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in *Acts of TSM'95, Workshop Time, Space and Movement, Meaning and Knowledge in the sensible world*. 23-27 juin 1995, Château de Bonas
**Broken bottles, ex- or future prime ministers,
 non-existent houses,
 and the progressive:
 time and modifiers***

**Le temps et les modificateurs:
 bouteilles cassées, ex- ou futurs premiers ministres,
 maisons inachevées et le progressif**

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Abstract: This paper is dedicated to the study of modifiers. Its main thesis is that modifiers' function is to modify the extension of the noun to which they apply. The extension can be modified in different ways depending on whether the extension of the unmodified noun and the extension of the modified noun coincide, are included in one another, intersect one another, or are totally different. It is argued that modifiers such as *broken*, as well as modifiers such as *ex-*, *future*, *fake*, *toy*, etc. yield a modified noun which extension is totally different from that of the unmodified noun. It is also proposed that the progressive, when it concerns verbs of accomplishment should be treated as a modifier acting not on the extension of the VP but on the set of contextual implications which can be derived from it.

Résumé: Cet article porte sur les modificateurs. Sa thèse principale est que la fonction des modificateurs est de transformer l'extension du nom auquel ils s'appliquent. L'extension peut être modifiée de façon différente suivant que l'extension du nom non modifié et l'extension du nom modifié coïncident, sont incluses l'une dans l'autre, ont une intersection ou sont complètement disjointes. L'article argumente pour une analyse dans laquelle des modificateurs comme *cassé*, de la même façon que des modificateurs comme *ex-*, *futur*, *faux*, *jouet*, etc. livre un nom modifié dont l'extension est totalement différente de celle du nom modifié. Il est aussi proposé que le progressif, quand il concerne des verbes d'accomplissement, soit traité comme un modificateur qui joue, non sur l'extension SV, mais sur l'ensemble d'implications contextuelles que l'on peut en tirer.

1. Introduction

In a paper published in 1993, Robert Martin proposes to deal with such NPs as *a/the broken bottle* (or with sentences such as *the bottle is broken*: it is not entirely clear in his paper) in the following way: according to him, this should be considered as the predicate *broken* applied to the object designated by the noun *bottle*. As, obviously, when a bottle is broken it is hard to recognise it as a bottle, he adds the proviso that "reference occurs in a world where the object in question was indeed a bottle" (Martin 1993, 6). This claim is not entirely clear as Martin does not say exactly what he means by *reference*, but it may be surmised that reference here has to do with the assignation of a referent to the noun

* This paper owes quite a lot to discussions between myself and a few colleagues from the Center of Research in Computer Science at Nancy (C.R.I.N.), namely Fabrice Duermael, Bertrand Gaiffe and Laurent Romary. Nevertheless, I am responsible for any errors.

in *Acts of TSM'95, Workshop Time, Space and Movement, Meaning and Knowledge in the sensible world*. 23-27 juin 1995, Château de Bonas *bottle*. His hypothesis is still mildly ambiguous as it might mean either that the hearer assigns reference in another world than the world in which he actually lives or that the referent is in another world than the world the hearer lives in. This, however, is, up to a point, relatively immaterial as, in either interpretation, the proposal does not work: the problem which it raises is that the truth of a sentence cannot be assigned relatively to several contradictory possible worlds. In other words, it is impossible to say that in the same sentence, the noun refers to an object which satisfies the sortal predicate *bottle* in world W_1 , while the predicate *broken* is interpreted relative to the real world W_0 : truth for a sentence can only be evaluated relative to a single world¹.

2. An extensional view of modifiers

I want to defend here the idea that such NPs as *broken bottle* raise very much the same kind of problems as do NPs such as *ex-/future Prime Minister*: the latter NPs are a very common instance of an as yet rather insufficiently analysed problem, that is modifiers which transform the extension of a noun, whether that noun is a sortal substance predicate or a sortal phase predicate². Predicate modifiers have been the object of two papers by Romane Clark (cf. Clark 1970 and 1986) and she proposes the following classification of modifiers depending on the transformations which they imply on the modified predicate's extension³:

- (i) the extension of the predicate P and that of the modified predicate P' perfectly coincide;
- (ii) the extension of the predicate P and that of the modified predicate P' are included in one another, with either the extension of P included in the extension of P' or the reverse;
- (iii) the extension of the predicate P and that of the modified predicate P' are not equivalent nor are they included in one another: they may have or not have an intersection.

Modifiers such as *ex-*, *future*, *ancient*, etc. are temporal modifiers which apply exclusively to phase sortal predicates⁴ and which, most frequently, modify the extension of the phase predicate in such a way that the extension of the modified predicate P' not only does not coincide with the extension P but does

¹ Very much the same kind of thing occurs with examples such as (a):

(a) If Susan had not existed, no one would have met her.

As Cresswell, from whom I borrow this example, points out (Cresswell 1990, 103): "if it is true, then the predicate [met] will be true in a world w_1 where Susan does not exist". Bottles do not stop existing when they are broken, but they certainly are not bottles anymore. I will have more to say about this at the end of this paper (cf. § 11).

² For a definition of sortal predicates and for the distinction between those sortal predicates which are phase predicates or substance predicates, I can only refer the reader to Wiggins (1983) and Reboul (1993).

³ This is a very rough presentation of the highly interesting contents of Clark's papers.

⁴ Indeed, it makes sense to consider that they are a good test for the sorting of sortal predicates between phase predicates and substance predicates: temporal modifiers can only be literally applied to phase predicates (i.e.: *an ex-Prime minister*, *a future professor*, but **an ex-/future horse/cat/dog*, etc.).

in *Acts of TSM'95, Workshop Time, Space and Movement, Meaning and Knowledge in the sensible world*. 23-27 juin 1995, Château de Bonas not even intersect the extension of P. Thus a future mother is not a mother, an ex-Prime Minister is not a Prime Minister, etc.

It should be noticed that temporal modifiers are not, by far, the only modifiers which transform the extension of the predicates to which they are applied in such a radical way and one should think here of such modifiers as *fake*, *toy*, *make-believe*, etc. Just as an ex-Prime Minister is not a Prime Minister, a toy pistol is not a pistol and a fake Picasso is not a Picasso. I would like to claim here that such NPs as *broken bottle*, *dead horse*, etc. behave very much in the same way as do NPs with temporal modifiers or with modifiers such as *fake* or *toy*. In other words, they modify the extension of the modified predicate in such a way that the two extensions not only do not coincide anymore, but do not even intersect. Thus broken bottles are not bottles, dead horses are not horses, just as toy pistols are not pistols or ex-Prime Ministers Prime Ministers. If, however, one takes seriously the proposition that events are individuals, then it could be supposed that the predicates which designate them are also susceptible of modifications. This leads us directly to the paradox of the imperfective.

3. The paradox of the imperfective

The paradox of the imperfective can be best explained through examples:

- (1) a. Mary was pushing a cart.
b. Mary pushed a cart.
- (2) a. Mary was building a house.
b. Mary built a house.

The paradox comes from the fact that though (1b) has to be true in order for (1a) to be true and vice versa, the truth of (2a) is implied by the truth of (2b), but the reverse is not true. In other words, it may be both true that Mary was building a house and false that Mary built a house. This can be summed up by saying that for some verbs (those of the same type as *to push*, *to walk*, *to run*, etc.), a past progressive sentence is semantically equivalent to the corresponding simple past sentence, while for some other verbs (those of the same type as *to draw*, *to make*, *to build*, etc.) a past progressive sentence is not only not semantically equivalent to the corresponding simple past sentence but the simple past sentence does not even have to be true when the progressive past sentence is.

Very roughly, the difference between the first and the second type of verbs, assuming Vendler's classification (cf. Vendler 1967), would be the following: verbs of the first type are verbs expressing an activity, whereas verbs of the second type are verbs of accomplishment. The paradox of the imperfective arises only with verbs of accomplishment and seems to be limited to the past tense⁵. Its paradoxical side comes from the fact that when the progressive sentence is true and the non-progressive false, it would seem possible to say that the event described by the sentence both has and has not occurred.

4. Dowty's solution

Dowty's solution (cf. Dowty 1979) uses a peculiar variety of possible worlds logic: the inertia worlds solution. Let us assume a situation in which Mary is crossing the street but, before she has reached the other side, a truck comes and kills her: in such a situation, though it would be true that she was crossing

⁵ Parsons (1990) denies (rightly, I think) that this is the case and claims that the paradox arises regardless of past, present or future tense.

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 the street, it would not be true that she crossed the street, or that she has/had crossed the street. Dowty's solution is to say that, in this case, though in the real world, Mary did not cross the street, in every corresponding inertia worlds she did, where an inertia world is defined as a world identical with the actual world up to the time at which the action was stopped and in which, after that time, the action is pursued to its normal end.

This analysis is interesting in that it deals with the imperfective paradox, but it nonetheless meets with some difficulties: the main one is that if everything happens in the inertia worlds as in the real world up to the encounter between Mary and the truck, this means that in the inertia worlds, just as in the real world, the truck is coming along the road and there does not seem to be any reason why the truck should not kill her in the inertia worlds just as it does in the actual world⁶.

5. Parsons' solution

Parsons' solution (cf. Parsons 1990) is quite different from Dowty's in that it does not make use of possible worlds logic nor of notions such as possibility or normality: in other words, Dowty's solution is an intensional one, whereas Parsons' solution is extensional. According to Parsons, the problem raised by the imperfective paradox is not a problem of what could have happened but the problem of what events actually happened. His analysis is based on the distinction between *hold* and *culminate*: the event designated by an accomplishment holds during the time which is necessary for the action to succeed, while it culminates at the time it has reached its end. An accomplishment both holds and culminates whereas an activity just holds. This, however, does not, Parsons says, imply that an event of accomplishment must culminate though it usually does.

Parsons' solution, based on this distinction, is fairly simple. He proposes that in a non-progressive sentence where the verb designates an accomplishment event, this event must not only hold but culminate for the sentence to be true. In a progressive sentence, by contrast, the event needs only to hold in order for the sentence to be true. Given that, according to Parsons, events of accomplishment do not have to culminate to be these events, the imperfective paradox does not arise: (2a) is true even though (2b) is not and under this analysis there is no reason why (2a) should in any way implicate (2b).

This solution has quite a few nice features: it is very simple, it does not imply anything more than definitions which seem to be necessary anyway and it is extensional. Nevertheless two important objections have been raised against it: namely that it implies absent processes and unfinished objects.

6. Absent processes and unfinished objects

Let us begin with unfinished objects, an objection which Parsons raised against his own account and answered in his book (*Ibid.*). For those accomplishments which imply that an object, which did not exist before, has been made or created in one way or another, the imperfective paradox has the nasty consequence of somehow destroying the parallelism between the implications which can be drawn from progressive sentences with activities or with accomplishments. Let us go back to examples (1) and (2): (1) in its progressive

⁶ This objection was raised by Parsons (cf. Parsons 1990).

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 or non progressive version implies the existence of a cart, whereas (2b) implies and (2a) does not seem to imply the existence of a house. That is, we have the following inferences:

- (1') a. Mary was pushing a cart \Rightarrow There is a cart (which Mary is pushing)
 b. Mary pushed a cart \Rightarrow There is a cart (which Mary pushed).
 (2') a. \sim (Mary was building a house \Rightarrow There is a house (which Mary built))
 b. Mary built a house \Rightarrow There is a house (which Mary built)

The question is: if it is the case that progressive sentences with accomplishment do not imply the existence of the object, what on earth is it that Mary is building when we say that she is building a house? Parsons claims that this, in fact, is not truly a problem: according to him, it is not an ontological problem but rather merely a problem of denomination. If Mary is struck by lightning while she is building her house and if her house is not finished for this reason, there is something which Mary was building though that thing may not have all the features that finished houses do have. Parsons invokes the generally fuzzy nature of our language and of the way we use it to explain why, despite the difference between a partially built house and a completely built house, we nevertheless are ready to call both *house*.

It seems to me, however, that Parsons' answer is not satisfying. It should be clear that the problem here is very similar to the problem raised by broken bottles. *Bottle* and *broken bottle* do not have the same extension and I think that it is difficult to accept without any discussion that *unfinished house* and *house* have the same extension. If it were the case, it should be possible to say, when the event has not culminated, "Mary was building an unfinished house", which it is not. Thus, claiming, as Parsons does, that both unfinished houses and houses are called *house* seems an extremely feeble answer.

There is another problem which Parsons' solution meets with, the problem of absent events and this problem was first raised by Dowty⁷. The example given by Parsons is the following:

- (3) John is making me a millionaire.

Dowty pointed out that it is very difficult to see what type of events the VP in (3) refers to: it seems that there is a whole lot of quite different events which it could describe. According to Parsons though, the problem is not directly linked to the progressive, it is linked to what he calls the causative-inchoative nature of such sentences. Thus, on Parsons's view, if it is a problem, it is a problem raised by causative-inchoative sentences, not by the progressive, and his account of the imperfective paradox is immune from it.

7. Initial and final states

Is Parsons right when he says that the problems described above are independant from the progressive and should not impinge on its description? Up to a point, of course, he is: fuzziness of either language or language use is not a problem specific in any way to the progressive. Yet, it must be clear, I think, that the specific problems raised above are linked to the imperfective paradox, in as much as (a) Parsons' solution can only hold insofar as accomplishment verbs do designate more or less precise events; (b) unfinished objects are those objects which are left when an accomplishment event has not

⁷ Parsons indicates that this question was raised by Dowty on several occasions but I am not aware of any paper in which the question is specifically addressed.

in *Acts of TSM'95, Workshop Time, Space and Movement, Meaning and Knowledge in the sensible world*. 23-27 juin 1995, Château de Bonas culminated and the question remains of what it is that Mary is building in such cases. As said above, it would be very strange to say that she is building an unfinished house. Yet there is no house that she was building.

The first thing to do is to make sure that the problem of absent events does not plague most of accomplishment verbs. But this is far from sure: what is it that we are claiming Mary is doing when we say that she is building a house? What event exactly is it that has to hold for Mary to be truly building a house? It should be clear that there is no single obvious answer to that question: Mary may be an architect and she may be drawing the plans and controlling the work; she may be the person for whom the house is built and just be paying for the works and all degrees of personal involvement seem to be possible; she may be a worker and just building some parts of a house for someone else; or she may be building her own house with her own hands and here, again, quite a few different events may be possible, depending on the materials she uses, etc. Thus, it appears that there does not seem to be any well-circumscribed event described by the sentence *Mary is building a house*. This, I want to claim, though it certainly is not a general fact concerning all verbs of accomplishment, is nonetheless a very common fact in verbs of accomplishment. In a great number of cases, it seems to me that the event described by a sentence in which a verb of accomplishment occurs can only be described as an event of a kind such that, given an initial state before the event, the occurrence of the event will produce a precise final state⁸. In other words, no matter how unclear the event described is, the initial or final states are precise enough.

Thus, though the problem of absent processes is not peculiar to the progressive, it raises a specific problem for the progressive and any account of the progressive should take it into account, which Parsons' account does not. In fact, accepting as he does that the event described does not have to culminate for the progressive phrase to be true means that there will be no final state and that any causative account of accomplishment verbs becomes impossible.

8. The progressive as a kind of modifier

Parsons' solution, though he does not say it himself, seems to make the progressive a kind of modifier which would change the extension of the VP: the modifier in question would change the extension of the progressive VP in such a way that it would be included in the extension of the non-progressive VP⁹ in as much as the event denoted by the VP would not culminate and in as much as the event denoted by the VP may but must not culminate. Thus the truth-conditions of a progressive sentence and those of a non-progressive sentence are not the same. It should be clear that this non-coincidence between their extensions explains why the set of implications which can be drawn from the progressive sentence is also included in the set of implications which can be drawn from the non-progressive sentence. The problems raised above,

⁸ This is of course partly due to the fact that the most common verbs of accomplishment, such as *to make*, *to build*, *to accomplish*, *to create*, etc. are syncategorematic to a degree, i.e. they cannot be understood without a complement. I think that the task of the complement is precisely to indicate the final state resulting from the event, when it culminates (see below § 10).

⁹ Indeed, according to Parsons (1990, 171), the progressive, applied to an accomplishment verb, changes it in a state verb (which does not culminate but only holds).

in *Acts of TSM'95, Workshop Time, Space and Movement, Meaning and Knowledge in the sensible world*. 23-27 juin 1995, Château de Bonas however, seem to arise only from the changes brought by the progressive in the extension of the VP: they imply that the final state is not a part of the truth-conditions of the progressive sentence which is why the problem of absent processes arise. Yet, it is right that the set of implications which can be drawn from the progressive sentence should be included in the set of the implications which can be drawn from the non-progressive sentence.

Thus, the question is how could we preserve that consequence without meeting the difficulty of absent processes? I think that there is a way to do it: the progressive could be seen as a kind of modifier which would act only on the set of contextual implications and not on the extension: i.e., a progressive sentence and the corresponding non-progressive sentence would have the same truth-conditions which means that they would have the same truth value whether the event culminates or not. In other words, like (2b), (2a) would be literally true only in the situations where the event culminates and would be literally false in all the other situations¹⁰. Nevertheless, quite a few true implications (those which are not blocked by the progressive) could be drawn from it.

This, it should be noted, is, up to a point, a pragmatic solution to the imperfective paradox and, more precisely, it relies heavily on the distinction made between Sperber and Wilson (1986) between literal and non literal discourse: in a sentence used literally, the speaker commits himself to the truth of the sentence and to the truth of most if not all of the implications which can be drawn from his utterance, while, in a sentence used non literally, the speaker does not commit himself to the truth of his utterance and commits himself to a truth of only a subset of the implications of his utterance. Thus, it could be considered that, in those situations where Mary does not succeed in building her house, (2a) is used non literally and is false and that the speaker does not commit himself to the truth of (2a), though he does commit himself to the truth of all those utterances which are not blocked by the progressive. The progressive acts as a modifier which changes, not the extension of the VP, but the set of contextual implications which can be drawn from the utterance¹¹. To account for its most common use, I should also add that it indicates as well that the relevant interval for the interpretation of the sentence is the one during which the event holds.

9. A few arguments in favour of the pragmatic solution

Maybe the first argument which might be invoked in favour of the pragmatic solution which has just been outlined is a drawback of Parsons' solution, which the pragmatic solution does not have. The drawback of Parsons' solution is the fact that if it is true that the progressive transforms an accomplishment verb into a state verb, i.e. a verb which implies culmination in a verb which only implies holding, it becomes difficult to make sense of those (rather frequent) occurrences in which a past progressive accomplishment verb is used when the event culminated, e.g. when the house actually was built: in those cases, Parsons' analysis does not account for the existence of the house. In my analysis, on the other hand, there is no such problem: the event is supposed to culminate and the existence of the house, though it cannot be inferred from the

¹⁰ Note that this means that (2a) and (2b) have the same truth-conditions, though they do not have the same set of implications relative to the same context.

¹¹ This means that events of accomplishment must both hold **and** culminate, and may not only hold for the sentence to be true.

in *Acts of TSM'95, Workshop Time, Space and Movement, Meaning and Knowledge in the sensible world*. 23-27 juin 1995, Château de Bonas progressive sentence¹², can have an explanation. Another thing which should be noted is that Parsons' analysis would come to difficulties over such examples as (4):

- (4) When he was building his house, no one could suppose that twenty years afterwards he would be living in it, in utter isolation, his family dispersed, his fortune gone, on the splendid and yet desolate loneliness of the top of the cliff.

Here, there does not seem to be any doubt that the house got built, but according to Parsons' analysis, there is no reason why it should have been. The second problem comes from Parsons' theory of unfinished objects: his answer to that objection was that we are always ready to stretch a point and adopt a loose ontology when it is convenient to us, in such a way that *house* can be used to designate a few foundations as well as a fully constructed, decorated and livable in house. If this is the case, *it* in example (4), given that the event described in the temporal clause does not have to cuminate, could corefer with *house* to an unfinished house. Yet, this does not seem to be a natural interpretation. Again this difficulty does not arise in the pragmatic theory.

10. Unfinished objects again

To show that this is the case, I would like to come back to the problem of unfinished objects: if, as I claimed before, verbs such as *to build*, *to draw*, etc. are interpreted relative to an initial state and a final state, it could, I think, be said that the argument (*a house, a wall, a circle, the nativity*, etc.) is merely a specification of that final state. In other words, although such verbs as these are identical from a syntactic point of view with other verbs such as *to cut*, *to paint*, etc., their semantic construction differ:

- (5) a. Mary is pushing a cart.
 b. Mary is building a house.
 c. Mary is cutting the bread.
 d. Mary is painting the wall blue.

In the first case, there is an activity which does not imply a culmination. In the second case, there is an accomplishment which does imply a culmination. In the third and fourth cases, there are accomplishments which imply a culmination. Yet, it should be clear that (5c) and (5d) are in one respect at least nearer to (5a) than they are to (5b): all of (5a), (5c) and (5d) presuppose the existence of the referent of the argument in the VP, which is not the case for (5b).

This difference can, I think, be explained through the fact that though all the verbs in (5b), (5c) and (5d) are verbs of accomplishment, the verb in (5b) is what could be called a "verb of creation", whereas the verbs in (5c) and (5d) are "verbs of transformation": in other words, they must have a complement designating a pre-existing object in order for the sentence (in the present tense) to be true, which is not the case for verbs of creation. This explains the presupposition of existence. It also explains why there is no such presupposition of existence for accomplishment verbs which imply the creation of an object and why the complement, despite overall syntactic similarity with the complement of a transformation verb, does not in the least have the same kind of semantic role and, mainly, does not have to refer.

11. Pulling all the threads together

¹² It is one if not the only implicature which the progressive stops.

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We came all the way from broken bottles, dead horses and ex-Prime Ministers to houses, finished and unfinished, via the progressive and the imperfective paradox. As a conclusion, I would like to say a little more about broken bottles, dead horses and ex-Prime Minister and how they relate with one another and with the progressive. The first thing I would like to say is that what the preceding paragraph should lead us to do is, up to a point at least, to distrust Geach's support of Buridan's law¹³, according to which (cf. Geach 1980, 10): "the reference of an expression E must be specifiable in some way that does not involve first determining whether the proposition in which E occurs is true". There is much to be said in favour of this principle and it would be nice if it were true: certainly the life of the linguist would be much simpler. However, with regards to a certain number of facts (attribution of referents to pronouns among them), it is hard to see how it could be true¹⁴.

I think that among those facts that should incline us to abandon it are precisely broken bottles, dead horses and ex-Prime Ministers. I pointed out at the beginning of this paper that it was not clear whether Martin's suggestion applied to NPs such as *a/the broken bottle* or to sentences such as *The bottle was/is broken*: in the first paragraph which is where I raised the question, it did not seem to matter as, anyway, Martin's proposal does not seem justified. I would like to point out that, in any case, if the aim is reference, it does in fact not matter much because the speaker who says: "The bottle is broken" refers in fact to something whose best description is "a/the broken bottle", if he is saying the truth. In other words, there is a number of cases where it seems that the VP is used to indicate what modifier should apply to the description so that the right referent is picked out.

This has a further consequence. A few years ago, a phenomenon, described as evolving reference, was isolated. The canonical example, taken from Brown and Yule (1983, 202) is the following:

- (6) Kill an active, plump chicken. Prepare it for the oven, cut it into four pieces and roast it with thyme for 1 hour.

One of the interests of examples of this kind is that they put in strong jeopardy the traditional and substitutional view of anaphora because substitution *salva veritate* is obviously not possible here. A suggestion made to save this substitutional account was to say that what is substituted is not the entire NP but only the head noun, which, in examples such as (6), is presumably a solution. But this means that when one has in the original NP a modifier which so modifies the extension of the N that both extensions have an empty intersection, the pronoun or pronouns would be supposed to refer to the objects in the extension of the non-modified (and substituted) NP rather than to the objects to which the original NP (with modifier) actually referred, which would hardly lead to a substitution *salva veritate*. The only solution left would be to restrict the substitution of the head noun to those cases where a different kind of modifier, if any, had been used in the NP: this however would seem a rather *ad hoc* procedure.

Finally, I would like to deal with a last point: the relation between the object designated by an unmodified sortal phrase predicate and that designated by the

¹³ Geach indicates that the first statement of this law is to be found in Buridan's *Sophismata*, hence its name.

¹⁴ I should presumably say that I am indebted here to my colleague, Bertrand Gaiffe, with whom I had numerous discussions on the subject. This, however, is my formulation and any objections should apply to it.

in *Acts of TSM'95, Workshop Time, Space and Movement, Meaning and Knowledge in the sensible world*. 23-27 juin 1995, Château de Bonas corresponding modified sortal phase predicate, when the modifier is a temporal modifier. What, in other words, is the relationship between the man who is the Prime Minister at t_0 and the man who is the ex-Prime Minister at t_1 ? Why is it that they are called by the same name though, in the second case, it is modified in such a way that its extension is entirely disjoint from the extension it had when it was used without modification? I want to claim here that the relationship in question is **identity** and that this means that identity is not, contrary to what has been stated by Wiggins (cf. Wiggins 1983), sortal-relative: it is because Michel Rocard was a Prime Minister a few years ago that he was so called a few years ago and because Michel Rocard is the same man, though not the same Prime Minister, that he is called the ex-Prime Minister now. In much the same way, the bottle was called *a bottle* before it was broken because it was a bottle and is called *a broken bottle* now because it is the same object, though not the same bottle, and has been broken¹⁵. In other words, when a speaker says: "The bottle was broken", the hearer should assign as a referent to *bottle* a broken bottle. Time, transformation, "creation", identity and their various linguistic expressions all have a role to play in reference assignment, *pace* Geach and Buridan's law.

12. Answering a few objections

The objections I want to address here are those of my reviewer and concern the penultimate sentence of the previous section. He or she says: "I see three problems here (hence, in general, three problems with the proposed solution). The first is that the determination of the referent of "bottle" cannot depend on the sentence's being true, since the truth of the sentence depends on the referents of the terms occurring in it. The second, independent problem is that the proposed analysis makes a sentence such as "The bottle was broken", if true, analytically true. For that sentence is treated as equivalent to "The broken bottle was broken". Alternatively, there seems to be a sense in which the analysis is trivial. For every sentence of the form "The P is Q" can only be made true by assigning to P a referent which is a Q-P". I will take the objections in the order in which they are presented.

The first objection can be taken as a defense of Buridan's law and is apparently very similar to Geach's principle (see above § 11). As I said before, this law meets a few facts which makes it difficult to comply with it when dealing with natural language. Pronouns are a very obvious counter-example, but they are not the only one:

- (7) The boss fired the worker because he was a convinced communist.
- (8) a. The symphony began half an hour ago.
b. You'll find the symphony on the piano.
c. This motive can be found in the symphony¹⁶.

In the first example, the interpretation of the pronoun cannot be done in isolation nor can it be made on the basis of any syntactic construction: it is ambiguous between two interpretations, one in which it is co-referring with *The boss* and one in which it is co-referring with *the worker*. Here, the desambiguation is not done only on the basis of the predicate *was a convinced*

¹⁵ This, and hopefully it is clear, does not mean that *broken* is a temporal modifier in the sense in which *ex-*, *future*, *ancient*, etc. are. On evolving reference and identity, see Reboul to appear.

¹⁶ Example (7) is borrowed from Mehler & Dupoux 1987. Examples (8) are borrowed from Godard & Jayez (to appear).

in *Acts of TSM'95, Workshop Time, Space and Movement, Meaning and Knowledge in the sensible world*. 23-27 juin 1995, Château de Bonas communist, but also on the basis of encyclopaedic knowledge. As Mehler & Dupoux (1987) say, the interpretation of the pronoun will depend on whether the situation takes place in the pre-Gorbatchev's USSR or in the USA. Godard & Jayez's analysis is not oriented toward reference but toward distributionally based lexical semantics. They point out that *symphony* in (8a), (8b) and (8c) corresponds respectively to three different types¹⁷: *event*, *material object* and *informational object*. Though types were not originally described with anything like reference as a goal, it is hard not to see that the different types in (8) would correspond to different (types of) referents. Hence, Buridan's law (or my reviewer's objection) does not seem to hold.

The second objection is, I think, misguided. The sentence "The bottle was broken" analytically implies indeed something like "There is a broken bottle and the broken bottle is identical with the bottle" and thus the referent can be described as *a/the broken bottle*. The sentence is not however equivalent to "The broken bottle was broken", as substitution *salva veritate* is not possible in temporal context, as was shown by the well-known example from Quine:

(9) Peter married Jane.

Jane is a widow

 ∴ Peter married a widow

The third objection does not hold either: for one thing, I would say that sentences such as "I broke the bottle" or "The bottle got broken" have the same analytic implication as "The bottle was broken", i.e. "There is a broken bottle and the broken bottle is identical with the bottle" and, though that should be obvious enough, it is certainly not trivial in the sense in which my reviewer sees it¹⁸.

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¹⁷ Which are determined by selection restrictions or distribution.

¹⁸ And, again, neither "I broke the bottle" or "The bottle got broken" are in any way equivalent to "I broke the broken bottle" or to "The broken bottle got broken".

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