

## Rethinking Quine's Argument on the Collapse of Modal Distinctions

GENOVEVA MARTÍ

**Abstract** This paper examines and discusses an argument for the collapse of modal distinctions offered by Quine in "Reference and Modality" and in *Word and Object* that relies exclusively on a version of the Principle of Substitution. It is argued that the argument does not affect its historical targets: Carnap's treatment of modality, presented in *Meaning and Necessity*, and Church's Logic of Sense and Denotation, developed by Kaplan; nor does it affect a treatment of modality inspired in Frege's treatment of oblique contexts. It is argued, nevertheless, that the immunity of those systems to Quine's argument depends on the success of their rejection of the Principle of Substitution presupposed by Quine.

**1 Introduction** Over the years Quine has provided several arguments questioning the coherence of modal discourse. One of those arguments, specifically, purports to show that if we try to extend a standard logical principle, like the Principle of Substitution, to modal contexts, modal distinctions collapse. That is,  $p \leftrightarrow \Box p$  turns out to be valid for any sentence  $p$  whatsoever. The only way to avoid such a catastrophe, Quine tells us, is to embrace another misfortune: to accept the commitment to Aristotelian essentialism.

In spite of its influence at the time it was proposed by Quine, this argument has received little attention in subsequent discussions, not justifiably I believe. In general, there have been two different reactions to the argument. Several of the first criticisms were devoted to showing that the modal logician's commitments are either an extremely weak form of essentialism or not a form of Aristotelian essentialism at all.<sup>1</sup> Quine's argument about the collapse of modal distinctions has been also dismissed on the grounds that Quine obviously misapplies the very principle that his argument relies on, the principle of substitution.<sup>2</sup>

In spite of the general agreement regarding the lack of success of Quine's argument, it seems to me that it deserves serious consideration, even if one is convinced,

*Received September 9, 1996; revised July 5, 1997*

as I am, that the argument was, in fact, incorrect and that it failed to affect its historical targets, namely, the treatment of modality proposed by Carnap and the intensional semantics inspired by Frege (developed later by Church and spelled out by Kaplan).

I think that the argument deserves consideration partly because the two lines of reaction—that is, the rejection of the charge of essentialism and the dismissal of Quine's application of substitutivity—miss some important aspects of Quine's argument. Regarding the first reaction, and with respect to the collapse of modal distinctions, the commitment to essentialism, whether weak or strong, is what Quine views as the modal logician's only way out of a quandary, not the quandary itself. Bad as it is, such commitment is, from Quine's point of view, the only way of saving the coherence of modal discourse. Without the acceptance of Aristotelian essentialism, modal distinctions collapse, that is, modal operators become meaningless, and any project that rests on the distinction between necessary truth and mere actual truth, becomes baseless.<sup>3</sup> Thus, the rejection of the charge of Aristotelian essentialism, important as it is, does not even focus primarily on the details of the argument about the collapse. As regards the second reaction against Quine, the issue is a bit more complex. I do agree, in essence, with the arguments against Quine's use of the principle of substitution in the collapse argument, but, as I will argue, it seems to me that reasons why the argument fails lie elsewhere.

But the main issue here is not one of historical fairness, and my main purpose is not exegetical. I think that the discussion of Quine's argument and its basic presuppositions invites a reflection about the grounds on which certain principles become, rightly or wrongly, the criteria that determine the status of linguistic contexts. For Quine, the principle of substitution—or his version of it—is such a criterion, for whether or not a context abides by the principle determines whether or not the context in question is a sealed package whose internal composition and structure is beyond the reach of standard semantic laws.

In the first part of the paper, I provide a reconstruction of Quine's discussion. The argument itself is well known and it occupies barely a couple of pages in Quine's own works; nevertheless, since it is easy to dismiss the argument too quickly, I think it is justified to spend some time laying it out explicitly and discussing the motivations behind its central moves, as well as some of the traditional rejoinders. Here, I should make clear that my main purpose is not so much to unravel Quine's own motivations as it is to try to provide what seem to me to be plausible ways to justify the argument's basic assumptions. In the second part of the paper I proceed to discuss the fundamental reasons why the argument fails against its intended targets.<sup>4</sup>

**2 *Quine's argument*** Quine's objections to the coherence of modal discourse arise under different guises throughout his writings, but the specific argument about the collapse of modal distinctions, as I see it, has two well-delimited stages that appear articulated explicitly in two of Quine's works. The first part appears in §3 of [25], where Quine's purpose is to establish that the conditions required to provide a theory of meaning for modal contexts cannot be met and, therefore, that modal contexts have to be treated as sealed packages. In a second stage, presented in pp. 197–98 of [26], Quine aims to show that, if in spite of the warnings one still insists in opening up the packages, then modal distinctions will collapse. First I will examine the argument.

Afterwards, I will make a few clarifications about its interpretation and examine some of the standard rejoinders.

**2.1 *The argument and its background assumptions*** The substitution of ‘the number of planets’ for ‘nine’ in ‘necessarily nine is greater than seven’ turns a truth into a falsehood. On Quine’s view the reason is that ‘necessarily nine is greater than seven’, unlike the sentence ‘nine is greater than seven’, is not about the number nine. If it were, no change in truth value should occur, that is, the intersubstitution of terms that designate the same object (as Quine assumes ‘nine’ and ‘the number of planets’ do) should preserve truth, since, paraphrasing Quine, whatever is truly said of the number nine should be equally true of the number of planets, this being the same number:

Failure of substitutivity reveals merely that the occurrence to be supplanted is not *purely referential*, that is, that the statement depends not only on the object but on the form of the name. For it is clear that whatever can be affirmed about the object remains true when we refer to the object by any other name. ([25], pp. 17–18)

The principle of substitution, according to Quine, states that if  $t$  and  $t'$  are codesignative singular terms (singular terms forming a syntactic category in which Quine would make no distinction between, say, names and descriptions), the truth of  $t$  is  $t'$  entails the truth of  $\varphi(t) \longleftrightarrow \varphi(t')$  for any  $\varphi$  whatsoever.<sup>5</sup> The fact that substitutivity fails in contexts governed by the necessity operator shows that the way of specification, and not just the individual specified, has become relevant in the determination of truth value. The conclusion, Quine contends, is evident:

Necessity does not properly apply to the fulfilment of conditions by *objects* (such as the ball of rock which is Venus, or the number which numbers the planets), apart from special ways of specifying them. ([25], p. 27)

It is then easy to see why Quine concludes also that quantification into contexts governed by ‘necessarily’ produces nonsense, if quantifiers are interpreted, as is usual, as ranging over a universe of objects. A sentence of the form  $\exists x \Box \psi(x)$  is true if and only if at least one object in the domain of quantification satisfies the matrix. For any arbitrary object in the universe, it should be the object in question, no matter how it is specified, that satisfies, or fails to satisfy  $\Box \psi(x)$ . But that is precisely what, according to Quine’s previous conclusion, is nonsense. If modal operators render the context they govern sensitive to modes of specification of objects, a crucial component in the determination of the truth value of  $\exists x \Box \psi(x)$  is missing.

Quine notes repeatedly that the points about substitutivity and quantification are equivalent, and that, if anything, the problem of quantification into modal contexts is a more basic one, for even when singular terms are analyzed away, quantification into modal contexts remains problematic.<sup>6</sup> But I think that in the case that occupies us here—that is, the alleged collapse of modal distinctions—the force that sets the argument in motion is substitutivity. Let us recall that Quine launches the discussion in [25] appealing to what he takes to be a basic principle of logic, a principle that governs identity, namely the principle of substitutivity of codesignative singular terms. Contexts that do not abide by the principle are those that, on Quine’s view, should be treated as sealed packages, and whether or not it is possible to open those sealed

packages depends on whether the principle of substitution can somehow be restored in the context in question.

Quine appeals to two different arguments in order to show the importance of the restoration of substitutivity. One of those arguments provides support to the principle of substitution from above, by linking it to the well-established and undeniable Law of Identity. The other argument provides support from below, basing the principle of substitution on naïve intuitions about the role of singular terms. As for the first source of support, Quine tells us:

One of the fundamental principles governing identity is that of *substitutivity*—or, as it might well be called, that of *indiscernibility of identicals*. It provides that, *given a true statement of identity, one of its two terms may be substituted for the other in any true statement and the result will be true*. [emphases Quine's] ([25], p. 17)

So, the way Quine sees this issue, the principle of substitution is just the linguistic counterpart of the law of identity. The latter can be stated as the following general principle:

$$\forall x \forall y (x = y \longrightarrow (\varphi(x) \longleftrightarrow \varphi(y))),$$

from which, for any singular terms  $t$  and  $t'$  it seems to follow that

$$t = t' (\varphi(t) \longleftrightarrow \varphi(t'))$$

a statement of what Quine takes to be the principle of substitution.<sup>7</sup> The second source of support comes from below. Substitutivity is, according to Quine, obvious because it is grounded solidly on intuitions concerning the *aboutness* of language.

The basis of the principle of substitutivity appears quite solid; whatever can be said about the person Cicero (or Giorgione) should be equally true when said about the person Tully (or Barbarelli), this being the same person. ([25], p. 17)

The idea conveyed in this passage, in a nutshell, is that we have singular terms in language in order to talk about things; the use of a singular term enables speakers to affirm or deny things about the object designated by the term. How the object in question is specified or named should play no role whatsoever in the truth or falsity of our statements, for what counts for truth or falsity is the object and whether it is as it is claimed to be, or whether it stands in the relations it is claimed to stand, not the name of the object nor the way in which it is specified. Hence, if the object is really what counts, it should be indifferent for the determination of the truth or falsity of a statement which way of designating the object we choose.

That, I believe, is an extremely powerful intuition, one that anyone who thinks about how words connect to things can hardly deny;<sup>8</sup> and Quine believes it to be connected to a principle that provides that any two codesignative singular terms should be interchangeable *salva veritate*.<sup>9</sup> Thus, whether or not substitutivity can be restored becomes the crucial theme in the discussion of modal contexts and the decisive criterion in classifying those contexts as being either within or beyond the realm of a coherent theory of meaning.

Quine contends that if we had a way of mimicking sensitivity to objects and not to modes of specification in modal contexts, we would be able to restore those contexts to normality. The way to mimic sensitivity to objects is somehow to restore substitutivity; it is the restoration of substitutivity that imitates sensitivity of the context

to *which* object is designated by a term, not to *how* the object is designated.<sup>10</sup> The way to proceed, according to Quine, is to purify the universe of discourse, cleanse it of all those objects that can be designated in ways that fail to be intersubstitutable *salva veritate*. What should happen then is that whenever two terms *a* and *b* designate one and the same entity in the purified domain, the truth value of a sentence of the form  $\Box(\dots, a, \dots)$  is preserved if *b* is substituted for *a*.

Now, since all sentences of the form  $\Box a = a$  are true,  $\Box a = b$  should also be true for any *a* and *b* that codesignate the same purified entity; so it follows, it seems, that any two terms that codesignate an entity of the purified domain of discourse should be necessarily codesignative. On the assumption that necessity comes down to analyticity, Quine puts that point in the following terms.

Suppose now we were to repudiate all objects which, like 9 and the planet Venus, or Evening Star, are nameable by names which fail of interchangeability in modal contexts . . . An object *x* must, to survive, meet this condition: if *S* is a statement containing a referential occurrence of a name of *x*, and *S'* is formed from *S* by substituting any different name of *x*, then *S* and *S'* not only must be alike in truth value as they stand, but must stay alike in truth value even when 'necessarily' or 'possibly' is prefixed. Equivalently: putting one name of *x* for another in any analytic statement must yield an analytic statement. (Quine [25], pp. 26–27)<sup>11</sup>

In that way, the requirement that entities in the purified universe be nameable only in ways that are necessarily codesignative mimics sensitivity to objects *because* it restores substitutivity. Since substitutivity is so restored, the positions occupied by those terms can be taken to be, for all purposes, purely referential: it is only the (purified) object that counts in the determination of truth value, as it should, and thus the context in question ceases to be deviant. It would be nice if it worked, but, Quine tells us, it will not.

First of all, in §3 of [25], Quine argues that the move to a purified universe will not provide what is needed in order to extend substitutivity to modal contexts, to reinstate quantification into and, in a word, to bring modal contexts back to normal.

The reason why the conditions for reinstating substitutivity cannot be met is simple: no matter how much we purify the universe, there will be designators and ways of specifying the dubious, intensional objects that will fail the requirement of necessary equivalence. So, to use Quine's own example, if *A* designates one of those intensional entities and *p* is a true but contingent sentence,  $\iota x(p \& x = A)$  is also a designator for the same entity. But the requirement of necessary codesignativeness clearly fails. So, it follows, it seems, that *A* and  $\iota x(p \& x = A)$  are not intersubstitutable *salva veritate* in modal contexts:  $\Box A = A$  is true, but  $\Box A = \iota x(p \& x = A)$  is not, so the two expressions "are no more interchangeable in modal contexts than are 'Morning Star' and 'Evening Star', '9' and 'the number of planets'" ([25], p. 28).<sup>12</sup> Once we reach this point, Quine contends, it should be clear that we have to abandon the project of restoring the principle of substitutivity in modal contexts, and with that principle, we have to abandon also any hope of making sense of quantification into; in short, of extending the standard principles of semantics to those contexts. Let us treat them as sealed packages: intending our theories of meaning to apply to the occurrence of 'nine' in 'necessarily nine is greater than seven' makes exactly as much

sense as intending for them to apply to the occurrence of ‘nine’ in ‘canine’. Surely, Quine observes, we would not expect to be able to quantify into and to substitute in the latter; just the same goes for the former.

Now, if in spite of everything, we still insist on regarding intensional entities as the designata of terms under the scope of modal operators, and if we still insist on not treating those contexts as the sealed packages they are, then modal distinctions will collapse. This is the second part of Quine’s argument, articulated in [26]. As we have seen, the restoration of the law of substitution in modal contexts requires that  $A$  and  $\iota x(p \& x = A)$  be necessarily codesignative; but  $A$  and  $\iota x(p \& x = A)$  are necessarily codesignative just in case  $p$  cannot fail to be true. This, obviously, obliterates completely the distinction between  $p$  and  $\Box p$ .<sup>13</sup> The hard choice, according to Quine, is this: either we confine modal discourse beyond the realm of the theory of meaning, or we render modal operators meaningless.

If Quine is right, his argument affects, specifically, Church’s treatment of modality, for, on Church’s view, expressions under the scope of modal operators designate intensional entities. But the consequences of Quine’s argument are much more general, for any treatment of modality based on Frege’s approach to oblique contexts, not just Church’s version, would restrict the designation of expressions in modal contexts to intensional entities; so any treatment of modality based on Frege’s approach to modal contexts would be bound to collapse if Quine is right. Moreover, even though Carnap does not literally regard expressions under the scope of modal operators as designating intensions, in his system the truth value of sentences containing modalities depends on the intensions of the components. Thus, *prima facie*, Quine’s argument seems to affect Carnap’s treatment of modality too. Thus, if Quine is right, his argument has broad catastrophic implications, for it would render useless a standard move in the treatment of modal contexts: the restriction of the domain to intensional entities. The question, of course, is: Is Quine right and if he is not, what is wrong with his argument?

**2.2 Some clarifications and some rejoinders** Before proceeding to answer that question, we need to settle a few issues. First, Quine’s argument, as I have laid it out here, is not an instance of the slingshot, so dubbed after Barwise and Perry [2]. Quine has indeed used that form of argument, and both in [25] and, more explicitly, in [27] we can find a slingshot argument of which the collapse of modal distinctions is just a specific application: assuming  $\Box p$  to be true, and supposing  $q$  is any arbitrary true sentence, we can derive:

1.  $\Box p$
2.  $\Box(\iota x(x = 1 \& p) = 1)$  by logical equivalence
3.  $\Box(\iota x(x = 1 \& q) = 1)$  by substitution of codesignative terms
4.  $\Box q$  by logical equivalence.

The essence of Barwise and Perry’s response is that slingshot arguments require that we shift the grounds for the validity of each of those steps right in the middle of the derivation. On their view, slingshot arguments rely on two premises: (a) the only contribution of a singular term (name, definite description, indexical, . . . in general any term whose natural syntactic locus is that of subject position) to the determination of truth value is the object the term applies to, designates or names—and, therefore,



codesignative terms should be interchangeable *salva veritate* (in short, the principle of substitution endorsed by Quine); (b) logically equivalent sentences (sentences that are true in the same models) can be intersubstituted in any context whatsoever, or, in short, they make the same semantic contributions.

According to Barwise and Perry, if we validate the step that depends on (a), from (2) to (3) in this case, then the steps that depend on (b), from (1) to (2) and from (3) to (4), are in trouble, either because we are led to suspect that the logically equivalent sentences in question do not make the same contribution (for instance, part of (1)'s contribution is whatever the contribution of  $p$  is, but in the case of (2) we just have the object designated by the description and by "1") or, more radically, because the sentences do not look logically equivalent after all. If, on the other hand, we validate the steps that depend on (b), then it is the step that depends on (a) that seems unjustified, for it would seem that what makes (1) and (2) logically equivalent has to do crucially with the contribution of  $p$ , in which case the step from (2) to (3)—the latter sentence involving  $q$ —alters radically such contribution. This is all well, but the specific collapse argument discussed here is not an instance of the slingshot, for it relies only on the assumption of the intersubstitution of codesignative terms,<sup>14</sup> so the Barwise-Perry characteristic form of response does not apply to the collapse argument, at least not straightforwardly.

The second issue has to do with Quine's application of the principle of substitution. Quine's argument does rely on the assumption that since  $A$  and  $\iota x(x = A \ \& \ p)$  are two ways of designating the same intensional entity, the substitution of  $\iota x(x = A \ \& \ p)$  for  $A$  in the context of  $\square$  is truth preserving. A way of arguing against Quine is to reject his contention that the substitution in question is legitimate. There are several intertwined arguments against Quine's use of the principle of substitution and, in essence, they all aim to establish that instances of the principle should not involve definite descriptions. Specifically, if one analyzes away definite descriptions, as Russell or Carnap did (and Quine himself endorses Russell's analysis explicitly in several of his works), then the substitution in question is not legitimate, for there simply are not two terms there to substitute. From this point of view Quine quite simply tries to apply the principle of substitution for singular terms to an incomplete expression, something that is not a term at all, as Russell himself pointed out.<sup>15</sup>

More generally, Marcus had also argued that, independently of whether one analyzes descriptions away or not, definite descriptions should be excluded from the class of expressions to which the principle of substitution is meant to apply, for the legitimate instances of the principle of substitution should involve only proper names. Because of a description's "predicative role . . . the logical form of an identity sentence flanked by a description (used descriptively) is not given by ' $x = y$ '" (Marcus [18], p. 107).<sup>16</sup> My sympathies are wholeheartedly with these responses to Quine. I agree that the culprit in Quine's argument lies in his application of the principle of substitution, although my perspective on the substitution issue is slightly different. The way I see it, Quine points in the right direction when he provides as the basic ground that supports a principle of substitution the intuition that whatever is truly said about an object, should be equally true no matter how the object is designated. I think, though, that the principle of substitution that this intuition supports is not Quine's principle. It is rather a principle according to which substitutions that preserve aboutness preserve truth value.<sup>17</sup>

My standpoint is fundamentally Russellian, for, I think, I am moved by the reasons that led Russell to postulate that definite descriptions are not genuine singular terms. And one can abide by those reasons without espousing Russell's, nor any other form of contextual analysis. For suppose that, contra Russell, we regard expressions like 'the *F*' as real semantic units (i.e., as making a specific contribution to the determination of truth and content). It is not forced upon us to take such contribution to be the entity denoted, the individual that satisfies uniquely the attributes called up by the description. Such contribution might well be a complex that contains those very attributes (and some way of representing the condition of uniqueness). But then, it can be argued that by the same intuitive remarks on the aboutness of discourse to which Quine appeals, two (nonsynonymous) definite descriptions, or a definite description and a genuinely referential device, like a proper name, should not be expected to be intersubstitutable *salva veritate* in any context whatsoever. For each of the definite descriptions contribute different complexes to the determination of content and truth value, and, consequently, sentences of the forms 'the *F* is *P*' and 'the *G* is *P*' are not about the same things. And unless one agrees with Quine that '*A*' is ultimately an abbreviation of a definite description, '*A*'s contribution is an object (intensional or not); so '*A* is *P*' and 'the *F* is *P*' are not about the same things.

I am not offering these considerations with the pretense that the notion of aboutness at stake is clear. I do not have a precise analysis of the notion and I am not sure that precision in this matter can be achieved. Nevertheless, no matter what account of aboutness we come up with, I think it should preserve the following datum: that, precisely because of what Marcus calls the "predicative nature" of definite descriptions, a sentence like 'the number of planets is greater than seven' is about, among other things, planets in our solar system, while 'nine is greater than seven' is not. Thus there is a difference of aboutness between the two; a difference that, in my view, tells us that their coincidence in truth value is dependent on worldly facts and independent of semantic or logical principles.

The third and final issue is the following: Quine's argument can be reconstructed, as it has been here, using definite descriptions and names of intensional entities. As I have pointed out above, there are some reasonable doubts about its legitimacy. But the truth is that the argument, as presented by Quine, is even more illegitimate, and it is so by Quine's own standards. For the argument for the collapse that Quine presents in [26] as I mentioned before, does not involve names and descriptions; it involves general terms that are satisfied by a unique object. Those Quine takes to be ways of specification of objects, and so he intersubstitutes two that happen to specify one and the same object. But here Quine does not even have the *prima facie* support that he seems to have for the principle of substitution of codesignative singular terms, neither from above (because the intersubstitution of general terms is not easily connected to the law of identity) nor from below, for the pretheoretical considerations on the aboutness of sentences do not support a view according to which two predicates *P* and *Q* that happen to apply to only one and the same entity, generate sentences that are about that entity; quite simply, it would not be a simple intuitive remark to propose a view according to which a sentence that contains a predicate is about the predicate's extension. Quine himself is aware of this and he explicitly tells us so. In [26] he points out that certain constructions (the so-called opaque contexts)



do not allow the substitution *salva veritate* of singular terms (names, indexicals and descriptions) with the same designatum; they do not allow the intersubstitution *salva veritate* of sentences with the same truth value; and they do not allow the intersubstitution *salva veritate* of general terms with the same extension. Then he goes on to say:

All three failures are called failures of *extensionality*. A reason for stressing the first is that *one rightly expects substitutivity of identity in discourse about the identical object*, whereas no such presumption is evident for full extensionality. [emphasis added] ([26], §31, p. 151)

I think that here Quine clearly sees that the aboutness intuition, although it does provide some sort of justification for the expectation that singular terms be intersubstitutable *salva veritate* (even if, against Russell, among singular terms we include expressions like definite descriptions), it clearly does not provide any justification for a generalized principle of substitution for any two coextensional expressions, including sentences and general terms that do not even have the appearance of designating a unique individual. So, by his own standards, the requirement that any two ways of specifying an object be interchangeable is not well grounded.

With all this said, though, I think we can still learn a lot if we keep forging ahead, for none of the considerations examined here are required in order to see why Quine's argument missed its targets. We will see, first, that Quine's argument fails to affect both Carnap's treatment of modality and a treatment of modal contexts inspired by Frege's approach to oblique contexts. In both cases this occurs because neither Carnap nor Frege endorsed the principle of substitution that Quine takes to be the criterion for referentiality, the principle of substitution that should be restored in modal contexts (although Frege is alleged to have a similar principle—how similar, we will also discuss). And their reasons for not endorsing Quine's substitution principle are different from the ones just described. Finally, we will also see that even in a system that restores Quine's principle of substitution in all contexts, there are reasons to suspect his argument.

### 3 *How the argument fares*

**3.1 *Frege and Carnap*** According to Frege's theory in [11] failures in the intersubstitution of apparently codesignative terms are an indication that the expressions involved in the attempted substitution do not have their customary *designata*. (Here I will use 'designatum' as the translation of 'Bedeutung'.) If we adapt Frege's treatment of oblique contexts to modal contexts, we should conclude that the *designatum* of an expression in a modal context is the expression's customary sense. So, '9' and 'the number of planets' have the same customary designatum. Still, they are not codesignative when placed in a context governed by a modal operator, which explains why ' $\Box 9 = 9$ ' and ' $\Box 9 = \text{the number of planets}$ ' differ in truth value.

It is easy to see why Quine's argument misses the Fregean target. The argument requires the consideration of two ways of specifying the same (intensional) entity. It is about those two specifications that the question of substitutivity *salva veritate* is brought up. But the very assumption of the argument is nonsensical from Frege's point of view: whether  $A$  and  $\iota x(x = A \ \& \ p)$  designate the same entity or not depends

on the context in which they occur, and this is independent of whether the entity designated is an apple, a number, or an intension. Suppose that, as Quine contends, we purify the universe of discourse and leave in it only intensional entities, the types of entities that, according to Frege, are the designata of expressions in oblique contexts. The purification of the universe will still not affect the fact that  $A$  and  $\iota x(x = A \& p)$  are not codesignative when placed under the scope of a modal operator, although surely they do have the same customary designatum. Thus, for instance, ‘the sense of ‘Hesperus’ ’ and ‘Mary’s favorite sense’ may well codesignate in contexts like ‘. . . is an intensional entity’, but they are definitely not intersubstitutable in sentences like ‘the sense of ‘Hesperus’ is the sense of ‘Hesperus’ ’ and ‘John believes that the sense of ‘Hesperus’ is the sense of ‘Phosphorus’ ’.

Frege’s semantics is essentially contextual: what an expression designates is relative to a linguistic context and no two expressions are codesignative or noncodesignative in absolute terms. Thus, on Frege’s view, the correct application of the principle of substitutivity requires that the candidates for substitution be codesignative in the context in which the substitution is performed.  $A$  and  $\iota x(x = A \& p)$ , quite simply, are not codesignative in the context that counts. It would be fallacious to conclude that they are intersubstitutable, for the same reason that it would be fallacious to conclude that, according to Frege, ‘Cicero’ and ‘Tully’ are interchangeable *salva veritate* in belief reports, on the basis of their having the same (customary) designatum.

The failure of Quine’s argument to apply to the treatment of modality inspired by Frege is not due to an internal flaw in the argument itself. The problem is simply that Frege does not accept one of the argument’s background assumptions, namely, the principle of substitutivity that Quine endorses. In fact, that principle is either nonsensical or false by Fregean standards, depending on how its antecedent clause (i.e., the assumption that  $t$  and  $t'$  are codesignative) is interpreted. If codesignativeness is to be understood in absolute terms, the principle makes no sense for Frege. If, on the other hand, codesignativeness means having the same customary designatum (be that designatum a regular object or an intensional one) then in no way does it follow that the intersubstitution of the expressions in question in noncustomary contexts should preserve truth value. The examples that Quine uses make it likely that he has in mind the latter interpretation of the principle, that is, that he thinks expressions that, on Frege’s terms, designate customarily the same intension, should be intersubstitutable in modal contexts. Trying to make modal contexts fall in line with that principle is what, if Quine is correct, results in a collapse of modal distinctions. But the contextual version of the principle of substitutivity that Frege endorses turns out to be radically different from the substitution principle *tout court* that Quine defends. Frege and Quine both proclaim allegiance to the principle of substitution and they both connect it to the law of identity (see §65 of Frege [10]); but, judging by the consequences, they defend extremely different principles.

It is fairly clear, though, that Frege’s reasons not to endorse Quine’s principle of substitution are not connected to the ones explored above (Section 2.2). Obviously, Frege did not embrace Russell’s analysis of definite descriptions. It is also obvious that he would not have endorsed Marcus’s arguments to the effect that proper names are the only members of the substitution class of the principle. And, needless to say, my considerations on the aboutness of discourse would not have moved Frege either.

Carnap's treatment of modality is also immune to Quine's argument. In a system like Carnap's there is no presumption that a substitution principle like the one endorsed by Quine should hold. In general, simple sentences without modal operators admit the substitution *salva veritate* of codesignative (or coextensional, in Carnap's terminology) terms. However, in the case of a modal sentence, the truth value depends on the intensions of the expressions under the scope of the modal operator.

Carnap does not assume that the designatum of an expression under the scope of a modal operator is the expression's intension, so not even the contextual version of the principle of substitution that Frege endorses is accepted by Carnap.<sup>18</sup> It is important to notice that Carnap's semantics is both sensitive and innocent: innocent, because there are no Fregean shifts in the semantic values of expressions depending on the context in which they are placed; expressions always have the same extension and the same intension, in general, the same semantic properties. Different contexts may be sensitive to different semantic properties, and that sensitivity will determine which substitutions are guaranteed to preserve truth. Thus, an extensional sentence is one in which sameness of extension will be a guarantee for preservation of truth, but a context governed by a modal operator is intensional: sameness of intension is what is then required.<sup>19</sup> Quine's argument does not get off the ground in this case either, since it is quite straightforward to see that  $A$  and  $\iota x(x = A \& p)$  may well designate the same intension; but, if  $p$  is a contingently true sentence, they do not have the same intension, so one cannot expect their intersubstitution to preserve truth in a sentence whose truth value is sensitive to the intensions of its components, like  $\Box A = A$ .

As in Frege's case, Carnap's immunity to Quine's argument is also independent of the reasons presented in Section 2.2. It is true that Carnap analyzes away definite descriptions; but the reasons why he rejects the principle of substitution are not connected with the analysis in question. They are not connected either to the special status of proper names nor to intuitive considerations regarding the aboutness of sentences (hardly anything is farther from Carnap's logical positivist stance).

Of course, in Quine's eyes, neither Carnap nor Frege should count as trying to restore intensional contexts to normality.<sup>20</sup> Many philosophers have paid, at the very least, lip service to the substitution principle endorsed by Quine. There has been, and there is somewhat, a pervasive stance in the philosophical tradition, that nonextensional contexts are *prima facie* problematic, that there is something about their behavior regarding substitutivity that needs to be explained or solved. Frege himself is an exponent of this trend.<sup>21</sup> Sure enough, Frege does have an elegant solution to the problem. But the issue here is that the failure of the principle of substitution that Quine endorses is, in principle, regarded as a puzzle. Thus, I do not think that one can argue that it is a glaring mistake on Quine's part to hold the position that, unless that principle of substitution is restored without conditions, the puzzle remains.

How to tip the scales then, would depend on how good the defense of, or the attack on, Quine's principle of substitution is; and if we had to leave the discussion at this point, I do not think it would be totally obvious that the scales were tipped against Quine. Quine's argument fails to prove anything about systems like Frege's and Carnap's. But this is so because neither Frege nor Carnap accept the terms of the duel. Would modal distinctions collapse if those terms were accepted? This is the question we will address next.

**3.2 The Church-Kaplan mono-denotationalist approach** Church's and Kaplan's treatment of modality<sup>22</sup> is inspired by Frege's approach to oblique contexts. On their view, like on Frege's, expressions under the scope of a modal operator do not designate individuals, planets, or truth values, but rather senses or intensional entities. In Kaplan's formulation, intensions are presented, following Carnap, as functions from representations of possible ways the world might be, models in Kaplan's system, to the appropriate kind of extension (objects for singular terms, sets of  $n$ -tuples for predicates, and truth values for sentences). Unlike Frege's, however, the approach of Church and Kaplan is not contextual: every well-formed expression has a designatum or denotation assigned to it once and for all, and so the linguistic context plays no role in determining denotation.

On this approach, sentences like 'Necessarily Hesperus shines' and 'John believes that Hesperus shines' are simply not well formed. Expressions in oblique or intensional contexts designate intensions, so in such contexts we cannot have, for instance, the name of a planet; instead, we need 'Hesperus<sub>1</sub>' a term that designates the function from models to objects that represents the intension or the sense of 'Hesperus' (in Kaplan's terms, the analogue of 'Hesperus') and thus we obtain the syntactically correct counterparts of the previous sentences: 'Necessarily Hesperus<sub>1</sub> shines<sub>1</sub>' and 'John believes that Hesperus<sub>1</sub> shines<sub>1</sub>'.<sup>23</sup> Analogues denote the types of entities that constitute what Quine views as the purified universe. And it is obvious that such entities do not satisfy the criterion laid down by Quine, according to which any two names of those entities should be analytically, or necessarily, equivalent. For the intension of 'Hesperus', denoted by its analogue, may also be denoted by 'Mary's favorite intension', a term that is not itself an analogue of any expression.<sup>24</sup> Clearly 'Hesperus<sub>1</sub>' and 'Mary's favorite intension' are neither analytically nor necessarily equivalent, for semantic rules, by themselves, determine that 'Hesperus<sub>1</sub>' denotes the intension of 'Hesperus' but rules alone do not suffice to determine the denotation of 'Mary's favorite intension'. So, it will follow that although the analogue of 'Hesperus' could not fail to denote the intension it denotes (in the given language), 'Mary's favorite intension' is just a contingent name for the same intension.

According to Quine, the presence of codesignative specifications of intensions that fall short of necessary equivalence entails that such specifications will fail to be intersubstitutable *salva veritate* within the scope of a modal operator (this is the first part of his argument); and if we insist in regarding them as fully intersubstitutable, then modal distinctions will collapse (this is the second part of his argument). But here again his conclusion is unwarranted, for the first part of his argument fails. It is true that, intuitively speaking, 'Mary's favorite intension' does not designate the intension of 'Hesperus' as a matter of necessity. But in the Church-Kaplan system that does not entail that the sentence ' $\Box$  Hesperus<sub>1</sub> =<sub>1</sub> Mary's favorite intension' is false. For, in general, where  $\alpha$  and  $\beta$  designate the intensions of expressions like 'Hesperus',  $\Box\alpha =_1 \beta$  is true just in case the function designated by  $\alpha$  and the function designated by  $\beta$  have the same values for each argument. To put it more intuitively, since the arguments are meant to represent possible ways the world could be, a sentence of the form  $\Box\alpha =_1 \beta$  is true just in case the intension designated by  $\alpha$  and the intension designated by  $\beta$  determine the same extension in every possible world. And surely, if the function designated by 'Mary's favorite intension' happens to be the function

designated by the analogue of ‘Hesperus’, the values of the intension designated by each expression will be the same for each argument.<sup>25</sup>

In general, if  $\alpha$  and  $\beta$  are codesignative terms or specifications of intensions they are intersubstitutable under the scope of a modal operator, for the truth value of a sentence of the form  $\Box \dots, \alpha, \dots$  depends on what the values of the function designated by  $\alpha$  are for each argument; that is, it depends on which function is in fact designated by  $\alpha$ , not on what other functions could  $\alpha$  have designated, and thus, the truth value of a modal sentence in which  $\alpha$  occurs remains the same when  $\beta$  is substituted for  $\alpha$ , independently of whether  $\alpha$  or  $\beta$ , or both, turn out to be contingent specifications of the intension they designate.

We usually think that modal operators are not just sensitive to the extensions that the expressions under their scope happen to have, but also to the extensions they might have had. But the effect of mono-denotationalism is to turn the necessity operator, literally, into a purely extensional operator, sensitive only to what the expressions under its scope happen to designate. Granted, the entities designated will be quite bizarre, but the crucial point is that according to the Church-Kaplan approach, all that matters is which one of these bizarre entities happens to be designated. It would be strictly correct, although terminologically misleading, to say that mono-denotationalism makes intensional contexts extensional.

So, to use Quine’s own example, if  $p$  is contingently true, and  $A$  is the name of an intension,  $A$  and  $\iota x(x = A \& p)$  are codesignative and they are indeed intersubstitutable *salva veritate* under the scope of  $\Box$ . Surely, the former designates the intension in question necessarily, or rigidly, whereas the latter is just a contingent designator of that same intension, for  $p$  is, by assumption, contingently true. But that means precisely that  $\Box p_1$  is false and yet, because  $A$  and  $\iota x(x = A \& p)$  happen to designate the same intension the values of the function designated by each expression are the same for each argument and therefore  $\Box A = \iota x(x = A \& p)$  is true. A crucial step in Quine’s argument is thus blocked, for on the mono-denotationalist approach  $p$  does not have to be a necessarily true sentence in order for the two expressions in question to be intersubstitutable *salva veritate* in a modal sentence, and hence, from the assumption that their intersubstitution preserves truth, one is not entitled to conclude that the necessity of  $p$  is entailed. Therefore, one is not entitled to conclude that modal distinctions collapse.<sup>26</sup>

Church and Kaplan’s approach to intensional contexts takes up Quine’s challenge and responds to it in Quine’s own terms. In their system the Quinean principle of substitution holds across the board, so Church and Kaplan manage to bring modal contexts back in line with regular extensional contexts by showing, in Quine’s terms, that occurrences of expressions under the scope of a modal operator are as referential as occurrences of expressions outside the scope of modal operators. And still Quine’s argument about the collapse of modal distinctions does not get off the ground.

**3.3 A problem for mono-denotationalism?** There may be a problem with the foregoing optimistic conclusion.<sup>27</sup> Suppose that  $q$  is contingently true and that  $\Box p_1$  is a true sentence. The question is: Can  $q$  and  $p$  be intersubstituted *salva veritate* in the context  $\Box \dots_1$ ? A moment’s reflection shows we should not expect the two sentences to be interchangeable.<sup>28</sup> But there are two ways in which we may justify such an an-

swer. One of them, clearly, is inadequate, and it is not the one Church and Kaplan intend. But it is not clear to me that the other one, the intended answer, is completely free of problems. The obviously incorrect answer is the following: let us say that we regard  $p$  as a constituent of  $\Box p_1$  and at the same time deny  $p$ 's and  $q$ 's interchangeability. In such a case, the occurrence of  $p$  in  $\Box p_1$  is irreferential, and the obvious problem then is that mono-denotationalism does not succeed after all in truly restoring the principle of substitution as Quine requires.<sup>29</sup>

The explanation that Kaplan explicitly favors is different: we regard the occurrence of  $p$  in its analogue as purely accidental. No expression is a constituent of its analogue and, thus, the question as to whether  $p$  and  $q$  are interchangeable in  $p_1$  does not even arise. But the problem then is that we seem to break any syntactic connection between expressions and their analogues; axioms of the system, like for instance  $\Box p_1 \dots p$ , have to be interpreted as " $\Box\alpha \rightarrow \beta$  for some  $\alpha$  and some  $\beta$  such that the former is an analogue of the latter."

Now, it can be interjected that there is no problem here. The relation between an expression and its analogue is perfectly well captured in Church's and Kaplan's systems: after all, that is precisely the role of the  $\Delta$ -function. But yet, without a syntactic procedure to connect terms and their analogues, such relation would have to be captured by enumeration.

I think that the worries about mono-denotationalism mentioned here were in Quine's mind also. In the 1961 version of "Reference and Modality" [25] he objects to Church's treatment of modality as follows: ". . . the constants and variables occurring in a sentence do not recur in Church's name of the corresponding proposition. Thus, the interplay, usual in modal logic, between occurrences of expressions outside modal contexts and recurrences of them inside modal contexts, is ill reflected . . ." ([25], p. 29). In 1980, having realized that Church provides for a connection between what is denoted by an expression and what is denoted by its analogue via the  $\Delta$ -function, Quine is still disturbed: "The interplay, usual in modal logic, . . . is mediated in Church's system by this function." ([28], p. 154).

The problem, in short, is that without a syntactic procedure to connect the right analogue with each expression it is not clear that the resulting system constitutes a formal logic of sense and denotation. In any case, though, whether or not there is a problem here for mono-denotationalism, it is different from the problem raised by Quine, for in this type of system codesignative terms are interchangeable under the scope of a modal operator, without collapse of modal distinctions.

**4 *Summing up*** Quine's argument does not succeed in proving that modal distinctions collapse. A crucial step in Quine's reasoning relies on the assumption that whenever two expressions determine the same object, those two expressions should be intersubstitutable *salva veritate* even when they occur under the scope of a modal operator. We have seen that on the mono-denotationalist approach of Church and Kaplan the Quinean outlook on substitutivity is preserved and yet, in spite of some other potentially serious problems, Quine's argument still fails.

Among the more standard treatments of modality against which Quine's treatment was addressed, neither Carnap's nor Frege's endorse the assumption on substitution. Carnap explicitly does not incorporate a normative principle of substitution



for codesignative (or coextensional) terms, and Frege espouses a form of contextualism that makes Quine's assumption nonsensical. Their rejection, however, is not connected to the lines of argument, discussed in Section 2.2, that suggest the illegitimacy of Quine's use of the principle of substitution. Thus, the immunity of their respective systems to Quine's argument is tied to the grounds on which each of them rejects the reasons provided by Quine to consider his principle of substitution as a principle that should be extended to any context to which the principles of a coherent theory of meaning are meant to apply.

**Acknowledgments** A version of this paper was given at a meeting of the Society for Exact Philosophy in Calgary. I thank the members of the audience for their comments. I wish to thank also John Etchemendy, Carl Hoefer, Paul Hoffman, and Alex Rosenberg for discussion and comments on a previous draft, and an anonymous referee for helpful remarks and criticisms. The research and writing for this paper was generously supported by a grant from the government of Spain (DGICYT, SAB95-0180). I am grateful to the research group and the students of the Universitat de Barcelona for their help.

#### NOTES

1. See, for instance, Marcus [17], Parsons [23] and [24]. See also Linsky [15], Føllesdal [9] and Fine [6], especially §2.
2. I discuss several versions of this argument against Quine below, in Section 2.2
3. So, for instance, in [26], after arguing for the collapse of modal distinctions, Quine remarks: "Modal logic as systematized by Barcan and by Fitch allows unrestricted quantification into modal contexts. How to interpret such a theory without making the disastrous assumption (4), is by no means clear. It would seem, failing (4), that we must somehow distinguish between necessary and contingent ways of specifying one and the same object" (Quine [26], p. 198). Assumption (4), an alleged instance of the principle of substitution of codesignative terms, is the crucial step of the proof of the collapse. The discussion of its role is at the core of the present essay.
4. An argument for the collapse of modal distinctions inspired by Quine is offered by Føllesdal in chapter 5 of [7] and in [8]. Føllesdal's argument, unlike Quine's, is addressed toward a specific treatment of modality, the one offered in Carnap [3]. I have addressed Føllesdal's argument separately in [20].
5. For the sake of the argument, I will use some traditional terminology: definite descriptions that apply to the same object are codesignative and a definite description and a name can codesignate the same entity.
6. Thus, most attempts at showing that modal contexts are not problematic in the way suggested by Quine, have addressed primarily the issue of quantification into. See, for instance Kaplan [13], [14], and Fine [6], among others.
7. For a critical discussion of the connection between the law of identity and the principle of substitutivity, see Cartwright [4]. At this point I am just presenting the background on which Quine's argument relies, so it is not my purpose to criticize him.
8. Those naïve intuitions would seem to suggest that the standard role of a singular term in natural language is to stand for its designatum and thus that, *prima facie*, referring is the normal function of a singular term. Of course, such intuitions are essentially pretheoretical and they are not part of Quine's official theory, but I think that the passage quoted makes it clear that he, nevertheless, relies on them to establish the point about the naturalness of the principle of substitution of codesignative terms.

9. A different question, of course, is whether the powerful intuition does provide support to the principle of substitutivity endorsed by Quine. I think it definitely does not, but it does support a radically different law of substitution. I have discussed this issue in [19]. More on this in Section 2.2.
10. The success in mimicking sensitivity to objects would also reinstate quantification into modal contexts. Restoration of substitutivity and restoration of quantification go hand in hand if we agree with Quine that modal contexts pose problems *because* the truth value of modal sentences depends on modes of specification.
11. The entities in Quine's purified universe are reminiscent of Frege's senses and Carnap's intensions. At least in the case of Frege and Fregeans like Church, it is clear that words in contexts that seem to violate the substitutivity principle refer to senses and that reference to senses is presented as the reason why substitutivity does not fail. At any rate, I think it is quite apparent that Quine intended his argument for the purified universe to recast the generic reasoning that might have led Frege, Church, and Carnap to postulate such a crucial semantic role for senses and intensions in nonextensional or noncustomary contexts. Whether Quine's argument really represents their standpoint, and whether his subsequent criticisms apply to their respective systems, will be discussed below.

Observe that Quine's requirement is that the designators be necessarily codesignative, not that they be rigid. It may seem that what Quine intended in laying his criterion for restoration of substitutivity had to be stronger than necessary codesignativeness, for although the necessary codesignativeness of  $a$  and  $b$  supports the inference from  $\Box\psi(a)$  to  $\Box\psi(b)$ , the nonrigidity of  $a$  disallows the inference to  $\exists x\Box\psi(x)$ , so it does not suffice to restore the sense of quantification into modal contexts. It may be true that Quine intended rigidity and not just mere necessary codesignativeness of terms for the entities in the purified universe, but we should not jump to that conclusion on the basis of the alleged breakdown of the inference to  $\exists x\Box\psi(x)$ . For instance, in a system like Carnap's **S2**, where the values of the variables are intensional entities, a sentence of the form  $\exists x\Box\psi(x)$  follows from a sentence of the form  $\Box\psi(a)$  whether  $a$  is rigid or not.

12. One could, as Quine suggests, restrict the ways of designating or specifying intensional objects that are candidates for intersubstitution to precisely those that satisfy the requirement of necessary codesignativeness. But that is unacceptable for Quine because it does not constitute a real restoration of the principle of substitutivity and, therefore, it is not a successful way of extending the standard principles of semantics to modal contexts.
13. An important aside: the argument in [26], does not rely on the assumption that, if intensional entities are going to do the job, singular terms that designate the same intensional object must be fully interchangeable. It relies rather on the much more sweeping assumption that any two ways of cospecifying an intensional object must be interchangeable *salva veritate*. According to Quine, if  $\varphi$  and  $\psi$  are two modes of specification of one and the same intensional entity,  $\Box\forall x(\varphi x \longleftrightarrow \psi x)$ , a trivially true sentence, entails  $\Box\forall x(\varphi x \longleftrightarrow \psi x)$ . *Mutatis mutandis*, both the restricted version of the argument involving only singular terms and the general one, lead to the same conclusions, but here it is important to stop and think. Quine is operating on a version of the principle of substitution that goes beyond the category of singular terms, a version according to which any two ways of specifying an object, that is, any two well-formed expressions that apply to one and the same object, should be intersubstitutable *salva veritate*. The generalization, of course, is not trivial: it will turn out that two coextensional predicates that happen to apply to only one object will be regarded as interchangeable. But the justification for that, obviously, cannot be connected to the argument that links substitutivity to the law of identity nor to the naive considerations on aboutness. Quine himself recognizes this (see [26] §31, p. 151—and Section 2.2 here for a discussion of what he says there), but,

nevertheless, he does not explain whether or why he considers the generalization legitimate. For the moment I leave this issue aside, so that we can discuss the argument in full. In any case, whether it is or is not intuitively well justified, we should keep in mind that the substitution principle that Quine endorses as the condition *sine qua non* for restoring modal contexts to normality comprises any expressions that happen to specify a unique object.

14. This point is stressed in Neale [22]. See especially §14.
15. See Russell's solution to the first puzzle in Russell [29]. For a discussion see Neale [21], §4.4. Neale points out that all the ammunition for an argument against Quine on those grounds can be found as early as 1948 in Smullyan [30].
16. There is another argument against Quine's use of substitutivity, also proposed in Marcus [16]. There she argues that different principles of interchangeability of expressions operate in different contexts. While '5 + 4' can replace '9' in a modal context, 'the number of planets' cannot, for in modal contexts the requisite for intersubstitution is tautological equivalence. But Quine would probably reject that line of argument on the grounds that it is an acknowledgment of the problem, not its solution.
17. I have discussed this issue in [19].
18. See Carnap's discussion of this issue in §24 of [3].
19. *Extensional* and *intensional* are not exhaustive categories for Carnap. There are sentences whose truth value depends on features other than the intension or the extension of their components (like attitude reports, whose truth value depends on intensional structure).
20. This is especially clear in Carnap's case. Carnap proposes different principles of interchangeability for different contexts. So, from a Quinean perspective Carnap simply acknowledges the problem (this being the same response that would be appropriate later on to Marcus's argument in [16]).
21. And contemporary Fregeans follow suit. To give an example, Appiah begins [1] by reviewing the traditional failures of substitution in nonextensional contexts, and he goes on to say: "I rehearse all this familiar story because the fact that this is a problem, that there is something here to explain, gets lost from time to time in recent semantic theorizing."
22. See Church [5] and Kaplan [12]. Kaplan's work develops and refines the ideas presented in [5], so I follow Kaplan's exposition.
23. There are infinite layers of analogues in the system to account for multiple embeddings. For our purposes here, it will be sufficient to consider just the first layer of analogues.
24. Descriptive specifications of intensions are considered informally in the introductory chapter of [12]. They subsequently disappear from the first formal language considered by Kaplan,  $K_w$  (see specifically Thesis 67, which requires that any expression denoting an intension be itself the analogue of some other expression), and they reappear again finally in another formal language  $L_w$ , a language that, unlike  $K_w$ , contains descriptions.
25. At this point, I have found, some people are tempted to raise the following as a Quinean objection: "Substitutivity is restored, sure, but at the price of sacrificing the very intuitive meaning of the sentence, and thus the meaning of necessity statements. For, what does the sentence ' $\Box$  Hesperus<sub>1</sub> =<sub>1</sub> Mary's favorite intension' say? What natural language sentence is this supposed to represent? When we read that sentence, we expect it to say that a certain intension, the intension of 'Hesperus' is Mary's favorite one as a matter of necessity. But it turns out that this is not what the sentence says! And in that

case, we completely lose the intuitive meaning of the modal operator.” Quine himself has at times made remarks that can be interpreted in this way—witness his comments to the effect that in modal contexts baldness is attributed to intensions. But I do think that those comments of Quine’s should be viewed as purely humorous, for Quine himself would surely agree that the issue under discussion is not what a sentence seems to say from a superficial and naïve point of view (nor is the issue whether or not the sentence is the natural translation of a natural language sentence). The issue is rather that there be syntactic and semantic rules that determine a sentence’s well-formedness and its truth conditions in a precise way. All this is not lacking in the case of ‘ $\square$  Hesperus<sub>1</sub> =<sub>1</sub> Mary’s favorite intension’.

26. Observe that, even though Quine’s argument does not have the structure of a slingshot, the response, from the mono-denotationalist perspective, has a bit of the structure of Barwise and Perry’s response to slingshot arguments. For, here too, we are contending that, if all that counts in the determination of truth value is the object designated, then  $A$  and  $\iota x(x = A \& p)$  are intersubstitutable, but then the internal structure of the latter does not play any role. So  $p$  is, so to speak, unrecoverable.
27. The discussion that follows is based on issues raised by Etchemendy, both in conversation and in unpublished notes.
28. Observe that if we did apply substitutivity at this level, then modal distinctions would collapse.
29. What is at issue is whether  $p$ , as a denoting symbol, is a meaningful constituent of its analogue. Its shape is not relevant.

## REFERENCES

- [1] Appiah, A., “Why componentiality fails: a case study,” *Philosophical Topics*, vol. 15 (1987), pp. 23–45. [4](#)
- [2] Barwise, J., and J. Perry, “Semantic innocence and uncompromising situations,” *Midwest Studies in Philosophy*, vol. 6 (1981), pp. 387–403. [2.2](#)
- [3] Carnap, R., *Meaning and Necessity*, 2d edition, University of Chicago Press, Chicago, 1956. [Zbl 0034.00106](#) [MR 8,430a](#) [4](#)
- [4] Cartwright, R., “Identity and substitutivity,” pp. 119–33 in *Identity and Individuation*, edited by M. Munitz, New York University Press, New York, 1971. [4](#)
- [5] Church, A., “A formulation of the logic of sense and denotation,” pp. 3–24 in *Structure, Method and Meaning*, edited by P. Henle, H. Kallen, and S. Langer, Liberal Arts Press, New York, 1951. [Zbl 0054.00601](#) [4, 4](#)
- [6] Fine, K., “The problem of De Re modality,” pp. 197–272 in *Themes from Kaplan*, edited by J. Almog, J. Perry, and H. Wettstein, Oxford University Press, Oxford, 1989. [4, 4](#)
- [7] Føllesdal, D., *Referential Opacity and Modal Logic*, vol. 32 of *Filosofiske Problemer*, Universitetsforlaget, Oslo, 1966. [4](#)
- [8] Føllesdal, D., “Quine on modality,” pp. 175–85 in *Words and Objections*, edited by D. Davidson and J. Hintikka, Reidel, Dordrecht, 1969. [4](#)
- [9] Føllesdal, D., “Essentialism and reference,” pp. 97–113 in *The Philosophy of W. V. O. Quine*, edited by L. E. Hahn and P. A. Schilpp, Open Court, La Salle, 1986. [4](#)

- [10] Frege, G., *The Foundations of Arithmetic*, translated by J. L. Austin, Northwestern University Press, Evanston, 1968. [Zbl 0037.00602](#) [MR 23:A2287](#) 3.1
- [11] Frege, G., “Über Sinn und Bedeutung,” *Zeitschrift für Philosophie und philosophische Kritik*, vol. 100 (1892), pp. 25–50. 3.1
- [12] Kaplan, D., *Foundations of Intensional Logic*, Ph.D. thesis, University of California-Los Angeles, 1964. 4, 4
- [13] Kaplan, D., “Quantifying in,” pp. 178–214 in *Words and Objections*, edited by D. Davidson and J. Hintikka, Reidel, Dordrecht, 1969. 4
- [14] Kaplan, D., “Opacity,” pp. 229–89 in *The Philosophy of W. V. O. Quine*, edited by L. E. Hahn and P. A. Schilpp, Open Court, La Salle, 1986. 4
- [15] Linsky, L., “Reference, essentialism and modality,” *Journal of Philosophy*, vol. 66 (1969), pp. 687–700. 4
- [16] Marcus, R., “Extensionality,” *Mind*, vol. 69 (1960), pp. 55–62. Reprinted in *Reference and Modality*, edited by L. Linsky, Oxford University Press, Oxford, 1971, pp. 44–51. 4
- [17] Marcus, R., “Essentialism in modal logic,” *Noûs*, vol. 1 (1967), pp. 91–96. 4
- [18] Marcus, R., “Does the principle of substitutivity rest on a mistake?” pp. 101–109 in *Modalities*, Oxford University Press, New York, 1993. 2.2
- [19] Martí, G., “Aboutness and substitutivity,” *Midwest Studies in Philosophy*, vol. 14 (1989), pp. 127–39. 4, 4
- [20] Martí, G., “Do modal distinctions collapse in Carnap’s system?” *Journal of Philosophical Logic*, vol. 23 (1994), pp. 575–93. [Zbl 0812.03006](#) [MR 96e:03022](#) 4
- [21] Neale, S., *Descriptions*, The MIT Press, Cambridge, 1990. 4
- [22] Neale, S., “The philosophical significance of Gödel’s slingshot,” *Mind*, vol. 104 (1995), pp. 761–825. [MR 96k:03012](#) 4
- [23] Parsons, T., “Grades of essentialism in modal logic,” *Noûs*, vol. 1 (1967), pp. 181–91. 4
- [24] Parsons, T., “Essentialism and quantified modal logic,” *The Philosophical Review*, vol. 78 (1969), pp. 35–52. 4
- [25] Quine, W. V. O., “Reference and modality,” pp. 17–34 in *Reference and Modality*, edited by Leonard Linsky, Oxford University Press, Oxford, 1971. 2, 2.1, 2.1, 2.1, 2.1, 2.1, 2.1, 2.1, 2.1, 2.2, 3.3, 3.3
- [26] Quine, W. V. O., *Word and Object*, The MIT Press, Cambridge, 1964. [Zbl 0093.00915](#) [MR 22:2536](#) 2, 2.1, 2.2, 2.2, 2.2, 4, 4, 4, 4
- [27] Quine, W. V. O., “Three grades of modal involvement,” pp. 185–96 in *The Ways of Paradox*, Random House, New York, 1966. 2.2
- [28] Quine, W. V. O., “Reference and modality” pp. 139–59 in *From A Logical Point of View*, 2d revised edition, Harvard University Press, Cambridge, 1980. 3.3
- [29] Russell, B., “On denoting,” pp. 41–56 of *Logic and Knowledge*, Unwin Hyman, London, 1956. 4
- [30] Smullyan, R., “Modality and description,” pp. 17–43 in *Reference and Modality*, edited by Leonard Linsky, Oxford University Press, Oxford, 1971. 4

*Department of Philosophy  
University of California, Riverside  
Riverside, CA 92521  
email: [gmarti@citrus.ucr.edu](mailto:gmarti@citrus.ucr.edu)*