Buridan on Future Contingents1

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Abstract: The Medieval philosopher John Buridan (14th century) develops a complex kind of semantics based on the distinction between the context of utterance and the context of evaluation in order to establish the truth conditions of propositions. This article intends to analyze this semantics and, in particular, to understand its consequences with regard to future contingent propositions. It states that the distinction between the context of utterance and the context of evaluation results in a satisfactory approach of the truth conditions of future contingent propositions. The approach is considered satisfactory because it avoids, on the one hand, the unpleasant consequences related to the denial of the Principle of Bivalence, and, on the other hand, the attachment to determinism.

Keywords: John Buridan, Future Contingents, Medieval Logic, Principle of Bivalence, Determinism, Necessity.

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I – Introduction

One of the most debated logical problems during the Middle Ages concerns the determination of the truth-value of propositions about future events. The famous problem has is origin in chapter nine of the *De Interpretatione*, in which Aristotle questions the truth-value of the proposition "There will be a naval battle tomorrow". By questioning the truth-value of this proposition, we intuitively tend to consider that it is still not true or false, since it concerns an event which has not happened yet. But such position meets one of the most basic principles of logics, the Principle of Bivalence, according to which every proposition must be true or false. If we commit to the truth of this thesis, we must assume that the proposition "There will be a naval battle tomorrow" is true or false now. Thus, if we consider it as true, then there will necessarily be a naval battle tomorrow, and, if is false, then there will necessarily not be a naval battle tomorrow. Therefore, such proposition implies the commitment to a deterministic vision in regard to future events. These two positions seem to have unpleasant consequences: the first, which defends the idea that propositions regarding the future are not true or false, abandons a law of logics; the second maintains the Principle of Bivalence, but commits to determinism.

The aim of this article is to show how the medieval philosopher John Buridan (14th century) presents a solution to this problem, which at the same time preserves the Principle of Bivalence and avoids the commitment to determinism. The key to Buridan's solution is in the development of a complex semantics for the determination of the truth-value of propositions, which distinguishes the context of enunciation from the context of evaluation of propositions.

II – The Truth Conditions of Propositions of Future

In the *Questiones Longe Super Librum Peri Hermeneias,* Buridan devotes the tenth question of the first book to the addressing of the problem of future contingent events.[2] Buridan proposes as example the following proposition "I will read tomorrow". According to the Principle of Bivalence, Buridan considers that the proposition "I will read tomorrow" or its contradictory "I will not read tomorrow" must be true, for it is impossible that both are true or that both are false.

In the Buridanian theory the determination of the truth-value of categorical *de inesse* propositions depends on the determination of the supposition of the terms of the proposition. In order for an affirmative categorical proposition in personal supposition to be true it is necessary that its terms, that is, the subject and the predicate, supposits for the same thing or the same things; therefore, in order for the proposition to be false, it is enough that they do not supposits for the same thing or that the subject (or the predicate) supposits for nothing. Thus, a proposition like "A man is white" is true if the term "man" and the term "white" supposits for the same thing. Such rule for the determination of the truth-value seems to bring an existential implication as consequence, for in a true categorical proposition of present tense the terms subject and predicate of the proposition must refer to the same things and these things must exist. In the analysis of proposition relative to the present time, this rule can be easily verified when we analyze how things are in the world at the moment of utterance of the proposition. But in some cases the propositions refer to situations in which the referents of the terms do not currently exits, but may come to exist, as in the case of the proposition "The Antichrist will come". Thus, the problem concerning future propositions is that we cannot determine, at the moment of their utterance, whether the terms of the proposition supposits for something or not, since the event does not exist yet. So, the rule used for the determination

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[2] "Utrum aliqua propositio de contingenti futuro sit determinate vera." (BURIDANUS, *Questiones Longe Super Librun Peri Hermeneias*, I. 10, p. 45. Henceforth, this work will be abbreviated as QSPH)

of the conditions of truth of the proposition may fail because we remain not being able to determine whether the proposition is true or false.

However, this flaw in the theory only seems to occur because we try to evaluate the truth-value of a proposition which refers to a future event in a moment previous to this event, that is, in the context of utterance of the proposition. Such distinction between the context of enunciation and the context of evaluation of the proposition was proposed by John Macfarlane (2003) as a solution to the problem of contingent future events and it seems to apply very well to the Buridanian semantics.

Buridan defends a propositional semantics, which means that the truth-value of a proposition is provided according to its parts. The semantic properties of the parts of the proposition are, therefore, essential for the determination of the truth-value of a complex expression. The syncategorematic terms also play a fundamental role in the determination of the truth-value of a proposition because they determine the selection of the referents of a term among everything it means. For instance, the occurrence of certain terms in a proposition can extend the supposition of another term to referents which do not exist currently. Such semantic property is called ampliation (*ampliatio*) and it enables that a term supposits for past, future, or even possible things. This occurs in contexts in which verbs or terms which indicate past or future time, modal verbs, or modal and intentional terms occur. In these cases we have a special context for the evaluation of propositions: the evaluation of the truth-value of propositions in which occurs ampliative terms always starts from the present moment to the moment indicated by the verb tense. In an affirmative proposition whose verb is in the present tense and in which there is no occurrence of ampliative terms, the verb in the present tense restricts the supposition of terms to things signified by the terms which exist at the moment of utterance of the proposition. In this case, the moment of evaluation of the proposition coincides with the moment in which it is enunciated. But in cases in which a verb in the past tense figures in a proposition, such term makes the other terms supposits for past things, aside from the present things signified by the term. Thus, if we enunciate the proposition "A man was philosopher', the verb 'was', in the past tense, makes the other term 'man' supposits for every man who was or is a philosopher, like Socrates or Plato. In this case, although the statement is enunciated at the present moment T, it is evaluated in a moment of time T1, in which T1 is equal or previous to T.

This same scheme can also extend to the case of propositions in which occur verbs in the future tense. Thus, in a proposition such as "A man will run" the verbs 'will run' lead the proposition to be evaluated in a moment T2, posterior or equal to the moment T in which this proposition is declared. According to this rule, we cannot determine whether a temporal proposition is true or false at the moment T in which it was enunciated, whether the context of evaluation of this proposition refers to a moment T2 posterior to T, and whether the event has not occurred in T2 yet. Nevertheless, we can correctly determine which the conditions of truth of this proposition are. This means that a proposition in which occur terms which indicate future tense, such as "The Antichrist will run", will be true if at the moment T2 of evaluation, posterior to the moment T of utterance of this proposition, the proposition "The Antichrist runs" is true, that is, if the Antichrist runs in T2. This shows that an affirmative proposition of future tense has the same conditions of evaluation of an affirmative proposition of present tense, which means that it will be true if in the moment of evaluation its terms supposits for the same things.

Thus, the essential point of the evaluation of the truth-value of propositions in which occur the semantic phenomena of ampliation through the occurrence of verbs in the future or past tense is the distinction between the context of utterance and the context of evaluation. This solution allows Buridan to keep the notion of bivalence and, at the same time, the indeterminism of propositions related to future events. In this regard, Buridan explains:

So it seems that this proposition "I will read tomorrow" is true if I read tomorrow, and false if I do not [read tomorrow]. And even if I indeed read tomorrow, it is still possible that I do not read tomorrow. Or rather, if I happen to not read tomorrow, it is also possible that I read tomorrow, for many things which are possible to happen will not [happen], and many things may not [happen]. In other words, everything that happens would happen by necessity, which we consider to be impossible (QSPH I. 10, p. 45).[3]

In this passage Buridan explains that the affirmative categorical proposition of future tense "I will read tomorrow" will be true if I read tomorrow, that is, if tomorrow the proposition "I do not read" is true, which confirms the fact that even the propositions of future fit the scheme of the determination of the conditions of truth traced by Buridan. But he also affirms that such events do not necessarily occur: there is both the possibility that they occur and that they do not occur.

Despite this consideration, Buridan proposes a distinction between propositions of past and present and propositions of future:

(…) regarding the difference between those present or past [tense propositions] and these of future [tense]. And for this reason I call those true in a determined way, for it is impossible that they are not or have been not true, and false in a determined way [determinately], for it is impossible that they are not false or have not been false. And it does not follow the same [in] these [propositions] "I will read tomorrow" or "I will not read tomorrow". For regarding this affirmative <proposition> it is still possible or it can always be possible that tomorrow the same [proposition] is not true or have not been true because it is possible that I do not read tomorrow. Likewise, it is stated that [the proposition] is not true in a determined way. And, similarly, if it is false, it is not false in a determined way, for it is always possible and it will always be possible that tomorrow the same [proposition] is not or has not been false, for it is possible that I read tomorrow. Thus, it is not true or false in a determined way. The same [reasoning applies] to the negative [proposition] (QSPH, 1.10, p. 46-47).[4]

In what follows, we will try to understand in which sense Buridan considers the distinction between these propositions or in which sense the temporal propositions of past or present are determined.

III – Can Temporal Propositions be Necessary?

Unlike future propositions, which concern a contingent event, Buridan considers that past and present propositions are determinatively true or false, for it is impossible that that which occurred had not occurred. This line of thought also applies to present propositions because that which occurs in the present tense will come to pass. In this regard, we can assign necessity to propositions relative to past and present events, for a proposition is considered determined if it is impossible not to be or had been true. Now a proposition considered necessary is one which is always true, while the propositions which may be true in some cases are contingent and the ones which cannot be true are impossible.[5] But such a perspective can lead to determinism. We could then ask ourselves: would it not be possible that this event could have occurred in a different way?

[3] "Hoc apparet, quia hec propositio 'ego legam cras' si cras legam, vera est, si non, falsa est. Et tamen licet ego legam cras, adhuc possibile est quod ego non legam cras. Vel etiam, licet ego non legam cras, adhuc tamen possibile est quod ego legam cras, quia multa erunt que adhuc possibile est quod non erunt et multa possunt esse que non erunt. Aliter quecumque evenient de necessitate evenirent, quod supponimus esse impossibile."

[4] "(...) quantum ad hoc differentiam inter illas de presenti vel preterito et istas de futuro. Et arguitur ratione quia hoc voco determinate verum quod impossibile est de cetero non esse vel non fuisse verum, et determinate falsum quod impossibile est de cetero non esse vel fuisse falsum. Et sic non est de ista 'ego legam cras' vel 'ego non legam cras'. Modo de affirmativa adhuc possibile est et erit possibile usque cras quod ipsa non est nec fuit vera, quia possibile est quod ego non legam cras. Igitur ipsa non est determinate vera. Et similiter si est falsa, tamen non est determinate falsa, quia adhuc est possibile et erit possibile usque cras quod ipsa non est nec fuit falsa, quia possibile est quod ego legam cras. Igitur nec est determinate vera nec falsa. Et similiter de negativa."

[5] "(...) ista dicatur 'necessaria' que est et semper erit vera et quod non poterit esse falsa, licet ante fuit falsa. Et dicitur 'impossibilis' que nec est nec poterist esse vera, licet possuit esse vera. Et dicitur 'possibilis' quia est vel de cetero poterit esse vera" (QSPH I.10, p. 56).

This issue leads us straight to a discussion regarding the modal *status* of temporal propositions. According to Jaakko Hintikka (1973), this would have been the issue referred by Aristotle on chapter nine of the *De Interpretatione*: the attempt to define the modal status of sentences temporally defined, that is, sentences which refer to single historical events. This kind of sentences has as characteristic a defined and immutable truth-value and, thus, such sentences are necessary if they are true, and impossible if they are false. But the sentences temporally undefined can have a mutable truth-value, that is, they can be considered true or false at different moments of evaluation and are, therefore, contingent. The problem is that if sentences temporally defined are true, they must always be considered true and, thus, necessarily true. For Hintikka, Aristotle solves this problem by pointing out the distinction between the different meanings of necessity: a sentence temporally undefined and qualified as true is considered necessary in the sense that its truth-value is immutable on account of the moment in which it was evaluated, that is, if a proposition P is true in T, it is necessarily true at any moment T1 posterior to T. This means that the proposition is considered necessary on account of the moment in which it is evaluated, in a temporal context, as a sentence temporally determined. And this would be the meaning of necessity we should consider when Aristotle states that "what is, is necessarily, when it is" (*De Interpretatione* 19a23). But it does not follow that P is necessarily true at any moment. On the contrary, a sentence temporally determined which is said to be true and, thus, necessarily true in a certain moment of evaluation, can become contingent if there is a change in the temporal context. But according to Hintikka, such distinction is insufficient to solve the problem of the modal qualification of future sentences temporally determined.

We could say that in the Buridanian semantics a proposition is only said to be true or false in relation to a context of utterance and evaluation[6], which solves the distinction between sentences temporally determined and indetermined.[7] But Buridan also provides a more refined framework of modal qualifications for this kind of propositions. In the *De Demonstrationibus*, Buridan distinguishes four degrees of necessity:

> And other grades might also be posited on account of the fact that a *per se* proposition has to be necessary and that there are diverse grades of necessity, and, accordingly, of perseity.
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> The first grade of necessity occurs when it is not possible by any power to falsify the proposition while its signification remains the same, nor [is it possible] for things to be otherwise than it signifies.
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> Another grade occurs when it is impossible either to falsify it or for things to be otherwise by natural powers, although it is possible supernaturally or miraculously, as in 'The heavens are moving', 'The heavens are spherical', and '[Any] place is filled'.
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> The third grade occurs with the assumption of the constancy of the subject, as in 'A lunar eclipse takes place because of the interposition of the earth between the sun and the moon', 'Socrates is a man', and 'Socrates is risible'. These are said to be necessary in this way because it is necessary for Socrates, whenever he is, to be a risible man, and it is necessary, whenever there is a lunar eclipse, that it take place because of the interposition of the earth between the sun and the moon.
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> There is yet a fourth mode, which involves restriction. For just as 'possible' is sometimes predicated broadly, in relation to the present, past, and future, and sometimes restrictively, in relation to the present or the future, in accordance with what is said at the end of *On the Heavens*—that no force or power can be brought to bear on the past, i.e., on that which is done, but only on that which is or will be (for we say that everything that has been

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[7] We must notice that one of the solutions to the problem of the propositions relative to events of contingent future attributed to Boethius consists in the distinction between propositions determinately (definite) true or false and propositions indeterminately true or false, the latter correspond to contingent future propositions. Only the propositions determinately true or false would be committed to determinism. However, Boethius does not seem to provide a thorough explanation of what a proposition indeterminately true or false is. But the Buridanian solution indeed provides an explanation of the Boethian distinction in a semantic framework for the evaluation of propositions of past, present, and future. On Boethius' position cf. KNUUTTILA (2010).

necessarily has been, and cannot not have been)—the same goes for 'necessary' and 'impossible', which are also predicated either with restriction or broadly. (*Summulae de Dialectica*, 8.6.3, p. 733).[8]

The fourth degree of necessity is the most important for us. It is according to a restrict sense of necessity that we consider necessary past and present propositions necessary, that is, if we consider that they cannot have their truth-value modified, once they refer to events which have already occurred and which cannot be modified. It is according to this sense of necessity that Buridan considers such determined propositions:

> We must observe that being absolutely determined under a disposition means being under this disposition and it is impossible that it is not or that it had not been under this disposition. Thus, I am already determined to read because I read, and it is impossible that I am not reading now. And, therefore, we understand a determined proposition as true or false. In addition, it follows that all that was determined to have been, for the same has already [been] and it is impossible that it had not been like that because what was white was determined to be white. But regarding the others, I say that not everything that is determined to be is determined to be, because I exist, but it is also not impossible that I did not exist (QSPH, 1.10, p. 47).[9]

The past and present events are only considered determined or necessary when they happen or have happened. Thus, if I read a book yesterday, it is impossible that I did not read yesterday. But if the event has not occurred yet, there is both the possibility that it occurs and that it does not occur, which is evident when Buridan presents the possibility that it had not happened, which denies a possible deterministic reading of his theory. But, in fact, on account of the moment in which I exist, it is impossible that I do not exist or that I have not existed.

Apart from this kind of necessity, Buridan considers the necessity in cases in which the proposition is always true and, therefore, necessary, as in the case of the proposition "Every man is necessarily an animal". In the case of this proposition, the presence of the modal term 'necessarily' modifies the conditions of truth of this proposition: in order for it to be true, the proposition needs to be true in any situation of evaluation, be it past, present, future, or possible. Thus, one of the conditions to consider this proposition true is that the proposition "Every man will be an animal" must also be true. But this is a condition for us to consider the proposition "Every man is necessarily an animal". However, the truth of this sentence seems indisputable.

In order to explain the truth of this proposition and at the same time the indetermination of the truth-value of propositions which refer to future events, Buridan distinguishes between *de inesse* and *de accidens* propositions. The former concern the necessity of the relation between the terms subject and predicate and

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[8] "Et adhuc possent poni alii gradus, ex eo quod oportet propositionem per se esse necessariam, quia sunt diuersi gradus necessitatis et, secundum hoc, etiam perseitatis. Est enim primus gradus necessitatis quia per nullam potentiam est possibile propositionem falsificari stante significatione, uel aliter habere quam significat. Alius gradus est quia impossibile est falsificari uel aliter habere per naturalem potentiam, licet sit possibile supernaturaliter et miraculose, ut "caelum mouetur", "mundus est sphaericus", "omnis locus est plenus". Tertius gradus est ex suppositione constantiae subiecti, ut "eclipsis lunae est per interpositionem terrae inter solem et lunam", "Socrates est homo", "Socrates est risibilis". Haec enim dicuntur necessariae sic quia necesse est quandocumque est Socrates ipsum esse hominem et risibilem, et necesse est quandocumque est eclipsis lunae ipsam esse per interpositionem ... et caetera. Adhuc est quartus gradus, secundum restrictionem. Nam sicut "possibile" dicitur aliquando ample, in ordine ad omne tempus praesens, praeteritum et futurum, et aliquando restricte, in ordine ad praesens uel futurum, iuxta illud quod dicitur in fine primi de Caelo quod non est uirtus siue potestas ad praeteritum, scilicet eius quod est factum secundum eius quod est factum esse uel futurum esse; quod enim fuit dicimus quod necesse est fuisse et impossibile est non fuisse. Ita et "necesse" et "impossibile" dicuntur secundum restrictionem uel ample" (BURIDANUS, *Summulae de Demonstrationibus*, 8.6.3).

[9] "Notandum est quod simpliciter determinari ad aliquam dispositionem significat quod sit sub illa dispositione et quod impossibile sit tale non fuisse vel non esse tunc sub illa dispositione. Ut quod iam ego sum determinatus ad modo legendum quia modo lego, et impossibile est quin ego nunc legerim. Et isto modo intelligimus determinationem propositionis ad veritatem vel falsitatem. Sicut enim dico quod omne quod fuit, determinatum est ad fuisse, quia ipsum fuit tunc et impossibile est cetero quod ipsu non fuerit tunc, ita quod fuit album, determinatum est ad fuisse album. Sed de eo quod est ego dico quod non omne quod est, est determinatum ad esse, quia ego sum et tamen non impossibile est me non esse."

do not implicate the actual existence of that which is signified by the proposition. However, the *de inesse* proposition seems to imply that if the things to which the subject refers exist, we will necessarily be able to predicate a determined predicate to these things. Thus, if a man exists, we can necessarily attribute to him the predicate "animal". On the other hand, the *de accidens* propositions concern the relations between subject and predicate which are only true if the relation of predication between subject and predicate exists at the moment denoted by the verb tense. Thus, a proposition such as "A man ran" is only true if at a previous or equal moment to the enunciation of this proposition - the proposition "A man runs" was true. Notwithstanding, with regard to future events, we cannot determine whether this kind of predication occurs or not before the event occurs. Therefore, only the *de accidens* propositions of future are contingent and have an indetermined truth-value, but not the *de inesse* propositions, such as "Every man is an animal":

> (…) it follows that [the proposition] "every horse is an animal" is necessary, for every affirmative proposition in which the subject supposits for something is necessary. And if is necessary that [the subject] supposits for something, and if that proposition is set, this proposition is necessary (QSPH I.10, p. 52).[10]

Therefore, there is a difference between the necessity relating to past and present events, which occurs because it is impossible to change the truth-value of such propositions, and the necessity relating to *de inesse* propositions, or of *simpliciter* necessity, for in this case it is impossible that the proposition may have a different truth-value. This explains why we can consider that propositions such as "Every man is an animal" and "Every man is necessarily an animal"[11] are not only true, but necessary propositions. In this case, it is important to note that in the propositions "Every man is an animal" and "Every man is necessarily an animal" the verb "is", in the present tense, loses its function of restricting the reference of the terms subject and predicate to the time connoted by the verb.[12]

Still regarding the future *de inesse* propositions, Buridan says:

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[10] "(…) ita bene sicud illa est necessaria 'omnis equus est animal', quia omnis propositio affirmativa in qua subiectum pro aliquo supponit est vera. Et si necesse est quod semper supponat pro aliquo, si talis propositio proponatur, ista propositio est necessaria."

[11] Although the term "necessarily" stated in the proposition [4] indicates a modal reading of the proposition, a thorough analysis shows that, in fact, it is a *de inesse* proposition since the truth of this proposition implies that the following propositions must also be true: "Every man was an animal", "Every man is an animal" and "Every man will be an animal". This means that there is essential predication between a subject and a predicate, which is determined by the subject matter of the proposition. Thus, this kind of proposition would also have temporally determined reading in the Buridanian theory. In this case, Buridan believes that the terms are in a special kind of supposition, i.e, the natural supposition, which is typical of scientific statements. For a thorough discussion on this issue, cf. MIQUELANTI (2017).

[12] Ernesto Perini-Santos (2017) shows how in the Ockhamian analysis the thesis of the necessity of the past is only valid for propositions of present according to things (*secundum rem*) and according to the voice (*secundum vocem*), but not for present propositions only according to the voice, such as the case of the proposition "Peter is predestined", in which the future character of the evaluation of the proposition is given by the categoreme "predestined", although the copula is in the present tense. Thus, the restriction of the thesis of the necessity of the past is presented as the Ockhamian way out to avoid determinism. However, the motivation for the restriction of this thesis seems to have a semantic character, despite the ontological character of the issue. A thorough analysis of the Buridanian work would be necessary to determine whether the thesis on the necessity of the past is valid for all kinds of propositions, which initially seems to be the case (it is worth remembering that Buridan did not write theological treatises and Ockham discusses this issue by investigating the theme of the divine prescience). In the question XI of the QSPH, Buridan stresses that future events are not necessary and that this thesis is of theological nature, showing then that the author does not follow a deterministic view. Notwithstanding, Buridan says that if we eliminate the *casus* of action of the divine potency, we must accept that everything which will come to be, when it comes to be, will be necessary (as we indicated above, in QSPH, 1.10, p. 47). On the Ockhamian approach of the issue of future contingent events see also OLIVEIRA (2007).

The fourth conclusion states that not any affirmative categorical *de inesse* proposition is true or false in a determined manner because it is still possible that the true [proposition] is never or has never been true, but false, and it is still possible that the false [proposition] is not or has never been false, but true (QSPH, I.10, p. 49).[13]

In this passage, by considering that not any *de inesse* proposition is true or false in a determined way, Buridan seems to consider the broad sense of necessity or relatively to the first degree of necessity. In this case, a proposition is only necessary when it cannot be falsified, that is, when its meaning remains the same or when it is not possible for things to be different from what the proposition means. But we must remember that both the propositions (whereas they are vocal occurrences) and the things of the world are contingent in the Buridanian view because God, in his absolute potency, can simply prevent these things from existing. Thus, in the *casus* in which God annihilates all men, the propositions "A man is an animal" or "A man will be an animal" would simply be false.

IV – Conclusion

We see how the distinction between the context of enunciation and the context of evaluation is essential to understand the author's answer to the problem of future contingent events. Buridan does not believe that future propositions do not have truth-value or are indeterminate. As we have seen, Buridan says that "this proposition 'I will read tomorrow' is true if I read tomorrow and false if I do not [read tomorrow]" (QSPH I. 10, p. 45). However, such truth-value can still not be determined at the moment of utterance of the proposition. Such reason is explained in semantic terms, insofar as the context of utterance and the context of evaluation of this proposition are different. A more complex scheme of the determination of the conditions of propositions enables Buridan to keep the Principle of Bivalence without denying the contingent status of future events. Notwithstanding, we will be able to say tomorrow that the proposition "I will read tomorrow", said today, was true or false. In this regard, Buridan states:

(...) according to the case proposed, I concede that this [proposition "I will read tomorrow"] was true yesterday, but never in a determined manner. But, today, through my determinate act of reading it has become true and, after that, it is impossible that it had not been true (QSPH I.10, p. 49).

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[13] "Quarta conclusio est quod non omnis propositio de futuro affirmativa kategorica de inesse est determinate vera vel falsa, quia que est vera adhuc possibile est quod nunquam est vel fuit vera sed falsa, sed que est falsa, possibile est quod non est nec fuit falsa sed vera."

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