# Quine and Quantified Modal Logic: Against the Received View

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ABSTRACT: The textbook-like history of analytic philosophy is a history of myths, received views and dogmas. Though mainly the last few years have witnessed a huge amount of historical work that aimed to reconsider our narratives of the history of analytic philosophy there is still a lot to do. The present study is meant to present such a micro story which is still quite untouched by historians. According to the received view Kripke has defeated all the arguments of Quine against quantified modal logic and thus it became a respectful tool for philosophers. If we accept the historical interpretation of the network between Quine, Kripke and modal logic, which is to be presented here, we have to conclude that Quine's real philosophical animadversions against the modalities are still on the table: though Kripke has provided some important (formal-logical) answers, Quine's animadversions are still viable and worthy of further consideration.

KEYWORDS: History of analytic philosophy – quantified modal logic – Saul Kripke – Willard van Orman Quine.

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Modality and especially (quantified) modal logic (abbreviated as QML) has played an important role in twentieth-century analytic philosophy. In the early years it was considered suspicious, sometimes even meaningless. Among the main proponents of this skeptical attitude we find Willard van Orman Quine, whose considerations against the modalities (or any intensional items) date back to his doctoral dissertation (1932/1990), when he "reworked the foundations of *Principia Mathematica* in strictly extensional terms, and propositional functions to the winds" (Quine 1990/2004, 55). His very first explicit 'attack' directed against modal logic is to be found in his contribution to the Schilpp volume of A. N. Whitehead (Quine 1941, 141-142, especially n26), where he argued that the modal operators violate certain basic rules of extensional predicate logic, therefore it is dubious whether the modal notions could be integrated into the regimented language of science (a language based on extensional first-order predicate logic with identity) which was one of the few conditions of meaningfulness.

This kind of skepticism of Quine surfaced in most of his writings from the 1940s until his death, and posthumously published *Confessions of a Confirmed Extensionalist and Other Essays*.[2] One of his major problems was the following reduction-challenge: "There are logicians, myself among them, to whom the ideas of modal logic (e.g. [C.I.] Lewis's) are not intuitively clear until explained in non-modal terms" (Quine 1947, 43). Besides empiricism, the source of this conception is that Quine (2001/2008, 500) used to mark the boundaries of meaningfulness around classical extensional predicate logic with identity: "I doubt that I have ever fully understood anything that I could not explain in extensional language."

Though only a minority of logicians and philosophers (like Ruth Barcan Marcus, Rudolf Carnap, Alonzo Church and Arthur Smullyan) have responded explicitly to Quine's animadversions, QML gradually became a respectful tool after the 1960s and one could hardly imagine any metaphysical or linguistic analysis that was not using the modal vocabulary as a respectful tool.

As the typical text-book-like story goes, it was Saul Kripke and his possible-worlds semantics of modal logic that played a crucial role in

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[2]  See Quine (2008); the relevant works are Quine (1941; 1943; 1947; 1951; 1953; 1953/1966; 1960, chapter 6; 1963/1966; 1977; 1992/2008; 2001/2008).

changing the philosophical atmosphere. In the 1980s, Hintikka formulated this point according to the lines of the familiar story:

> The possibility of a reasonable modal logic was denied by Quine on philosophical grounds, but *his objections have been dead* for a while, even though they have not yet been completely buried. What has made a crucial difference is the development of what has generally been taken to be a *viable semantics (model theory) for modal logic*. This semantics has provided a basis from which Quine's objections can apparently *be answered satisfactorily* and which yields a *solid foundation* for the different axiom systems for modal logic. (Hintikka, 1982/1989, 1)

Recently Joseph Melia has framed this idea in a very similar way:

> We shall see that such worries [Quine's worries] were largely misguided and that the possible worlds machinery provides us with the conceptual tools to see off all such objections. (Melia 2003, 63)

> We have examined Quine's arguments against modal logic, and we have found them all lacking. The defenders of modal logic, be it propositional or predicative, have nothing to fear from Quine and are quite within their rights to take modal truths and modal logic seriously, and to search for a respectable theory of modality. (Melia 2003, 79)

I will claim that one part of Hintikka's report was adequate, but the other hasn't captured the force and aims of Quine's original animadversions. The adequate part of the claim is that Kripkean semantics indeed yields a solid foundation for the various axiom systems of modal logic – in some of his less known papers Quine has also accepted the formal results of Kripke's investigations. But the other claim of Hintikka – which is just the received, text-book-like story about Quine and QML – that says that Kripkean semantics has *fully answered* the Quinean arguments against the meaningfulness of the modalities cannot be maintained in such a simple form. We can detect various textual evidences where both Kripke and Quine state that the Kripke-semantics in itself is *just* mathematics, a formal investigation which cannot yield *philosophically interesting* results, i.e. it is not the required interpretation that Quine has demanded. Though there seems to be a consensus about the major theses of Kripke's philosophy (about rigid designation, natural kinds and metaphysical necessity) the field is still open for further debate.

By bringing together these historical claims we can uncover a highly different story of the twentieth-century analytic philosophy and modal logic. We can also show – though I will do no more than sketch the main idea – that the later philosophical works of Kripke and David Lewis could be integrated into this picture – they both provide the required form of intended or philosophical *interpretation* that Quine was demanding, though neither of them is acceptable for Quine for various reasons.

## 1. Methodological considerations

The present study summarizes partly the recent ideas about Quine and QML. Though one can still find some further "received-view-like" claims about these issues, in the last few years scholars like John Burgess (1998/2008; 2013), Stephen Neale (2000), Kit Fine (1989; 1990), Zsófia Zvolenszky (2006; 2007; 2010), Roberta Ballarin (2004) and earlier David Kaplan (1969; 1986) did a lot to rewrite the story and to reorient our thinking.

Taking a special approach to history and historiography we can distinguish three approaches: (i) systematic-narrative, (ii) argumentative, (iii) micro-historical. The first one results in a certain *history of ideas*, in a comprehensive and systematic *narrative*, usually based on a singular point of view, which tries to reconstruct the given story on a unified line. A typical example is that analytic philosophy is united by the *ideas* of the linguistic turn. The second embraces an *argumentative* point of view according to which we have to investigate the explicit statements and arguments of the individual thinkers, taking them to be hypothetical participants in our contemporary philosophical debates (this method is used by Scott Soames in his *Philosophical Analysis in Twentieth Century*). Such an approach is much less sensitive to the contextual factors offered by a narrative account. It is receptive instead to bare claims and arguments, lifted from their historical contexts. These have to hold up by themselves, facing the contemporary critics in our current space of reasons.

The third (iii) approach makes a far more moderate claim – it does not want to argue directly with the figures depicted *as* contemporaries, nor to generate a systematic and unifying *narrative*. Instead it sees its task in writing certain well defined *micro histories* – in such a suitably restricted story

the heroes can be certain thinkers and their oeuvre which are unknown and isolated from the point of view of the 'big picture', various scientific controversies and disputes and their participants, or the reconstruction of the (un)published works in the light of their reception. Erich Reck formulates a similar point of view:

> [...] we carefully recover – using tools borrowed from history, philology, as well as from philosophy (archival research, close textual exegesis, and attention to context) – what the philosopher's core concepts, basic assumptions, and main project *actually* were. We also refrain, at least initially, from evaluating the recovered ideas by using current standards. What we do, on the other hand, is to think them through *internally*, i.e., to evaluate them by using the standards and the understanding of the time. The latter is what makes the approach *philosophical* (not just 'historical reconstruction *as history*', but 'historical reconstruction *as philosophy*'). It is also what makes it a form of 'historicism', albeit a relatively modest one. (Reck 2013, 12)

The revisionary points of the aforementioned scholars are connected to approaches (i) and (ii) thus I will formulate my points on the base of their results. Some more quotations, however, from the primary materials are also provided to strengthen their claims from a more historical point of view. I shall join their efforts by calling attention to certain micro-stories regarding Quine, Kripke and the impact of their work and explaining some features of the received view on the basis of these considerations.

Considering logical and philosophical textbooks along with the relevant secondary literature from the second half of twentieth century, we can abstract a certain *received* or *official view* about Quine and QML. Talking about the 'received view' does not mean that there really is a unified story about Quine and QML which is shared by everyone working on this topic – it is only a useful formulation of certain well known ideas, and it has a certain heuristic value for the later argumentation.

The received view can be characterized with various dogmas as shown by Burgess (1998/2008) but I will restrict my focus and will discuss only two of them:[3]

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[3]   For a much comprehensive list see the groundbreaking work of Burgess (1998/2008).

(RV1) QML does not commit one to essentialism, since the essentialist theses cannot be derived in the usual systems.

(RV2) The (model-theoretic) possible-worlds semantics pointed out that QML could be interpreted in a meaningful way; therefore Quine's critique (that QML is meaningless) has been defeated.

## 2. Quine and essentialism

According to (RV1) the essentialist-charge states that QML is committed to the untenable view of *essentialism*. Quine claimed that essentialism comes into play when one tries to combine, for example, the notion of necessity to open sentences like: $(\exists x)\Box(x > 7)$. At this point Quine was mainly concerned with the concepts of *linguistic* (or *verbal*) *modalities*. Focusing on necessity, linguistic necessity, as Zvolenszky has put it (following Burgess), covers both analytic and logical necessity: "for both concern truth in virtue of the meanings of certain expressions; the difference is only whether we consider the meanings of all vocabulary items or just the logical ones" (Zvolenszky 2010, 43).

Having this in mind, Quine's problem could be formulated as follows. If one tries to substitute for the variable *x* 'nine' one gets that 'necessarily nine is greater than seven' which is true. On the other hand if one substitutes for *x* 'the number of planets' one gets 'necessarily the number of planets is greater than seven' which is presumably false. Given that nine *is* just the number of planets, the two expressions are coreferring, and hence substituting them for the same variable should yield sentences with the same truth-value.

In some of his writings Quine concluded that in certain contexts it *does* matter how we name things, that is, the form of the names. As he says:

> An occurrence of the name in which the name refers simply to the object designated, I shall call *purely designative*. Failure of substitutivity reveals merely that the occurrence to be supplanted is not purely designative, and that the statement depends not only upon 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. (Quine 1943, 114)

For Quine, the not purely designative constructions are the typical cases of the modalities: while the object, the number nine (in and of itself) under the name 'nine' is necessarily greater than seven, under a different name, for example, 'the number of planets', it is not necessarily greater than seven, be it either the case that it is not *analytic* that "the number of planets is greater than seven" or that it is not a *logical* truth.

But one of the most important metaphilosophical commitments of Quine is that he reads the quantifiers *objectually*. The objectual interpretation of the quantifiers means that the admissible values of the variables bounded by the quantifiers are *objects* simpliciter. Quine used to call this interpretation the *ordinary sense* of quantification, "corresponding to the sense of the parallel pronominal constructions of ordinary language."[4] Given this reading of the quantifiers it seems that they are neutral with respect to the form of the names of the objects since they are concerned with the values of the variables which are objects *simpliciter*.

Recall Quine's (1953/1966) famous three grades of modal involvement: in the first grade we attach the modal operators to sentences as *metalinguistic predicates*; in the second we attach the modal notions only to *closed formulas* – it is parallel with the use of negation; but in the third grade the modal operators are capable of attaching to *open formulas*. When we are concerned with open sentences the primary elements are just the *objects*, hence we attach the modal items (for example properties as "necessarily being such-and-such") to the *objects*.[5]

Now we would like to say that there is an object $x$ (namely the number nine) which is necessarily greater than seven, and there is exactly $x$ planets and it is not necessarily that there is $x$ planets. We should be able to say that the following sentence (even using a hybrid language) is meaningful:

$$(\exists x)[\Box(x > 7) \land \text{there are just } x \text{ planets} \land \neg\Box \text{ (there are just } x \text{ planets)}]$$

and in general that

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[4]   Quine's letter to Carnap, QC/105/1943-5-7, in Creath (1990, 328).

[5]   It is important to note that we are dealing with the objectual interpretation since, as Quine emphasized, "if [...] we do not have quantification in the old sense, then I have nothing to suggest at this point about the ontological implications or difficulties of modal logic" (Quine's response, in Marcus *et al.* 1962/1993, 27).

$(\exists x)(\Box Fx \land Gx \land \neg \Box Gx).$

According to our earlier example, it is necessary that nine is greater than seven and it is true that the number of planets is nine but it is not necessary that the number of planets is also nine, since it could have been five (if there were only five planets). Quine thought that in QML "quantifying in" could be meaningful only if we distribute modal properties with respect to the *form* of names (cf. Quine 1953, 147-148). That is, while under the label '9' it is necessary that nine is greater than seven, the same holds for the label '5+4', but under 'the number of planets' it seems that it is not. Under certain descriptions things bear their properties necessarily while under different descriptions they do not.

But regarding the quantifiers, in order to do their job we shall not deal with the mode or form of naming: "quantification, ordinarily understood, abstracts from the mode in which objects are designated."[6] The truth of a formula like '$(\exists x)(x > 7)$' depends on the existence of an *object* which is greater than seven and not on the naming of things. On Quine's view this means that we do not have to tie the accidental and necessary properties to the linguistic descriptions of objects (or to the meanings) but to the objects *themselves*.

So the tension in QML can be formulated as follows: according to the usual objectual interpretation of the quantifiers the mode of naming is not important, while the modalities, when we try to understand them as *verbal*, or *linguistic* modalities, are to be attached to the names (or generally to the linguistic considerations) of the objects. Therefore QML has to take account of the modes of naming and leave them out of consideration *at the same time*. Since for Quine the usual quantificational strategies have priority, we have to settle with the latter option, namely to leave behind the form of the names. But this means that we have to attach the modalities directly to the *objects* and hence we have to say that the number nine in and of itself bears some of its properties necessarily and some of them accidently.[7]

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[6] The formulation is from Leonard Linsky who owes it to one of his students. See Linsky (1969, 695, n10).

[7] Quine considered the possibility of reading the quantifiers, for example, in an intensional way (as, according to him, Carnap did in his *Meaning and Necessity*) but he

This view is usually called (Aristotelian) essentialism:

This is the doctrine that some of the attributes of a thing (*quite independently of the language in which the thing is referred to, if at all*) may be essential to the thing, and others accidental. (Quine 1953/1966, 173-174; italics added)

This is how essentialism comes in: the invidious distinction between some traits of an object as essential to *it* (by whatever name) and other traits of it as accidental. (Quine 1962/1966, 182)

An object, of itself and *by whatever name or none*, must be seen as having some of its traits necessarily and others contingently, despite the fact that the latter traits follow just as analytically from some ways of specifying the object as the former traits do from other ways of specifying it. (Quine 1953/1961, 155; italics added)

This kind of essentialism was incompatible with Quine's (1953/1961, 156) scientific naturalism: "Such a philosophy is as unreasonable by my lights as it is by Carnap's or [C. I.] Lewis's." According to Quine the existential questions are to be dealt with by science and scientific inquiries: since philosophy is not in a position to answer these questions *science* has to inform us whether there are essential properties or not.[8] Inasmuch the latter does not claim that there are such things, their conception is just plain metaphysics for Quine (1953/1966, 174): "[QML] leads us back into the *metaphysical jungle* of Aristotelian essentialism."[9]

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claimed that "if you take quantification in some such new sense, you depart from the topic of my article" QC/105/1943-5-7, in Creath (1990, 328).

[8]     About Quine's naturalism see Gregory (2008) and Weir (2014).

[9]     There is an interesting parallel between Neurath and Quine on this issue. As Quine used to attack Carnap's semantics and considerations of modal logic in the 1950s, Neurath has argued against Carnapian semantics as early as the 1930s but mainly in the 1940s after the publication of Carnap's *Introduction to Semantics*. In a letter to Carnap Neurath said that "I am really depressed to see here all the Aristotelian metaphysics in full glint and glamour, bewitching my dear friend Carnap through and through" (Neurath to Carnap, January 15, 1943, ASP RC 102-55-02). For Neurath semantics in Carnapian (and Tarskian) style entails metaphysics and thus it undermines empiricism; he thought that "it [is] rather dangerous to speak of the DESIGNATUM of an expression" and therefore tried to reformulate the semantical concepts in a behavioristic way and

We can reconstruct a typical argument from the secondary literature which tried to capture the main points of Quine's considerations (cf. Parsons 1967):

(P1)   QML is committed to essentialism
(P2)   Essentialism is an untenable, incoherent view.
(C)    Therefore QML is untenable and incoherent.

This argument did not strike Quine as having a devastating consequence:

> [...] in conclusion I say, as Carnap and [C. I.] Lewis have not: *so much worse for quantified modal logic* as well; for if we do not propose to quantify across the necessity operator, the use of that operator ceases to have any clear advantage over merely quoting a sentence and saying it is analytic. (Quine 1953/1961, 156, italics added)

Philosophers in the 1960s used to attack the first premise of this argument pointing out that QML is not committed to essentialism. The very first defender of QML against the essentialist-charge was Ruth Barcan Marcus (Marcus 1967/1993), who was followed by Parsons (1967; 1969) and Linsky (1969). They have argued that QML is committed to essentialism only in a very *trivial* sense; we can prove, for example, statements that claim self-identity, or that everything bears a certain property or not – that is we are committed in a modal system only to *non-substantial*, *trivial* essentialist claims like, everything is necessarily red or not-red (they are, so to say, logico-essentialist claims) but we cannot prove such statements as 'something is essentially a mathematician' (see Marcus 1962/1993). This trivial sense of essentialism, as Dagfinn Føllesdal has claimed,

> is no more objectionable than the modal operators themselves, when applied to closed formulae. In the case of other types of nonextensional contexts [...] the corresponding notions are required in order to permit quantification into such contexts. So, in this extended sense of 'essentialism', we are all essentialists. (Føllesdal 1986/1998, 104)

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claim that "I suggest to speak of an ACCEPTED SENTENCE (or of a designating sentence), instead of a denotatum I suggest to speak of an 'acknowledged' expression [...]" (Neurath to Carnap April 1, 1944, ASP RC 102-55-05).

Marcus and Parsons tried to strengthen their arguments by pointing out certain mistakes in Quine's argumentation. Parsons argued, for example, that in the reconstruction of Quine's argument we find an equivocation with respect to 'essentialism'. In (P1), according to Parsons, we have to consider only a trivial essentialism, while in (P2) we find a different and stronger sense of it which cannot be proven in QML. Therefore Quine's argument simply fails to reach the required conclusion.

Nonetheless a more subtle reconstruction of Quine's claims shows that essentialist-charge could be upheld even in the face of the Marcus-Parsons arguments. Dagfinn Føllesdal (1986/1998) argued for the thesis that in the writings of Quine we have to deal with two different essentialist-charges. On the one hand there is a certain *weak-essentialist-charge* (WEC) and a *strong-essentialist-charge* (SEC):

> The first, weak notion was developed in response to Carnap, Lewis, and others, who championed quantified modal logic while at the same time rejecting as metaphysical nonsense the traditional Aristotelian view *that necessity inheres in things and not in language*. [...] Quine saw that Carnap and Lewis's linguistic conception of necessity was untenable if one wants to quantify into modal contexts, and that their position therefore was incoherent. (Føllesdal 1986/1998, 98; italics added)

According to (WEC) we have to make a distinction between a thing's necessary and accidental properties and this distinction inheres not in the way we talk about things but *in the things themselves, in and of themselves*. Quine claims that if we want to interpret QML, then we must tie essentialism to the things but do not have to say anything about what could be the essences. At this point there is no need to commit oneself to *any nontrivial* essential property, what matters is only the distinction and that it inheres in the things, not in the language.

Essentialism, however, got a stronger sense, (SEC). It says that things have in themselves *individual, unique essences*; it says that there are certain essences which belong only to one individual: $x$ has a certain $x$-ness, which is $x$'s essence. (SEC) appears, for example, when we are dealing with transworld identity, and we don't have to consider it here. Føllesdal (1986/1998) states that for Quine in the 1940s-1960s what was at stake is (WEC), but after that in the 1970s Quine was putting forward (SEC) and hence causing certain interpretational confusions for others.

What is more important is that Marcus and Parsons haven't met the Quinean challenges. The reason is that Quine, already in 1962 at the Boston Colloquium, has made his arguments explicit; i.e. he is not talking about proving essentialism in QML:

> I've never said or, I'm sure, written that essentialism could be proved in any system of modal logic whatever. I've never even meant to suggest that any modal logician even was aware of the essentialism he was committing himself to, even implicitly in the sense of putting it into his axioms. *I'm talking about quite another thing – I'm not talking about theorems, I'm talking about truth, I'm talking about true interpretation.* And what I have been arguing is that if one is to quantify into modal contexts and one is to interpret these modal contexts in the ordinary modal way and one is to interpret quantification as quantification, not in some quasi-quantificatory way that puts the truth conditions in terms of substitutions of expressions, then in order *to get a coherent interpretation* one has to adopt essentialism and I already explained a while ago just how that comes about. *But I did not say that it could ever be deduced in any of the S-systems or any system I've ever seen.* (Quine's response, see Marcus et al. 1962/1993, 32; italics added.)

Earlier in the discussion Marcus argued that we cannot prove any disturbing essentialist claims in QML, thus Quine's arguments fail against QML. Quine pointed out two things in his response. He said that he wasn't talking about proving essentialism in the systems of QML. From this point of view the articles of Marcus and Parsons pointed out rightly that such theorems are not available in QML, but they miss the point. Keeping this in mind, it is even stranger that though Quine made these claims in 1962, Marcus and Parsons in their published articles at the end of the 1960s were attributing to Quine a non-Quinean position.

On the other hand, Quine did not specify the list of essential properties and the non-trivial essences have not appeared at this point either. They will be relevant only after the 1970s and not in the sense of provability – Quine has localized the essentialist commitments in the *use* of QML. Since the language of QML is stronger than that of classical logic, we can formulate in it certain statements that cannot be stated in classical logic. That is, when we are talking in the language of QML and *using* modal operators in the formalization of statements of ordinary language, we can formulate sentences whose interpretation shows the signs of essentialism. Modal logic

commits us to essentialism when we are using it to *express* ourselves and not at the level of provability and deducibility. This problem is closely tied to what Quine has called 'true interpretation', but to discuss it, we have to move on to the second point of (RV).

## 3. Quine and interpretation

(RV2) states that Quine's arguments against QML have been defeated mainly due to Kripke's model-theoretic possible-worlds semantics. One of the main reasons behind Quine's animadversions against QML was that it violates the rules of extensionality.[10] Kripke was well aware of the usual extensionalist tendencies of his time and tried to motivate his approach from that point of view:

> It is noteworthy that the theorems of this paper can be formalized in a *metalanguage* (such as Zermelo set theory) which is 'extensional', both in the sense of possessing set-theoretic axioms of extensionality *and* in the sense of postulating no sentential connectives other than the truth-functions. *Thus it is seen that at least a certain non-trivial portion of the semantics of modality is available to an extensionalist logician.* (Kripke 1959a, 3; italics added)

It seems that Kripke has indeed defeated Quine's arguments (since he has provided the required purely extensional means for the semantics of the modalities) and seemingly Quine accepted this point which could be based on the fact that he has not published much about the modalities after Kripkean semantics has appeared in the early 1960s.[11]

In the 1970s, however, two publications appeared from Quine which show a different picture and attitude:

> The notion of possible world did indeed *contribute to the semantics of modal logic*, and it behooves us to recognize the nature of its contribu-

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[10]  About Quine's extensionalism see Bar-Am (2012) and Kemp (2014).

[11]  The last longer discussion of the modalities could be found in his *Word and Object* from 1960 (§41). In his most famous later writings, *Pursuit of Truth* (see Quine 1990/1992, 73-74) and *From Stimulus to Science* (see Quine 1995, 99 and 90-95), he discussed the modalities only a few pages altogether.

tion: it led to Kripke's precocious and significant theory of models of modal logic. Models afford consistency proofs; also they have heuristic value; but they *do not constitute explication*. Models, however clear they be in themselves, may leave us still at a loss for the primary, *intended interpretation*. When modal logic has been paraphrased in terms of such notions as possible world or rigid designator, where the displaced fog settles is on the question when to identify objects between worlds, or when to treat a designator as rigid, or where to attribute meta-physical necessity. (Quine 1972, 492-493; italics added)

A rigid designator differs from others in that it picks out its object by essential traits. It designates the object in all possible worlds in which it exists. Talk of possible worlds is a *graphic way of waging the essentialist philosophy*, but it is only that; it is not an explication. Essence is needed to identify an object from one possible world to another. (Quine 1977, 8)

In these passages Quine claimed that Kripkean semantics is *indeed* a huge step in order to interpret QML meaningfully. He admitted that the model-theoretic semantics provides various technical insights and results (completeness, soundness, paradox free structures etc.). He also pointed out, however, that (RV2) builds upon an equivocation.

We can talk about 'semantics' in the sense of *mathematical theory of models*, where the modelling of the relevant semantical notions are based on mathematical structures and formal relations; and on the other hand we can talk about 'semantics' as the *philosophical theory of meaning*. As Burgess (1998/2008, 216, italics added) says, both approaches are important but serve different purposes: "A mathematical theory of models could *refute a technical claim* to the effect that the common systems are formally inconsistent, but without some further gloss it cannot say anything against a *philosophical claim* that the common systems are *intuitively unintelligible*."[12] My

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[12]  Cf. with Quine (1962/1966, 176-177): "Still, man is a sense-making animal, and as such he derives little comfort from quantifying into modal contexts that he does not think he understands." Note the case of the Barcan-formulas. In certain formal semantics we can validate both the Barcan-formula and its converse. However, not everyone would admit the both of them are legitimate from a philosophical and metaphysical point of view. We can build up model-theoretic semantics in such a way that we validate only one of them but we certainly have to motivate this step from *outside* of the model theory.

claim is not simply that philosophical semantics, considered as a theory of meaning, is something radically different from mathematical semantics, considered as a branch of model theory, and therefore the second type of semantics cannot resolve directly problems stemming from the first type of semantics, since this would be almost trivially true. I would like to show rather that (i) the received view seems to claim that Kripke's model-theoretic semantics has indeed defeated Quine's arguments and (ii) that this view is mistaken and that (iii) neither participant of the 'debate' held the mistaken view.[13]

Quine is quite consistent on this point since he shows that even if the model-theoretic semantics of modal logic is viable, we still have to account for those possible worlds and individuals which seem to surface in these settings. He claims, for example, that if we try to rely on possible worlds, we risk that our approach will be non-reductive or even circular:

> [...] let us come to grips with necessity as such. It is not easy. A leaf that latter day philosophers have taken from Leibniz's book explains necessity as truth in all possible worlds. Whatever clarity can be gained from explaining necessity in terms of possibility, however, can be gained more directly: a sentence is necessarily true if it is not possibly false. 'Necessarily' means 'not possibly not'. And we can equally well explain possibility in terms of necessity: 'possibly' means 'not necessarily not'. We understand both adverbs or neither. (Quine 1987, 139-140; italics added)

Even though when this passage from 1987 was published a reductive analysis of modality, put forward by David Lewis who has been emphasizing his reductive approach at least from his 1968 article about counterparts, was already in play, Quine's remark could be read as an important warning: using merely *possible worlds* is just defining necessity in terms of possibility and negation. If we are satisfied with circular non-reductive definitions we could use our adverbs without advocating such entities like possible worlds.[14]

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[13]   As Burgess (1998/2008, 216) claims, all the earlier literature "involve[s] essentially the same error, confusing Quine's philosophical complaint with some formal claim".

[14]   Of course for Quine (1972, 493), as a committed Humean, non-reductive definitions of modality won't work since our world is wholly non-modal: "everything is what it is, ask not what it may or must be". This phrase is a response to Kripke (1971, 160),

Besides his misgivings about possible *worlds*, on the other hand, in his notorious "On What There Is" from 1948, Quine formulated his skeptical remarks about (individuating) possible *individuals*:

> Take, for instance, the possible fat man in that doorway, and, again, the possible bald man in that doorway. Are they the same possible man, or two possible men? How do we decide? How many possible men are there in that doorway? Are there more possible thin ones than fat ones? How many of them are alike? Or would their being alike make them one? [...] Or, finally, is the concept of identity simply inapplicable to unactualized possibles? But what sense can be found in talking of entities which cannot meaningfully be said to be identical with themselves and distinct from one another? These elements are well high incorrigible? (Quine 1948, 23-24)

As we noted earlier, this problem could be fixed with the help of strong essentialism, but Quine couldn't accept it for the mentioned reasons.

So, in the context of Quine's writings we can formulate the problem as follows: even if we provide a suitable formal semantics for modal logic, we still have to give *philosophical* reasons for motivating our formal approaches; we have to provide an answer for what are possible worlds, what are possible individuals, why the thesis of rigid designation holds, how to differentiate between proper names and definite descriptions, what are the conditions and commitments of essentialism etc.[15]

Despite the fact that the received view claims that Kripke has answered Quine's animadversions, the whole point of the (RV) is just becoming more complex, since according to Ballarin (2004, 609) "surprisingly, Quine's best ally on these matters turns out to be the very philosopher who

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who cites the words of Bishop Butler in his "Identity and Necessity": 'everything is what it is and not another thing.'

[15]   At this point one could note again the parallel with Neurath, since he also claimed that "[...] as long as semantics appears as pure calculus I have nothing to say, assumed that your calculus is consistent" (Neurath to Carnap, April 1, 1944, ASP RC 102-55-05). For Neurath, formal and technical achievements were one thing, but 'philosophical' and scientific considerations were another. I say 'philosophical' since Neurath thought that philosophy wasn't something higher than science and he always tried to get rid of philosophy. In this case Neurath was a naturalist like Quine (1995/2008, 467) who claimed that "naturalized philosophy is continuous with natural science".

engineered the possible worlds model theory: Saul Kripke." In one of his articles Kripke formulates this point as follows:[16]

> *Philosophers should not confuse their own particular philosophical doctrines with the basic results and procedures of mathematical logic.* (Kripke 1976, 408; italics in the original)

> Philosophers often become so overjoyed, however, when they have found formal criteria for the success of some project that its intuitive basis is often disregarded like a ladder which can easily be kicked away after it has been climbed. [...] it is as if it were thought that any technical criterion, however loosely defended, is superior to a mere (!) philosophical argument. (Kripke 1976, 411)

> *Philosophers should maintain a proper skepticism of attempts easily to settle linguistic or other empirical questions by quick a priori formal considerations.* (Kripke 1976, 412; italics in the original)

> *Philosophers should have a better sense of both the power and the limitations of formal and mathematical techniques.* (Kripke 1976, 413; italics in the original)

> Logical investigations can obviously be a useful tool for philosophy. They must, however, be informed by a sensitivity to the philosophical significance of the formalism and by a generous admixture of common sense, as well as a thorough understanding both of the basic concepts and of the technical details of the formal material used. It should not be supposed that the formalism can grind out philosophical results in a manner beyond the capacity of ordinary philosophical reasoning. There is no mathematical substitute for philosophy. (Kripke 1976, 416)

These passages show that Kripke's attitude and metaphilosophical stance towards these matters were just the same as Quine's. Kripke is emphasizing that though model-theoretic formulations could provide suitable formal criterions with important mathematical results we have to be cautious when we are using formal logic in our argumentations. Formal logic

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[16]   See further Zvolenszky (2007) who also considers these quotations and their importance in the Quine-Kripke debate.

is just the *first step* when we try to defeat certain points of view but surely not the last. "There is no mathematical substitute for philosophy."

Interestingly Kripke was fully aware of the status of his model-theoretic semantics. For example, in his earliest formal articles, where he first formulated possible-worlds semantics, Kripke mentions Quine only two times – but what is more important, he did it only in certain insignificant contexts.[17] Firstly Kripke is mentioning Quine's *Mathematical Logic* with respect to the question that we shall formulate quantificational theory in a way which allows only closed formulae but there is no mention of the modalities (Kripke 1963/1971, 69, and note 14).

The other reference can be found in "A Completeness Theorem in Modal Logic" (see Kripke 1959a, 9) where Kripke is citing Quine's "Three Grades of Modal Involvement". In the citation Kripke is *not* responding to Quine's animadversions but mentions one of Quine's formulae, namely $(\forall x)(\forall y)(x = y) \supset \Box(x = y))$.[18] Regardless of the overall importance of this formula, it shows that Kripke was aware of Quine's writings about modality in 1958 when he was preparing his article while still in high school. Later Kripke applied to Harvard University where Quine was teaching. It is interesting since that time Quine was already famous for his remarks against modal logic so Kripke should have known this.[19]

After these publications, however, we can find no trace in Kripke's logical articles from the time that he was considering his formal semantics as a response to Quine's philosophical expectations.[20] Consequently we can plausibly assume that Kripke's intention *was not to undermine the whole of Quine's position with respect to the modalities.* What is more interesting is

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[17]  Kripke is referring to Quine quite a few times in his first two lectures of *Naming and Necessity* but I will just sketch this issue at the end of the paper since they belong mainly to the second phase of their debate, namely to the philosophical considerations of the modalities. Cf. Zvolenszky (2007).

[18]  Burgess (1998/2008, 212, n8) notes that virtually this formula was the only explicit contribution of Quine to the formal theory of modal logic.

[19]  Cf. Marcus (2010), who reports a similar attitude against modal logic from Harvard.

[20]  Kripke (1963/1971, 65-66) discussed the various philosophical theories (Frege, Russell, Strawson) of descriptions but he considers them as merely a starting point of the formal investigations. Similarly none of Kripke's early model-theoretic works (cf. Kripke 1959b; 1963a; 1963b) contains any reference to Quine or his animadversions.

that the logical community was not seeing Kripke's writings as a response to Quine that time either despite the suggestion of the received view.

Firstly none of the (relatively few) reviews of Kripke mentions the name or the animadversions of Quine – and especially none of them articulates that Kripke has provided an answer to Quine (see Bayart 1966b; Kaplan 1966; Gabbay 1969). Arnould Bayart's review of Kripke's "A Completeness Theorem in Modal Logic" was put in *The Journal of Symbolic Logic* on exactly the same page where Bayart's other review of E. J. Lemmon has been published. In the latter review Bayart (1966a) doomed modal logic to be too obscure and vague without the relevant semantical constructions and metalogical results. This is important because in his review of Kripke (on the same page) Bayart did not mention that Kripke would provide all of these results while the received view indeed claims this.

It is also curious that in the literature from the late 1950s until the late 1960s almost none of the relevant logical journals (like *The Journal of Symbolic Logic, Notre Dame Journal of Formal Logic, Bulletin of the American Mathematical Society, Studia Logica, Zeitschrift für mathematische Logik und Grundlagen der Mathematik*) contains any reference to Quine's animadversions or to Kripke's alleged answers. The logicians were occupied with the systems of J. C. C. McKinsey, J. Łukasiewicz and it is hard to find any article on modal logic which does not refer to B. Sobociński. This suggests that the relevant scholars have discovered the works of Kripke relatively late. The usually discussed logician, Sören Halldén (1969, 306), for example, in his 1969 review of the debate between Lemmon and Henderson about "Is there only one correct system of modal logic?" argues that Lemmon's attempts to show that while the M, S4 and S5 systems require different strategies and all of them are legitimate is just "[...] impressionistic, but suggestive." The problem is that while the debate between Lemmon and Henderson took place in 1969 we usually think that Kripke's article which settled the questions about the legitimacy of the various modal systems was published already in 1963.

Of course there were exceptions in the literature. For example, M. J. Cresswell (1967; 1968) published several (quite positive) articles explicitly about Kripke in the *Notre Dame Journal of Formal Logic* in the 1960s. Cresswell's role is important because his book on modal logic with G. E. Hughes from 1968 was one of the first textbooks about modal logic and it used the Kripke-semantics substantively. The other exception is the afore-

mentioned E. J. Lemmon (1966a; 1966b) who tried to synthetize the alge-
braic and semantical approaches to modal logic that discussed and analyzed
Kripke's works in a positive and subtle manner.

All of these suggest that the philosophical and logical atmosphere of
the 1950s and 1960s wasn't after all so receptive with respect to Quine ani-
madversions and Kripke's alleged answers. Two more points, however, need
to be mentioned. First, if the logical community was inactive in answering
Quine's philosophical animadversions (and for the right reason) who is re-
sponsible for the confusion of the formal and philosophical points? Burgess
(1998/2008, 216) suggests that the confusion "is represented in the com-
pendium by the suggestion that disputes about quantified modal logic
should be conducted with reference to a 'semantic construction' in which
connection the now superseded approach of Carnap is expounded (with the
now standard, then unpublished, approach of Kripke being alluded to as an
alternative in the discussion)." Burgess is referring here to the 1962 Boston
colloquium where Quine and Marcus (along with Kripke and Føllesdal)
discussed the questions of modal logic. Though he is not saying explicitly
but he is quoting from Marcus' presentation and in order to understand the
point let's see what was at stake.

Marcus (1961, 316) said that "I would like in conclusion to suggest that
the polemics of modal logic are perhaps best carried out in terms of some
explicit semantical construction. As we have seen [...] it is awkward at best
and at worst has the character of a quibble, not to do so." The mentioned
semantical construction corresponds to the formal considerations of the
debate since Marcus (1961, 322, n19.) refers to Carnap's *Meaning and Ne-
cessity* which was viewed then as a formal statement of modal logic.[21] But
she is mentioning Kripke's early abstract about the semantics of modal log-
ic (see Kripke 1959b) too which contains only the formal aspects of the
question.[22]

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[21]   Whether Carnap's *Meaning and Necessity* is rightly considered as a purely formal
work in the context of the formal-philosophical distinction of Quine is a further ques-
tion in the light of the recent works of Carnap-scholars who highlight the philosophical
character of Carnap's ideal of explication which is used in his book.

[22]   Interestingly while the English editions of the article (cf. Marcus 1961, 322, n20;
1962/1993, 23, n20) contain the reference to Kripke, one cannot find it in the Hunga-
rian translation (cf. Marcus 1962/1985).

The confusion surfaces also in the closure of Marcus' article (1961, 321): "In such a model modal operators have to do with truth relative to the model, not with things. On this interpretation, Professor Quine's 'flight from intension' may have been exhilarating, but unnecessary." Though the 1993 edition of the paper does not contain the "not with things" phrase it was in the first edition and shows well the intention of Marcus, just like her footnote (cf. Marcus 1961, 322, n21): "If one wishes to talk about possible things then of course such a construction is inadequate." This remark is about *things* and not models, so it seems to suggest that Marcus is concerning with the philosophical and not the formal issues. But the context (and actually the whole paper) makes it clear that for Marcus "possible things" are related to the varying domains conception of quantification (in her semantics the domains of 'possible' individuals and quantification coincide). Thus in her paper (mentioned by Burgess) Marcus did not response to the formal/philosophical distinction of Quine and while she talks about both types of problems at the same she considers only the possible formal solutions under the aegis of semantics and thing.

The second point is that, as I suggested along with Zvolenszky (2007) and Burgess (2013, chapters 3-4), Kripke was fully aware of what he *is* doing and what he *has* to do in order to meet the interpretational challenges of Quine. After showing the formal correctness of modal logic he moved on and tried to give philosophical motivations and justifications for his main moves. This is to be found in his famous lectures of *Naming and Necessity*.

Regarding the above mentioned argument of Quine against modal logic based on the essentialist charge, the usual method was to attack Quine's first premise, pointing out that QML is not committed to essentialism because the problematic essentialist theses cannot be deduced in the systems of QML. As we saw, Quine has never claimed that it is the case. Kripke took part in those discussions from 1962 where Quine made his points explicit against Marcus. While Marcus didn't seem to grasp what the core of Quine's animadversions against essentialism were, Kripke responded more sympathetically to his ideas. In *Naming and Necessity* he didn't claim that one cannot deduce the essentialist theses in QML because it was just irrelevant for Quine's challenges. What he did is to show that Quine's second premise, that essentialism is an untenable, incoherent view, does not hold.

To show this, Kripke is using a fictive dialogue:

Suppose that someone said, pointing to Nixon, 'That's the guy who might have lost'. Someone else says 'Oh no, if you describe him as "Nixon", then he might have lost; but of course, describing him as the winner, then it is not true that he might have lost'. Now which one is being the philosopher, here, the unintuitive man? It seems to me obviously to be the second. The second man has a philosophical theory. The first man would say, and with great conviction, 'Well, of course, the winner of the election *might have been someone else*. The actual winner, had the course of the campaign been different, might have been the loser, and someone else the winner; or there might have been no election at all. So, such terms as "the winner" and "the loser" don't designate the same objects in all possible worlds. On the other hand, the term "Nixon" is just a *name* of *this man*'. When you ask whether it is necessary of contingent that *Nixon* who won the election, you are asking the intuitive question whether in some counterfactual situation, *this man* would in fact have lost the election. If someone thinks that the notion of a necessary or contingent property (forget whether there *are* any nontrivial necessary properties [and consider] just the *meaningfulness* of the notion) is a philosopher's notion with no intuitive content, he is wrong. (Kripke 1980/1990, 41-42)

Kripke is pointing out that the distinction between accidental and essential properties is not an *ad hoc* technical distinction of philosophy but we recognize and use it already in our daily discussions and language games. We understand those claims intuitively which consider the modal features of objects. He also mentions that the question is not whether there are *any* (nontrivial) essential properties – what he is interested in is whether it is meaningful to talk about such things: and that is what Quine was doing in his weak essentialist charges as we have seen above.

*Naming and Necessity*, however, contains a lot more material where Kripke explicitly aims to meet the philosophical challenges of Quine: he tries to motive his distinction between proper names and descriptions with a lot of examples and thought experiments based on everyday linguistic practices; he tries to rehabilitate some of the modal notions and show their intuitive content but we cannot consider here all of them.

## 4. Summary

The textbook-like history of analytic philosophy is a history of myths, received views and dogmas. Though mainly the last few years have witnessed a huge amount of historical works that aimed to reconsider our narratives of the history of analytic philosophy there is still a lot to do.

The present study is meant to present such a micro story which is still in many ways untouched by historians. In section 1 I characterized the received view about Quine and modal logic with six dogmas and considered here the first two of them. In section 2 I tried to show that while the received view claimed QML does not commit one to essentialism, since the essentialist theses cannot be derived in the usual systems, Quine's animadversions were based on different grounds. He was talking about the intended meaning of modal notions and the philosophical interpretation of modal language. To shed some light on this point in section 3 I placed the early writings of Kripke in the context of Quine's requirements. While the received view states that Quine's arguments against modal logic have been met by the famous possible-worlds semantics of Kripke we saw that his formal semantics was never meant to defeat Quine's more philosophical argumentations and Quine has accepted the results of Kripke's formal-mathematical investigations. What were at stake were no less than the philosophical ideas and motivations of modality and essentialism and these are just the topics of *Naming and Necessity*.

If we could accept this historical interpretation of the network between Quine, Kripke and modal logic, we have to conclude that Quine's *real* philosophical animadversions against the modalities are still on the table: though Kripke has provided some important considerations which were widely accepted among philosophers in the second half of twentieth century, Quine had his own positive philosophical ideas about modality based on his Humean basic stance which didn't get any attention in the literature yet.

Also there is the account of David Lewis in his *On the Plurality of Worlds* which is just as extensional and reductive as Quine has always required it. Lewis and Quine shared almost the same metaphilosophical commitments and attitudes (see Soames 2015) and though Lewis did not mention the name of Quine, his efforts in *On the Plurality of Worlds* could be read as an answer to the Quinean challenges:

When I say that possible worlds help with the analysis of modality, I do not mean that they help with the metalogical 'semantic analysis of modal logic'. Recent interest in possible worlds began there, to be sure. But wrongly. For that job, we need no possible worlds. We need sets of entities which, for heuristic guidance, 'may be regarded as' possible worlds, but which in truth may be anything you please. We are doing mathematics, not metaphysics. Where we need possible worlds, rather, is in applying the results of these metalogical investigations. Metalogical results, in themselves, answer no questions about the logic of modality. (Lewis 1986, 19)

Lewis claims just the same as Quine did: formal-logical investigations answer the technical problems while for his *interpretational* challenges one requires more substantial 'philosophical-scientific' investigations. As Lewis (1986, 20) said, "It is the substantive theory, not the metalogic, for which we need possible worlds."[23]

But the metaphysics of possible worlds is just one possible answer to Quine and in these philosophical questions there aren't any final answers. In a different context Kripke (1973/2013, 155) said that we have a certain tendency at similar point to throw up our hands. Whether we throw them up or not, the debate about the modalities is still on the table and the ideas of Quine should deserve a fresh start.

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[23]  Similar ideas are to be found in Lewis' *Convention*, see Lewis (1969/2002, 207-208).

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