^{\wedge}N(R_{(1)},M)]$$

$$\text{and } \exists R_{(2)}[F( ,R_{(2)})^{\wedge}P(R_{(2)},M)]$$

$$\text{and } \exists R_{(3)}[P( ,R_{(3)})^{\wedge}F(R_{(3)},M)]$$

The moments (or points of reference) which are alluded to, are represented here by  $R_{(1)}$ ,  $R_{(2)}$  and  $R_{(3)}$ .

In the first quoted sentence (Ma), however, the absence of any reference to 'moments' implicitly calls for a slight (but decisive) difference of interpretation of formally similar tensed expression. In so far as the points of reference are not even mentioned, one is indeed authorized to work out the sentences just as if these points were bearing the same open status as the 'actual now' itself. For instance, the former expression would become:

MT1 (Ma):

$$[N( , )^{\wedge}N( ,M)] \text{ and } [F( , )^{\wedge}P( ,M)] \text{ and } [P( , )^{\wedge}F( ,M)]$$

The two-place predicates relating only two blanks could then be removed for a purpose of economy of thought, just by the same process the blank in an expression such as  $F( ,M)$  is usually removed, and  $F$  is considered economically as a one-place predicate. But once this is done, we are left with:

MT3:  $N( ,M)$  and  $P( ,M)$  and  $F( ,M)$

or even:  $NM$  and  $PM$  and  $FM$ , which is just the first step of the infinite regress.

An argument could still be used to dismiss this analysis of McTaggart's thought. It is the fact that the sentence Mb aims openly at explaining the meaning of 'has been' and 'will be' in Ma and that therefore MT1 should retrospectively become identical to MT2. But it appears that this precision comes too late: once the loose meaning of the tensed expression in Ma has opened the way to the ascription of incompatible tensed predicates to one and the same event, namely to MT3, further tightening can but give rise to the second step of the regress. The introductory argument of McTaggart's reasoning thus arises from an imperceptible shift of the meaning of the tensed expression, and in particular of the status of the points of reference which constitute the network on which any compound tensed sentence is built. The shift goes from an unspecified entity to a set of specified 'moments', from the referring 'actual now' to the referred to 'nows'. However, the introductory argument of McTaggart could have been stated in a much more straightforward manner. It was indeed enough to say that the 'actual now' being 'outside' the time series (the series of events), its relation to an element

of the time-series is undetermined, and that it may, in particular, be any tensed relation whatsoever. In other words, the hidden seed of McTaggart's regress is that there is no answer to the question 'when is the actual now?'. This version of McTaggart's introductory argument does not use the notion of 'change' or of 'time flow' any longer, but merely relies on the impossibility of referring to the 'actual now'. The relation between such a negative property of the 'actual now' and the notion of 'time flow' is to be examined thereafter.

An important issue to raise at this point is the question as to whether the mentioned imprecisions in the implicit use of 'now' are really specific to this indexical term, and to time. According to Mac Beath<sup>17</sup>, the same problem exists for other indexicals among which the most striking example is 'here'.

Let us consider the two following propositions:

O1: 'London is nearby far away, but far away nearby'

DO1: 'London is nearby and far away'

As long as 'here' is completely unspecified, it may appear that DO1 is a possible consequence of O1. But if, as suggested by the author, O1 means:

O1a: "'London is nearby" is true (only) if said far away, and "London is far away" is true if said nearby.'

then, one has gained an explicitation of the existence of two 'heres' from which the two contradictory propositions of DO1 are asserted, and any confusion is avoided. Using the relational notation we have introduced, with Fa for 'Far away' and Ne for 'Nearby', L for London and  $H_{(i)}$  for the specified 'heres', and further dropping the explicit mention of a truth-ascription in O1a, we can rewrite O1, DO1, and O1a:

O1:  $[Fa( , ) \wedge Ne( , L)]$  and  $[Ne( , ) \wedge Fa( , L)]$

DO1:  $Ne( , L)$  and  $Fa( , L)$

O1a:  $\exists H_{(1)} [Fa( , H_{(1)}) \wedge Ne(H_{(1)}, L)]$

and  $\exists H_{(2)} [Ne( , H_{(2)}) \wedge Fa(H_{(2)}, L)]$

The parallel of O1, DO1 and O1a with expressions MT1, MT3 and MT2 respectively, is so striking that one might consider that the problem of time is not as *specifically* untractable as it first appeared to be. This similarity is however purely formal. The blanks in expressions DO1 and O1a, as well as the left-hand

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<sup>17</sup>M. Mac Beath, "Dummett's second order indexicals", *Mind*, 1988, p. 113

blanks in O1 occupy the place of a 'here' which is not specified *but could be so without losing the status of 'actual here'*. Indeed, we can locate what we call the 'actual here' without moving at all, and thus be still enabled to call it 'the actual here' when the location has been carried out. On the contrary, if we locate the temporal position of the 'actual now' with respect to a given origin, it is no more the *actual* now when this location has been carried out. It is also true that it is possible to make reference to events occurring here, while being here, but it is not possible to make reference to any event occurring now without making, by the sole fact of this reference, a distinction between the referred to 'now' which is no longer really now, and the referring 'actual now'<sup>18</sup>.

The latter way of expressing the difference between here and now, however intuitive, is quite loose because it involves usual temporal and spatial expressions such as 'when', 'coordinates' 'location', past tenses etc... One may nevertheless formulate easily the previous observations without making use of our usual picture of space and time. One just has to reduce them to a distinction between the grammatical properties of 'here' and 'now' within the following kind of self-referential sentence:

I: The 'actual here' and its content can be specified here, whereas the 'actual now' and its content cannot be specified now.

A related thought was developed by Schrodinger, while he was speaking of the 'ego': 'The reason why our sentient, percipient and thinking ego is met nowhere within our scientific world picture can easily be indicated in seven words: because it is itself this world picture.'<sup>19</sup>. Such a remark would hold in an even far more rigorous sense if it were applied to 'the actual now' rather than to the 'ego' or 'I'. Indeed, the concept of an 'ego' has a wide field of definition in its usual acceptation. In addition to its Husserl-like transcendental position, it includes empirical features such as my past history, my body, etc... and these at least can be included in the objective picture of the world. By contrast, the 'actual now' has no such non-transcendental aspects and thus has definitely no place in the objective picture of the world. For it is nothing more and nothing else than the pure referring 'now' from which everything is referred to. I'll come back later to this remarkable relationship between the 'actual now' and the concept of a knowing subject.

#### b) *Infinite regress*

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<sup>18</sup>K. Rankin, ("McTaggart's paradox, two parodies", *Philosophy*, 1981, 333-348), tried (parodically) to reduce the problem of incompatible tensed predicate ascription to another non-temporal instance. He recalled Plato's paradox according to which Simmias is both tall and short, but that each of these predicates is purely relational. Tall or short can then only be said of Simmias by comparison with somebody else. It seems to me that the analogy with incompatible tensed ascription is once more purely formal, because the human being to whom Simmias is compared could be specified without altering him (and in particular without altering his height). This is not the case for the "actual now".

<sup>19</sup>E. Schrödinger, *Mind and matter*, Cambridge, Cambridge University Press, 1983, p. 138.

Most simplified versions of McTaggart's reasoning make use of compound tensed predicates in order to build the infinite regress which this reasoning is based on<sup>20</sup>. The first step of the regress consists, as we know, in ascribing the three incompatible predicates P, N, F to the same event e:

R1: Pe and Ne and Fe.

But, to proceed, e is not now past, present and future: it will be past (or FPe in terms of tensed predicates), is now present (or NNe), and has been future (or PFe). At which point one notices, say, that F is not the only tensed predicate which can be ascribed to Pe. In fact, the same three incompatible ascriptions as at the first step can be made at this higher level. We then arrive at a new set of three contradictory predicates, although at this stage they are ascribed to Pe rather than to e :

R2: PPe and NPe and FPe

(The same reasoning as for Pe would hold for Ne or for Fe, hence we have PNe and NNe and FNe; PFe and NFe and FFe)

Here again, e is ascribed incompatible predicates, the only difference being that, in the latter case, they are compound tensed predicates of the second order, while in the previous one they were simple tensed predicates. Therefore, any attempt at removing the contradiction from R1 by noticing that the three incompatible tensed predicates cannot be ascribed *simultaneously* to e, is bound to result in a new contradiction through the ascription of incompatible tensed predicates of higher level of complexity to the same event e.

The replacement by Lowe<sup>21</sup> and Mc Beath<sup>22</sup> of '(...)the compounding of tenses in an object language with a hierarchy of simply tensed meta-languages'<sup>23</sup> did not succeed in suppressing any kind of infinite regress<sup>24</sup>, but at least it changed the *nature* of this regress.

The key point of the new interpretation is, as we noticed above, that it must make use, more or less explicitly, of points of reference with which each level of simple tensed ascription is related. A version of McTaggart's regress making use of the concept of points of reference (and also of the concept of an 'actual now') would develop thus:

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<sup>20</sup>See: M. Dummett, *Truth and other enigma*, London, Duckworth, 1978, p.352, for instance.

<sup>21</sup>E.J. Lowe, "The indexical fallacy in McTaggart's proof of the unreality of time", *Mind*, 1987, p. 62

<sup>22</sup>M. Mac Beath, "Dummett's second order indexicals", *Mind*, 1988, p. 113

<sup>23</sup>R. Le Poidevin and D.H. Mellor, "Time, change, and the 'indexical fallacy'", *Mind*, 1987, p. 534

<sup>24</sup>*ibid.*

The (missing) 'actual now' can be related to an event  $e$  through any of the three relations  $N$ ,  $P$  or  $F$ :

$$N(,e) \text{ and } P(,e) \text{ and } F(,e)$$

To remove the apparent contradiction, one may notice (for instance) that the relation  $N(,e)$  holds from a point of reference  $R_{(1)}$  which is present,  $P(,e)$  from a point of reference  $R_{(2)}$  which is future, and  $F(,e)$  from a point of reference  $R_{(3)}$  which is past:

$$\exists R_{(1)}[N(,R_{(1)}) \wedge N(R_{(1)},e)]$$

$$\text{and } \exists R_{(2)}[F(,R_{(2)}) \wedge P(R_{(2)},e)]$$

$$\text{and } \exists R_{(3)}[P(,R_{(3)}) \wedge F(R_{(3)},e)]$$

In the latter expression (which is just MT2), each of the explicit points of reference  $R_{(i)}$  is related in a particular way to the (missing) 'actual now'.  $R_{(2)}$  for instance is future with respect to it:  $F(,R_{(2)})$ . Still, due to the temporal indeterminacy of the 'actual now', we can have  $P(,R_{(2)})$  and  $N(,R_{(2)})$  and  $F(,R_{(2)})$  as well. Thus, the initial contradiction has reappeared at a higher level. It no longer concerns the event  $e$ , but only the points of reference which helped removing the contradiction at its first level. It is certainly this structure of the infinite regress McTaggart had originally in mind when he stated: '(...)every *moment*, like every *event*, is both past, present and future. And so a similar difficulty arises.'<sup>25</sup>

As long as tenses were assimilated to one-place predicates, their repeated intervention only resulted in an increase of the complexity of the incompatible predicates which were ascribed to the same event. The intervention of points of reference, used as substitutes for the blind spot represented by the 'actual now', allowed one to remove any contradiction from what can be said of the event  $e$ , by transferring it to the points of reference. The latter contradiction bearing on a point of reference can in turn be removed and transferred to another point of reference etc... The infinite regress still exists, but one could argue at this point that, as in Prior's interpretation<sup>26</sup>, it is no longer a threat, since any well specified contradiction at a certain level can be removed, even if it is at the expense of

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<sup>25</sup>J.M.E. McTaggart, *The nature of existence*, Cambridge, Cambridge University Press, 1927, p. 21

<sup>26</sup>A. Prior, *Past, present and future*, Oxford, Oxford University Press, 1967, p. 6

generating a new entity (the point of reference) which is bound to face the same difficulty at a higher level.

At any rate, the previous analysis has provided us with the tool we needed to answer the fundamental question generated by McTaggart's argument: Does the infinite regress of temporal predicates invalidate the idea of a time-flow which is supposed to generate it? I'll argue that far from being invalidated by the infinite regress, the idea of a time flow is but the metaphorical expression of this infinite regress. And this infinite regress originates, as it has already been suggested, from the unique characteristics of the concept of the 'actual now' concerning self-reference. In a nutshell, the conclusion will then be that the very idea of a time-flow is generated by the status of the 'actual now' with respect to self-reference. This program of research will require a clarification of the relationship between 'now' and the most general instances of self-referential regress.

c) *The self-reference of self-references*

We have already noticed that the first step of the infinite regress, namely the ascription of incompatible temporal predicates to an event, can be perceived as a consequence of the absence of the 'actual now' from the series of the specified events. It also appeared that the absolute impossibility of facing a certain class of self-referential situation (the fact that the 'actual now' and its content cannot be specified now) is a unique characteristic of the 'actual now' and that it does not hold for its spatial equivalent: the 'actual here'. I'll further stress this striking singularity of the indexical 'now', by pointing out that precluding *its* self-reference is the way by which every *other* self-referential situation can be sorted out, however unspecifically.

A straightforward and quite general instance of the previous claim is afforded by the Liar's paradox, whose shortest version is contained in the sentence: 'This sentence is false'. Such a sentence is generally unfolded as follows: 'Suppose that this sentence is false. Then it is true. But if it is true, then it is false, etc...'. The potential of contradiction enclosed by the liar's statement may be tamed by adopting a specific strategy for ruling out self-reference, such as Russell's theory of types. But one must realize that the potential of contradiction of the self-referencing sentence was in fact neutralized from the outset, in the very process of unfolding its content, by splitting it into two 'successive' and ever-repeated steps. Further analysis of this splitting through succession enables one to unveil its structure. Let us suppose that the meaning of the sentence 'This sentence is false' is accepted *now* after a straightforward reading of the sentence. This meaning however involves the ascription of a truth-value 'false' which would be changed into 'true' in a meta-reading. But the 'actual now' and its content (the sentence) cannot be referred to or specified now. Thus, the meta-reading of the sentence, and the meta-ascription of the meta-truth-value 'true' to the sentence, can be performed only if the explicit meaning of the sentence is accepted at a moment which is *not* right now (but earlier). In other terms, an outline of a



distinction between the sentence and its meta-sentence is already implicitly at work, due to the archetypal fact that there exists an ultimate level of indexicality (the 'actual now') whose self-reference is precluded.

A half-serious way of delivering the same message would be to ask the following question: 'Why is it that a man who ignores Russell's theory of types does not become mad at the simple sight of the liar's sentence?'<sup>27</sup>. Developing a reflection by the quoted authors, our answer amounted to say: '*This man does not become mad because he manipulates unconsciously a kind of theory of types which is both non-specific and all pervasive. Since he has never read Russell, he calls it "the flow of time" '.*

It remains to be shown that the previous reasonings have opened the possibility of accounting for what is usually called 'change' or 'time flow' without any risk of circularity.

McTaggart gave very strong arguments against the belief according to which time may retain some of its original meaning without involving 'change'. Then he showed that change is irreducible to any aspect of event ordering, i.e. to the B-series. These arguments led to the image of an A-series sliding along the B-series, thus raising a standard difficulty: If sliding is taking place, one has the right to ask what is the velocity of this sliding. But the latter velocity (an amount of time per unit time) can only be defined by appealing to a super-time<sup>28</sup>.

In short:

(i) Time requires 'change' or 'flow'

(ii) 'Change' is not reducible to *static* ordering

(iii) Any attempt at making the *kinematic* components of the meaning of the word 'change' explicit leads to the paradox of supertime.

A third conception (say a C-conception, different from both the A- and B-series conception) could still retain the logical consistency of the static one without losing the irreducible specificity of the experience of change. We'll call this conception, after Sartre<sup>29</sup> and Heidegger, the 'ek-static' view of time. To begin with, let's mention that, despite its cryptic name, the said conception relies on a simple presupposition: that knowledge requires a duplication between the knowing and the known. About the latter duplication, two remarks should be made. The first remark is that it is highly significant that one can use tensed forms (present and past participles) to refer to these two poles of the theory of

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<sup>27</sup>See D.R. Hofstadter and D.C. Dennett, *The mind's I*, Penguin Books 1982, p. 269, for a detailed analysis of this question.

<sup>28</sup>See G.N. Schlesinger, "How time flies", *Mind*, 1982, 501-523

<sup>29</sup>J.P. Sartre, *Being and nothingness*, London, Methuen, 1957.

knowledge. The second remark is that the couple knowing-known can be construed as a translation, into a popular tensed language, of the unavoidable limitation of knowledge: *anything can be known, but not everything*<sup>30</sup>. The knowing can then be understood as the tensed expression of a felt *absence* in the field of the known, rather than as a second entity besides the known. The knowing (whose usual name is 'transcendental subject') should accordingly be replaced by the same blank as the one by which we displayed the absence of the 'actual now' in the time series.

Let's then take the basic incompleteness of knowledge as a departure point of our reasoning. We have seen that this incompleteness is usually expressed by tensed words (with present and past participles). This is a strong indication of the existence of a close relationship between it and the central issues of the problem of time, which must now be given a more precise assessment.

When one states the incompleteness of knowledge, this means that there must be a boundary between the known and what is not known. But nothing can be said *a priori* about the position of this boundary. The latter is thus *in principle* arbitrary. Whichever choice is made for this position, two facts may then be noticed:

(i) That within the field of the known, there are other possible positions of this boundary, such that they encompass subsets of the content of this field (let us call them the 'inner boundaries')

(ii) That, conversely, nothing prevents the field of the known from being more extended than the one this choice implies.

My thesis is that the first of these two facts gives rise to the static idea of 'succession', whereas the second one (together with a proper weakening of the concept of «choice» in this context) is the basis of the experienced instability of the present, and of the dynamical impression of change.

To develop the previous remarks in a more formal way, we can write the basic relation  $K_G$  which constitutes knowledge:  $K_G(,S_k)$  where  $S_k$  is the set of the known events ('the field of the known'), whereas the blank stands for the 'knowing-unknown'.

The sentence (i) then writes:

For any set  $S_k$ , there exists a set of  $m$  events  $r_k$  belonging to  $S_k$  such that the relation  $K_G$  also holds between the two following sets:

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<sup>30</sup> A. Peres & W. Zurek, "Is quantum theory universally valid?", American Journal of Physics, 50, 807-810, 1982

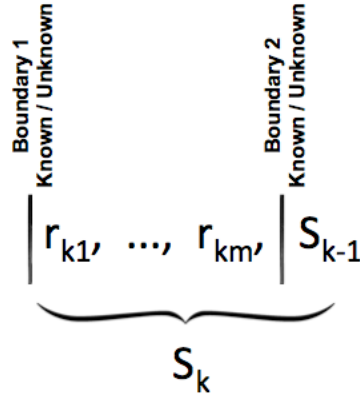
$$S_p = \{r_{k1}, \dots, r_{km}\} \text{ and } S_{k-1} = S_k - \{r_{k1}, \dots, r_{km}\}$$

Or, in formal notations:

PG: for a given  $K_G, \forall S_k, \exists r_{k1}, \dots, r_{km} \in S_k$ , so that:

$$K_G(\cdot, S_k) \wedge K_G(S_p, S_{k-1})$$

This abstract expression can be illustrated by the following diagram :



The same being true of  $S_{k-1}, S_{k-2}, \dots$ , further steps of the hierarchy might be written. A restriction  $K$  of the relation  $K_G$  to single events instead of the specified sets  $S_k, S_{k-1}, S_{k-2}, S_p \dots$  (for instance substituting a single event  $r_k \in S_k \cap S_p$  taken as point of reference, to both  $S_k$  in the first  $K_G$  and  $S_p$  in the second  $K_G$ , and substituting an event  $e_{k-1} \in S_{k-1}$  to  $S_{k-1}$  itself) could yield complete isomorphism with the tensed  $P$ -relation.

For example,  $P(\cdot, e_{k-1})$  corresponds to the restriction  $K(\cdot, e_{k-1})$  of  $K_G(\cdot, S_{k-1})$ ; and  $\exists r_k [P(\cdot, r_k) \wedge P(r_k, e_{k-1})]$  corresponds to the restriction  $\exists r_k [K(\cdot, r_k) \wedge K(r_k, e_{k-1})]$  of the expression PG.

Condition (ii) is more subtle. A straightforward interpretation of it is as follows: Saying that the field of the known could be more extended than  $S_k$  means that a relation  $K_G$  holds between the knowing-unknown and a set  $S_k^u = \{\cdot, S_k\}$  which itself includes both  $S_k$  and some part of the knowing-unknown:

$$K_G(, S_k^u) = K_G(, \{, S_k\})$$

Furthermore, the establishing of a relation  $K_G$  with a partly unknown set  $S_{k-n}^u = \{, S_{k-n}\}$ , such that  $S_{k-n}$  is included into  $S_k$ , can in turn be an event of the set  $S_k$  (in ordinary «introspective» terms, one can remember of having thought, at a stage when the field of the known was  $S_{k-n}$ , that this field could be more extended than  $S_{k-n}$ . This «thought» is part of the set of events  $S_k$ ).

Comparison of the relation:  $K_G(, \{, S_{k-n}\})$  and of the relation  $K_G(, S_k)$  leads to identify part of what is denoted by the blank in  $\{, S_{k-n}\}$ , with  $(S_k - S_{k-n})$ . Coming back again to ordinary terms, the latter sentence means the following: comparing the past thought that the field of knowledge could be more extended than  $S_{k-n}$ , to the fact that this field *is* actually the set  $S_k$  which contains  $S_{k-n}$ , leads to believe that this thought *was* justified. The field of the known has indeed been extended from  $S_{k-n}$  to  $S_k$ . The relation  $K_G(, S_k^u)$  is therefore to be understood as a prediction that the extension of the field of the known *will* increase.

It is also possible to specify the content of the unknown part of the set  $S_k^u$ , at least by analogical projection of the events of  $S_k$ .  $S_k^u$  then writes for instance:

$$S_k^u = \{e_k^{u1}, \dots, e_k^{un}, S_k\} \text{ instead of } \{, S_k\}$$

The relation  $K(, e_k^{ui})$  written by analogy with  $K(, e_k)$  obviously corresponds to the tensed F-relation:  $F(, e_k^{ui})$ , while  $K(, e_k)$  itself corresponds, as has been seen above, to a P-relation.

Given a certain boundary between the known and the knowing-unknown, there are thus two ways of conceiving its alteration: the first one, which consists of transposing part of the known into the field of the unknown, is the basis of the concept of past. The second one, which consists of transposing part of the unknown into the field of the known, generates the concept of future.

The whole A-series is generated thus.

A good metaphorical expression of the role of the all-pervasive absence of the actual now and of its self-referential characteristics in the genesis of what we

call 'time', is provided by Sartre, in some pages of his *Being and Nothingness*. Regarding the relations between time and attempts at self-referential description, how could it be more vividly addressed than in such sentences as: '(...)temporality can only indicate the mode of being of a being which is itself outside itself<sup>31</sup>. The knowing is indeed 'itself outside itself', because any attempt to refer to itself changes it into an empirical self, which is in turn an object for a new knowing which has thus not been captured by the move. At any rate, the 'mode of being of a being which is itself outside itself' is precisely what Sartre meant by 'ek-stasis', and this justifies the name 'ek-static view of time-flow' which has been proposed for the conception of time developed in this article.

Another metaphor, even closer to the formal account that has just been given, would consist in a comparison between time and the *vertigo* one feels in front of the unavoidable presence of the neighbouring unknown. The image of a vertigo (which was also used by Sartre in his metaphysical study of freedom) is meant to suggest the feeling of moving in a motionless state, generated by the dreaded possibility of falling in the adjacent void. In the same way, the idea of time flow, which is so averse to the scientific focus on the B-series, could be paralleled with a feeling of moving in the motionless (but epistemically *incomplete*) present; a present which faces the adjacent void of the unknown (called the future).

#### **Conclusive remark:**

Time flow, in the present account, has no purely objective foundation, in so far as it is not based exclusively on some characteristic of the known. However, our parallel with 'a feeling of motion in the motionless present' is not meant to suggest that it is 'subjective' in the restricted sense of its depending on the particular feelings of particular human beings, or even on general features of the human species. It only arises from what is both the most irreducible constraint of knowledge and the consequence of the mere possibility for it to exist: Its incompleteness. Neither objective, nor subjective, time flow can thus be said 'epistemic'<sup>32</sup> since it arises from an universal condition for something to be known. Such a conception is clearly Kantian in its spirit, for it identifies time with one of the conditions of possibility of objective knowledge. But it considers time as an even more fundamental concept than Kant would have it. For, here, time is not only the *a priori* intuition which '(...)renders comprehensible the possibility of change'<sup>33</sup> nor is it only the '(...)real form of our internal intuition'<sup>34</sup>. It rather arises from a characteristic (i.e. incompleteness) which is logically prior to the splitting

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<sup>31</sup>J.P. Sartre, *Being and nothingness*, London, Methuen, 1957, p. 136

<sup>32</sup>See M. Bitbol, "The concept of time symmetry in quantum mechanics", *Philosophy of science*, 55, 343-375, 1998, for an epistemic account of the problem of time asymmetry.

<sup>33</sup>I. Kant, *critique of pure reason*, London, Everyman's library, 1945. Transcendental aesthetics II, par.6.

<sup>34</sup>I. Kant, *critique of pure reason*, London, Everyman's library, 1945. Transcendental aesthetics II, par.8.

of the known into 'changing' and 'changeless' or into an 'internal' and an 'external' field.