

Advanced Reasoning Forum

Proceeding of the  
2nd Annual Conference on  
Logic and Reasoning

New Europe College  
Bucharest, Romania  
July 2000

Bulletin of Advanced Reasoning and  
Knowledge  
Volume 1, 2001  
Edited by Richard L. Epstein

New Europe College, Bucharest



# Modals and Quantifiers

Mircea Dumitru<sup>1</sup>

This paper is part of a work in progress in which I explore the prospects of a view about possibilities and matters modal for which I want to argue. The view in question is known as Modal Actualism. Roughly, the view consists of the following two theses, the first of which is primarily concerned with the semantics of modal idioms, and the second of which is motivated by a metaphysical (ontological) stance with respect to objects.

*Thesis I (Modalism)* The natural language idioms of “necessarily” and “possibly” are primitive with respect to elaborate semantical renderings via, e.g., “possible worlds.”

*Thesis II (Actualism)* Everything that exists is actual.

In this first part of my research I want to set the stage for giving a direct argument in favor of modal actualism. To this purpose I discuss some more foundational issues. I am particularly interested in disposing of major alternative views about *possibilia* and the semantics of modal talk. This is why I address certain ramifications of the main issue that are brought about by influential views which do not share with modal actualism either the semantic doctrine of the priority of modal idioms or the ontological stance about actual objects. Toward the end of this paper I will give my own sketch of the modal actualist solution that I will work out in more detail in another paper.

The challenge that a modal actualist has to meet is serious. In order to make sense of the modal language in a logical setting, i.e., to interpret various modal systems and to provide clear criteria for validity of modal arguments, the possible-worlds semantics for a modal language seems to be a solution which imposes itself naturally. But then the question arises of how to make sense of the possible-worlds language unless we are ready to take at face value quantification over possible worlds, and consequently to accommodate into our ontology those alleged entities that our quantifiers range over, namely, “possible worlds.”

If the modal actualist meets the challenge, then one is supposed to seek a strategy for justifying an affirmative answer to the following question: Could we have both the possible-worlds semantics which works so well with respect to validity of modal arguments, and more generally with matters metalogical for modal systems, and have, nevertheless, a way out from an ontology in which dubious entities like “possible worlds” are endorsed?

To be sure, to get the benefit of an ontology free of possible worlds one needn't be a *modal* actualist. One can very well be a *quantificational* actualist

<sup>1</sup> I would like to express my gratitude to Richard L. Epstein and Kit Fine for careful comments and useful suggestions on an earlier version of this work.

who can take possible worlds as a proxy for what in reality are but sets of sentences or propositions, but who, nevertheless, in contradistinction to a *modal* actualist will find quantifiers over possible worlds as giving in a natural way the meaning of modal operators.

For certain reasons to be addressed later, the quantificational approach doesn't seem to cope with the meaning of modals, for it introduces entities which the modal language doesn't seem to require in order to be able to make sense of it. So the quantification-over-possible-worlds solution, if taken as giving the meaning of modal operators, has the undesirable feature of being ontologically radical.

The main issue to be addressed here is that of a double reduction. First, there is a reduction of a modal language to a corresponding possible-worlds language according to certain translation schemata. The main reason for this reduction is that by doing possible-worlds semantics for modal systems and arguments we can see the logical mechanisms at stake in metalogical issues and validity. Second, when we come to the issue of the "real" meaning of sentences of modal language, what has been taken before as the class to be reduced, namely, the class of sentences of modal language, reverse roles with the previously reductive class, that is, the class of sentences of possible-worlds language. Thus, the problem of a reverse translation occurs as part of a general strategy through which we, as modal actualists, seek to show that the rendering for technical reasons of modal operators as quantifiers over possible worlds does not impute any meaning to sentences of a modal language, or at least any meaning which could be accounted for only by an ontologically radical solution. In a nutshell, how can a modal actualist use quantificational possibilist discourse in order to explain the validity of modal arguments, and at the same time be an anti-realist with respect to the existence of possible worlds?

To begin with, let's see what's the main rationale for asking for a reduction of the modal discourse to a nonmodal one in which modal operators are assimilated to (restricted) quantifiers over possible worlds?

A clear motivation for such a maneuver has been given by David Lewis.

The standards of validity for modal reasoning have long been unclear; they become clear only when we provide a semantic analysis of modal logic by reference to possible worlds and to possible things therein. Thus insofar as we understand modal reasoning at all, we understand it as disguised reasoning about possible beings.<sup>2</sup>

What is then to be done for achieving such standards? In Lewis' "Anselm and actuality" we find a strategy which is supposed to bring about the desired standards of clarity for modal discourse, the main principle of which is

Given any statement about what may be conceived to be the case, we translate it into a statement about what is the case.<sup>3</sup>

So what is required is to replace modal language and reasoning with reasoning in

<sup>2</sup> "Anselm and actuality," p. 10.

<sup>3</sup> Ibid., p. 11–12.

an extensional first-order language. This boils down to an argument in favor of substitution of talk about *the ways in which things could have been otherwise than they actually are* for talk about *things which could have been in many ways otherwise than they actually are*. Taken at its face value this idiomatic rendering of a modal locution is an existential quantification over certain entities described as “ways things could have been.” And since the existential quantifier is the logical device of expressing existence, it seems to follow that to make sense of that idiomatic modal rendering of possible nonactual properties one has to countenance the existence of those entities which can be called “ways things could have been” or for short “possible worlds.”

This is tantamount further to a requirement to the effect that for any sentence  $s_m$  of the modal language there is a corresponding sentence  $s_w$  of the language of quantifying over possible worlds (possible-worlds language, for short) such that there is a relation  $R$  that holds between them and its holding between the two sentences guarantee the same logical behavior both for  $s_m$  and for  $s_w$ .<sup>4</sup> What counts here for logical behavior is, roughly speaking, the truth-value of  $s_m$  and  $s_w$ , respectively, in corresponding interpretations, and the validity of arguments made up from sentences of modal language, and possible-worlds language, respectively. Thus, what  $R$  is bound to guarantee is that whenever  $s_m$  is true under one intended interpretation,  $s_w$  is also true under a corresponding interpretation, and that an argument  $A_m$  carried through within modal language is valid if and only if a corresponding argument  $A_w$  in the language of possible worlds which is obtained by some translation schemata from  $A_m$  is also valid.

If one asks further what type of relation is required to do this job, we find that the most plausible candidate for  $R$  is a synonymy relation between modal operators and quantifiers over possible worlds. For if  $s_m$  and  $s_w$  *mean* the same, and provided that  $s_w$  and the whole formal apparatus of possible-worlds semantics show the promise of more intelligibility than  $s_m$  and the modal reasoning show, then it makes sense to use  $s_w$  and that apparatus as a guide for the logical behavior of  $s_m$  and of any modal argument of which that  $s_m$  is a part thereof.

So, it seems that if we want clear standards for the validity of modal arguments then we need to buy into the view which construes modal operators as quantifiers over possible worlds. And this view comprises two essential claims: that a modal sentence and its corresponding rendering through restricted quantification over possible worlds are synonymous, and that the meaning of a modal sentence is given through its synonymous possible-worlds sentence.

The problem with this proposal is that it seems to force us to acknowledge in our ontology a special sort of entity, “possible worlds,” which the quantifiers corresponding to modal operators are supposed to range over. Since in the modal discourse no appeal to possible worlds is apparent, it follows that this solution is ontologically radical.

The need for those special entities is notably emphasized by David Lewis in

<sup>4</sup> Compare G. Forbes, *The Metaphysics of Modality*, pp. 70–76.

*On the Plurality of Worlds* by drawing our attention to the fact that it is not the mathematics of modalities, i.e., the metalogical investigation of various modal systems and of their relations, that requires the help of possible-worlds discourse, but the metaphysics of modalities, i.e., the application of modal concepts and systems to matters philosophical.<sup>5</sup>

It seems then that one can't have the benefits of the metalogical investigations of modal systems and the application of its results and concepts to metaphysical issues without paying a certain ontological price.

The real challenge now for somebody who can't be persuaded to be a full-blown realist regarding possibilities is to keep to a minimum those commitments, and to see whether it is possible to stick to the mathematical policy toward possible worlds, as described by Lewis, even when we are doing metaphysics. Can we afford to use, for philosophical purposes, any sets of entities whatsoever, which for heuristic guidance "may be regarded as" possible worlds? More to this point, can one develop a full-blown anti-realist position concerning possible worlds, while preserving all the technical advantages of the quantifier approach of the modal operators?<sup>6</sup>

But except for qualms about ontological paucity, why not endorse "possible worlds" as genuine entities that our quantifiers range over? Moreover, what reasons could there be for resisting the overall strategy of reducing modal language to possible worlds language, regardless of the view one might endorse about what a possible world could be?

I think that in the literature one can find two main reasons for resisting this approach, and accordingly, for insisting upon the primacy of modal language with respect to possible-worlds language. First, one may have worries concerning the

<sup>5</sup> Lewis in *On the Plurality of Worlds*, p. 17 says

For that job [the metalogical semantical analysis of modal logic], we need no possible worlds. We need sets of entities which, for heuristic guidance, 'may be regarded as' possible worlds, but which in turn 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, by themselves, answer no questions about the logic of modality.

And again, acknowledging the seminal results about the relations between modal systems obtained through the technical apparatus of modal frames and models based on different frames, Lewis stresses the limits of the technical approach when coping with metaphysical questions, *ibid.*, p. 19:

But in truth the metalogical results, just by themselves, cast no light at all. If the modal operators can be correctly interpreted as quantifiers over the indices of some or other frame, restricted by the relation of that frame, then we have found out where to look for illumination about controversial axioms. If not, not.

<sup>6</sup> In *The Metaphysics of Modality*, p. 76, Forbes acknowledges that

The most interesting philosophical question about the semantics of modal logic is whether it is possible to develop an anti-realist view that is consistent with our intuition of naturalness in the quantifier treatment of the modal operators, and which can deal with the thought that the invalidity of [a modal argument] is somehow explained by the invalidity of [its corresponding rendering in sentences belonging to the possible-worlds language].

*ontological status* of *that* to which the reduction is carried over, i.e., of possible worlds. Second, as we'll see soon, there is a more subtle motive for being suspicious about the reduction *as such*. For as Kit Fine shows the main problem with the attempt to reduce modal discourse to possible worlds language, and then further, from a quantificational actualist perspective, to reduce possible worlds to other entities which might appear more respectable from an ontological point of view, such as sets of propositions, and essences, is not mainly the nature of the things by which the reduction is effected, but the question-begging character of the reduction itself.<sup>7</sup>

First, why not to be a modal realist?

In general, you may not want to be a realist about worlds and possible individuals because within various sorts of realism advocated nowadays you don't find conclusive grounds for endorsing the view that modal locutions are synonymous with possible-worlds sentences, and because to make sense of possible-worlds language one has to introduce into one's own ontology entities which don't show up when perfectly meaningful modal locutions are used as part of the natural language.<sup>8</sup>

So, although you may prefer to do possible-worlds semantics for technical purposes, when you come to foundational philosophical questions, such as the meaning of modals, and the status of modal operators with respect to quantifiers over possible worlds, you may want to insist that ultimately quantifiers over possible worlds are not to be taken as primitive with respect to modal operators and that modal operators should be given meaning via another approach.

To this general attitude concerning the reduction of modal discourse, one should add, furthermore, the internal drawbacks and difficulties that the few distinct main types of realism about possible worlds face.

Then, the answers to the question "Why not be a realist concerning possible worlds?" will split according to what kind of realism one has in mind.

For the purposes of our discussion a useful distinction concerning realism about possible worlds is that between an *absolute* realist and a *reductive* realist.<sup>9</sup>

The best example, and maybe the single example of an absolute realist is D. Lewis. His realism could be spelled out in principle as being made from two basic ingredients, namely, quantificationalism and possibilism. Together they work to give credit to the main tenet of absolute realism that possible worlds are real entities which cannot be further analyzed. Roughly speaking, Lewis' absolute realism concerning possible worlds springs from his taking seriously existential quantifiers in ordinary language, i.e., to understand them as expressing the existence of a special sort of entities: "ways things could have been." Although he provides no decisive arguments in favor of his contention, Lewis

<sup>7</sup> "Plantinga on the reduction of possibilist discourse."

<sup>8</sup> Thus, you don't want to endorse what has been called the ontological radical character of such a solution which introduces for explanatory reasons new entities which don't show up in the ontology which is required to make sense of the language to be reduced.

<sup>9</sup> Compare Forbes, *The Metaphysics of Modality*, p. 75.

believes that “possible worlds” can do for philosophers the same kind of job as sets do for mathematicians. Thus, if possible worlds are useful for coping more easily and elegantly with a host of philosophical problems which otherwise would be dealt with in a clumsier way, then by way of an inference to the best explanation, and by analogy with the philosophical attitude of the mathematicians toward sets, one can legitimately entertain the existence of possible worlds.

There are in the main four tenets which Lewis defends: (i) possible worlds exist and they are as real as the actual world in which we exist; (ii) other possible worlds are things of the same sort as the actual world (characterized as “I and all my surroundings”); (iii) the indexical analysis of the adjective “actual” is the correct analysis; (iv) possible worlds cannot be reduced to something more basic.<sup>10</sup>

For the purposes of our discussion, the main divide between Lewis’ absolute realism and other brands of reductive realism can be located at the level of the second and the fourth theses on Lewis’ agenda. Thus, what makes Lewis’ realism a very implausible doctrine which flies in the face of our common intuitions is his systematic defense of the idea of homogeneity of all worlds which constitute the logical space. That means that according to Lewis other possible worlds differ not in kind from the actual world but only in what is going on at them. And our world is actual not because it has attached to it a special ontological status which makes it different in kind from other possible worlds but because it is the world which we are parts of. Actuality is not some ontological feature which opposes absolutely one particular world to any other possible world. Rather, it is a relation which obtains between the denizens of any world and that particular world in which they inhabit.

Lewis himself is ready to argue in favor of his implausible position on grounds of what might be called parsimony. Actually, from several other critical encounters which he deals with in “Possible worlds” this contention concerning the unparsimony of his ontology seems to be the only one he grants.<sup>11</sup> However,

<sup>10</sup> See R. C. Stalnaker, “Possible worlds.”

<sup>11</sup> In particular, one piece of criticism directed against Lewis’ view regarding the homogeneity of worlds is due to Stalnaker. The way in which that criticism seems to me to miss its target is paradigmatic for the internal consistency and resourcefulness of Lewis’ ontology of possibilities.

Thus, Stalnaker claims that if a possible world is, according to Lewis, a way things might have been, then the actual world should be construed as the way things are, and not as “I and all my surroundings.” Then, since “the way things are” expresses a property of a state of the world, and not the world itself, it follows that what makes the sentence “The actual world is the way things are” true is not the construal of *is* as the *is* of identity, but rather as the *is* of an attribution of a property, viz. the property of being “the way things are,” to a thing, viz. the world. And then, if we grant that properties could exist uninstantiated and that “the way the world is” is such a property, “then *the way the world is* could exist even if a world that is that way did not.” (Stalnaker, “Possible worlds”, p. 228.)

Hence, Stalnaker’s argument concludes, while one can accept that there are many ways that things could have been (which is Lewis’ claim (i)), one isn’t forced to make the further step to accepting that “there exists anything else that is like the actual world.” (ibid.) i. e., we are not supposed to accept Lewis’ claim (ii) by which the homogeneity of worlds is endorsed.



by way of drawing a distinction between qualitative and quantitative parsimony, Lewis claims that only the former is to be praised because “it keeps down the number of fundamentally different *kinds* of entity.”<sup>12</sup> Whereas his realism, being only quantitatively unparsimonious, is not at fault so damagingly with respect to that stringent and legitimate demand of parsimony. “You believe,” says Lewis, “in your actual world already. I ask you to believe in more things of that kind, not in things of some new kind.”<sup>13</sup>

The various brands of reductive realism could be interpreted as dispensing in the main with the thesis of homogeneity of worlds and with the unanalyzability demand. For reductive realists, possible worlds are made out of other entities, which are held to be in better ontological standing than worlds themselves.

Some prominent options which have been worked out are that worlds are maximal consistent sets of propositions, or maximal states of affairs, or maximal possibilities.<sup>14</sup> These reductive positions are not at variance with the main tenet of realism. Within any such doctrine it is perfectly meaningful to say that *there are worlds* which ultimately means, after analyzing worlds into their basic and genuine constituents, that there are sets of propositions or of states of affairs, and so on, which meet some specific constraints. What is different now is that worlds are not “respectable entities in their own right.”<sup>15</sup> They are identified by way of reduction with abstract entities, and hence they are taken to be abstract things themselves.

It is worth noticing, though, that the absolute-reductive distinction doesn’t coincide with the possibilism-actualism distinction. Although many prominent positions which are opposed to the former distinction are also opposed to the latter, not all reductive realists are actualists. Thus, a reductive realist who identifies worlds with possibilities is not an actualist. He or she is a reductive-possibilist.<sup>16</sup>

These reductive realist positions, however, face their own problems. That a realist such as Lewis points out that they can be faulted on scores such as circularity and incorrectness, probably shows that the divide between actualism

---

So the upshot of Stalnaker’s argument seems to be that it can block Lewis’ inference from “Things might be otherwise than they are” to “There are many ways things could have been besides the way they actually are.” Particularly if “ways things could have been” is an entity which the existential quantifier ranges over and which is of the same kind as the actual world.

But Lewis’ answer could be typically articulated as follows: I agree with the premises of your argument. And in particular with your point of view that “the way things are” is a property of the actual world and not the world itself. However, what I demand for the sake of doing systematic metaphysics more easily, and as an outcome of an inference to the best explanation, is to grant me that the world is a huge concrete system (“I and all my surroundings”) and that there are many other such concrete objects as the one we happen to be a part thereof.

<sup>12</sup> Lewis, “Possible worlds”, p. 185.

<sup>13</sup> Ibid.

<sup>14</sup> Compare Adams, “Theories of actuality”, Plantinga, “Actualism and possible worlds”, L. Humberstone, “From worlds to possibilities”, and Forbes, *The Metaphysics of Modality*.

<sup>15</sup> Lewis, “Possible worlds”, p. 183.

<sup>16</sup> Compare Forbes, *The Metaphysics of Modality*, p. 75.

and possibilism means more than that both Lewis and the actualists he criticizes share the same quantificationalist perspective on modal operators. Lewis' reproach against any position which interprets modal idioms as quantifiers over *so-called* "possible worlds" (ersatz possible worlds, which in reality would be some sort of respectable linguistic entities) is in the main that "the theory would be either circular or incorrect, according as we explain consistency [of maximal sets of sentences or propositions] in modal terms or in deductive (or purely model-theoretical) terms."<sup>17</sup>

Likewise, as R. C. Stalnaker points out in relation to Robert M. Adams' reduction of possible worlds to propositions (world-stories)<sup>18</sup>, by taking sets of propositions as primitives we are left with three undefined notions, namely, proposition, possibility, and contradictoriness, which require an account not yet told in a satisfactory way. Whereas, within a possible-worlds based framework, a very familiar analysis of intensions in terms of possible worlds is available; e.g., a proposition is a function from a set of possible worlds to truth values. And the advantage of this analysis seems to be acknowledged by Adams himself who defends, however, an ersatz program defined in terms of intensional concepts, and not in terms of nonactual possibles.<sup>19</sup>

In addition to the ontological problems with possible worlds there is an epistemological nominalist-actualist objection against both absolute and reductive realism. If knowledge of properties of an object – the argument goes – requires an experience of the object or of its effects which should be confined within the powers of human sensibility, then only objects which are actual and concrete could possibly be known, since only they, or their effects, are confined within the range of our sensibility. But then neither the absolute realist nor the reductive realist makes possible our knowledge of that property which either of them, respectively, attributes to an object or world by the expression " $\Diamond A$ ." For the former holds that " $\Diamond A$ " attributes the property expressed by " $A$ " to a non-actual thing, whereas the latter claims that the property is attributed to an abstract object. Thus, the upshot of this epistemological nominalist-actualist objection is that we cannot have knowledge of whether or not " $\Diamond A$ " is true.<sup>20</sup>

We come now to a crucial objection whose target is the very possibility of reducing modal language to possible-worlds language, even if a possible world is taken to be an ersatz entity. The objection is due to Kit Fine, and its target is A. Plantinga's reduction of possible worlds and nonactual individuals to sets of propositions (or in Plantinga's preferred version, states of affairs), and to individual essences, respectively.

<sup>17</sup> Lewis, "Possible worlds", p. 183.

<sup>18</sup> Compare Stalnaker, "Possible worlds", pp. 230–231.

<sup>19</sup> Adams admits that "there is a not unfamiliar trade-off here, between nonactual possibles and intensions (such as propositions)." And he adds optimistically and quite naturally for someone who favors a program based on an intensional concept that "given either [i.e., nonactual possibles or intensions], we may be able to construct the other or to do the work that was supposed to be done by talking about the other. ("Theories of actuality", p. 207.)

<sup>20</sup> Compare Forbes, *The Metaphysics of Modality*, p. 79.

The point that Fine makes is that the reduction of possible worlds to propositions and individual essences via a quantificationalist approach over ersatz worlds is bound to be circular. Let's take a quick glimpse at this. The challenge for the modal actualist is to translate back into his/her own modal language the possibilist language, and in particular three of its key locutions: (i) the predicate for the actual world, (ii) the atomic predications used by the possibilist such as statements of identity between possible individuals, ordinary world-relative predications, and the special world-relative predication " $x$  exists in  $w$ ," and (iii) the possibilist quantifier over worlds and possible individuals.<sup>21</sup>

Plantinga's reduction proceeds in the following way: Possible worlds are identified with world-propositions, i.e., propositions true in one world alone; possible individuals are identified with individual essences, i.e., properties true of a single possible individual in each possible world; and then properties of possible worlds and individuals are taken to be corresponding properties of world-propositions and essences.

The circularity of this reduction becomes apparent when one comes to realize that in order to specify an individual essence for each possible individual which is to be reduced to that unexemplified individual essence, one has to presuppose the existence of that nonexistent individual whose reduction is supposed to be accomplished through that program. The difficulty cannot be removed unless one can specify the individual essence for each possible individual in actualist terms only. But one can't have such a specification in actualist terms, unless a version of the following principle of the identity of indiscernibles is also forthcoming: "For any two distinct possible individuals there is an actualist formula  $A(x)$ , true of the one in each world in which it exists, but not true of the other in each world in which it exists".<sup>22</sup> Fine calls this the "Discernibility Doctrine." But the problem now is that this Discernibility Doctrine is far from being unobjectionable. Even were the Discernibility Doctrine unobjectionable, we are ill-advised methodologically if we make the reduction depend on such a metaphysical assumption. "For one thing, as Fine puts it, the reduction becomes more vulnerable to criticism. But also, more importantly, we feel that the reduction of possibilist discourse should not depend upon any particular modal views, that if the reduction is possible then that possibility should be written into the very nature of the discourse itself."<sup>23</sup> Thus, if the Discernibility Doctrine is rejected then the specification of individual essences in actualist terms only is rendered impossible. And what this boils down to is as Fine says,

It will be impossible, *even in principle*, to specify an individual essence for each possible individual without referring to some merely possible individuals. The circularity of the reduction is then apparent; an adequate supply of surrogates for the merely possible individuals requires that we already

<sup>21</sup> Compare Fine, "Plantinga on the reduction of possibilist discourse", pp. 146–147.

<sup>22</sup> Ibid., p. 148.

<sup>23</sup> Ibid., p. 149.

presuppose some of those individuals.<sup>24</sup>

The relevance of Fine's point for the main issue of this paper is apparent. Part of an affirmative answer to the question of whether modal operators should be interpreted as quantifiers over possible worlds is the feasibility of a reduction of modal sentences to possible-worlds sentences, regardless of the view which that reductionist has about the nature of possible worlds. However, in view of the question-begging character of the reduction itself, that is, of the fallacious reducibility of merely possible individuals to actual entities that are in better metaphysical standing, the prospects of equating modals with quantifiers are poor.

Let's sum up:

Reduction of modal language to possible-worlds language which goes along with the interpretation of modal operators as quantifiers over possible worlds is objectionable on three main grounds: (i) the ontologically radical character of the solution; (ii) the dubious nature of the entities referred to as "possible worlds" to which the quantifiers of the possible-worlds language are relativized; (iii) the question-begging character of Plantinga's reduction of the possibilist discourse to the quantificational actualist discourse in which the quantifiers are supposed to range over ersatz possible worlds and ersatz possible individuals.

Now, let's move more toward the constructive part. I want to investigate the prospects and ramifications of modal actualism, and against this background I want to develop a view which is anti-realist concerning the existence of possible worlds but which is free to use possible-worlds semantics.

The challenge now is to show that possible worlds sentences *do not mean*, as it were, what they say or what they seem to imply in order to make sense of them. Simply put the problem lies here: the meaning, and, more urgently, the truth of possible-worlds sentences seem to require the existence of some entities which might be called "possible worlds." To avoid all the problems discussed before we may want: (i) to adopt a metaphysical view which dispenses with the claim that *there are* possible worlds; and (ii) to work on a semantic view which separates the meaning from the truth-conditions, i.e., more specifically the meaning of modal sentences from the truth-conditions of possible-worlds sentences, whatever else the relation between the modal language and the possible-worlds language might be. Is it possible, then, and if so, how to give a truth-definition for possible-worlds sentences, which is required by the exercise of possible-worlds semantics for modal language on the one hand, and to eschew a committal metaphysical view with respect to the existence of possible worlds on the other hand? What would be, then, the anti-realist stance in the ongoing discussion?

There is, first, a very natural intuition that possible-worlds semantics captures very well our intuitions concerning what is valid and what is invalid in

---

<sup>24</sup> Ibid.

modal logic. So, the anti-realist is supposed to give an account of the fact that possible-worlds semantics is successful even though there are no such things as “possible worlds.” Second, in order that the systematic correlation between the semantics and our modal intuitions not be something miraculous the anti-realist has to accept that a relation of synonymy holds between modal language and possible-worlds language. Nevertheless, the modal actualist who is an anti-realist about possible worlds will shun away from saying that what gives *meaning* to modal sentences are their *truth-conditions* when spelled out in terms of possible-worlds via the apparatus of possible-worlds semantics. What he/she must deny is that the meaning of modal sentences is given through their corresponding possible-worlds sentences according to the translation schemata. Hence, he/she must deny the asymmetry part of the synonymy relation as it is endorsed by a realist, and he/she must emphasize that a possible-worlds sentence gets its meaning by its reverse translation into a corresponding sentence of the modal language. Therefore, since “ $\Diamond A$ ” is the sentence which imputes the meaning of “ $(\exists w) P(w)$ ”, the latter has to have the meaning of the former, and since the former doesn’t assert the existence of worlds, neither does the latter.<sup>25</sup>

To be sure, this approach faces some objections:

(i) The *validity problem*. Since what modal sentences mean is not what possible-worlds sentences say, another more direct account for the validity of modal arguments is needed, apart from the account in terms of possible worlds, because this latter account doesn’t give the meaning of modal sentences and arguments but is only a heuristic device for the purposes of an easier understanding of them. One way out that can be tried is a proof-theoretic account for validity of modal arguments. However, the prospects for such a maneuver do not seem *prima facie* encouraging. For it seems that a counterpart of the proof-theoretic approach (Gentzen-style) to the meanings of truth-functional sentential connectives via elimination and introduction rules does not work in the modal case. For in the modal case, an argument can be put forward to the effect that the meanings of modal connectives cannot be fixed “from within”—through the elimination and introduction rules of the modal systems for those modal connectives—but only “from outside,” through the means of model theory clauses for those connectives. Thus, the sketch for such an argument is the following: Given two arbitrary modal connectives  $c_m$  and  $c'_m$ , it is not the case in general that if both  $c_m$  and  $c'_m$  are governed by the same elimination-rule (E-rule) and introduction-rule (I-rule), any sentence that can be inferred by that E-rule from a sentence having  $c_m$  as its main connective is logically equivalent to the sentence that can be inferred by the same E-rule from the corresponding sentence having  $c'_m$  as its main connective. Likewise, the same holds if instead we apply the I-rule to two sentences to get new sentences having  $c_m$  and  $c'_m$  respectively as their main connectives. Simply put, even though the E-rule and the I-rule for both  $c_m$  and  $c'_m$  are the same, the semantics of those two connectives could differ. This question is still open.

<sup>25</sup> Compare Forbes, *The Metaphysics of Modality*, p. 80.

(ii) *The reverse translation problem.* The proposal made by the anti-realist works to the extent that any possible-worlds sentence corresponds to a modal sentence through certain translation schemata. For if we want every possible-worlds sentence to have a definite truth-value on an appropriate interpretation—and surely we want that for the purposes of doing possible-worlds semantics—then every possible-worlds sentence should have a meaning. But as modal actualists we want to say that the meaning of a possible-worlds sentence is given by its corresponding modal sentence, and consequently for every possible-worlds sentence there should be a modal sentence which gives to the former its meaning. There is, though, the well-known phenomenon of the expressive weakness of the modal language which needs an account from the anti-realist perspective: there are possible-worlds sentences which can be evaluated on interpretations but which do not seem to be the translation of any modal sentence.

Against this background, the overall structure of my argument for anti-realism with respect to possible worlds embodies, roughly, Michael Dummett's anti-realist reductive strategy as developed in his paper "Realism." In its broad structure it goes like this:

(a) Modal language sentences and possible-worlds sentences are synonymous.

(b) The modal discourse is not genuinely factual. It is not a discourse about facts. It is about quasi-facts and quasi-objects (possible states of affairs or merely possible objects), whose possible obtaining and existence, respectively, depend on the actual obtaining and existence of states of affairs and objects, respectively, or it is about 'abnormal' facts or things (necessary facts, which obtain no matter what, or necessary objects, which do not come into existence, and whose existence is unpreventable or unperishable). But then in order to be consistent with this non-factualness assumption about the modal discourse, one does not want to give a realist semantic account for its meaningfulness. So, to comply with the constraints of giving an anti-realist account of the meaning of the modal language there are a couple of options that one can consider. One either wants to give an intuitionistic account and divorce the meaning of the modal discourse from the truth-conditions of that discourse—for a truth-condition based theory of meaning invites easily a realist construal of the semantics of the discourse—or one can insist that if the meaning is to be accounted for in terms of the truth-conditions for the sentences of the modal language, then the construal of those truth-conditions should not be factual. And what I mean by this latter constraint is that when one comes to giving the truth-conditions for sentences governed by modal operators, the modal actualist will state them in terms of ersatz possible objects and states of affairs which are made from actual objects and states of affairs. In other words, in speaking about possible states of affairs or possible objects we, as modal actualists, are speaking modally only about actual states of affairs or actual objects. And since we do not want that the meaning of the modal discourse be given by the truth-conditions of the possible-worlds discourse, in the

reduction that is sought here, ultimately, the meaning of any quantification-over-possible-worlds sentence will be given by a corresponding modal sentence through reverse-translation.

Now, if one opts for the intuitionistic approach toward the meaning of the modal discourse, then what we should work out is an anti-realist non-truth-conditional semantics, along roughly the following (Dummettian) lines:

- (1) The meaning of a sentence is not necessarily given by its truth-conditions.
- (2) The notion of reference (semantic values) of the component parts of a sentence in a given language does not play a crucial role in the account of how the truth-conditions for that sentence get determined, and we do not necessarily have to identify the semantic values of different parts of a sentence in order to grasp its truth-conditions and thereby give it a meaning.<sup>26</sup>
- (3) On a given anti-realist semantics, to grasp the meaning of a sentence and to know its truth-conditions require that that sentence belong to a language which as a given class is reducible to another language (the reductive class).

The meaning of any sentence in the *reductive* class should be grasped in advance, and we may need to fix the reference of terms which occur in those sentences of the *reductive* class in order to figure out their truth-conditions and to grasp their meanings. But typically we don't need *that* for the understanding of the meanings and the truth-conditions of the sentences of the *given* class (the class to be reduced). For, basically, the grasp of what a sentence in the class to be reduced means and of its truth-conditions is made possible by the grasp of the reductive relation itself and by our prior knowledge of the meanings of the sentences which belong to the reductive class. Thus, one does not need a truth-conditional approach for the sentences in the given class in order to be able grasp their meanings.

- (4) The feasibility of this program depends on the existence of translation schemata which give the conditions for reducing the given class to a reductive class. Their understanding gives us the possibility of grasping in a non-truth-conditional way the meanings of the sentences which belong in the given class. As Dummett's claim reads:

---

<sup>26</sup> As Dummett spells out this sort of anti-realism in "Realism", pp. 67–68:

Realism is abandoned, not because a truth-conditional account of the meanings of statements is impossible, nor, necessarily, because there is any reason to repudiate the principle of bivalence as applied to them, but because the notion of reference no longer plays any role in the account of their meanings. ... We do not need to invoke the notion of reference ...[for a term] ... in order to explain how a sentence containing such a term is determined as true or false: the determination of the truth-value of the sentence does not proceed via the identification of an object as the referent of the term.

This translation is proposed, not merely as preserving truth-values, but as part of an account of the meanings of statements of the given class: it is integral to the reductionist thesis that it is by an implicit grasp of the scheme of translation that we understand those statements.<sup>27</sup>

(c) However, I do not want to leave open the possibility for a realist construal for the possible-worlds language. For, after all, even if one insists that the meaning of any quantification-over-possible-worlds sentence will be given by a corresponding modal sentence through reverse-translation, there is a coherent way of construing existential quantification over possible worlds which will certainly leave room for countenancing the existence of certain *genuine* entities that for better or worse are called “possible worlds.”

Moreover, since we really need the possible-worlds semantics for doing the metalogic of modal logic and for having clear standards of valid modal arguments, I cannot see how we can avoid giving the usual model-theory account for intensional languages. But this approach tells us that in order for the modal sentence “ $\Diamond A$ ” to be true on a given interpretation for the language of that sentence *there should exist* a “possible world” at which “A” holds. One option which is available here is to say that the existential quantifier which occurs in the metalanguage in which the semantic evaluation clause is given does not have its normal (standard) meaning. In other words, that the English phrase “there exists” is ambiguous, and that its occurrence in the above clause does not carry the usual implication of the existence of things to which the quantifier phrase is relativized in its application. But I don’t think that this solution will do. For one thing, I don’t see any ambiguity in the usual phrase “there exists.” And then, in the usual first order semantic clause for the existential quantifier, the required sense of the English phrase which occurs in the metalanguage should be the standard sense which conveys the existence of some objects which satisfy the given condition on a given interpretation.

Another solution would be to say that the quantifier-phrases in possible-worlds discourse are given a substitutional-instance Fregean interpretation. To form a substitution-instance of a quantified possible-worlds sentence we need a name for that possible world over which the quantifier is supposed to range: “ $(\exists w) P(w)$ ” will typically have as a substitution-instance “ $P(w_i)$ ”.<sup>28</sup> The individual constant “ $w_i$ ” will stand for a “possible world.” But this latter entity will have nothing metaphysically dubious about it, and it will be perfectly innocuous by actualist standards, for it is but the “reference” of a convenient way of speaking about a complete set of *sentences* (concrete actual inscriptions) which describe a re-arrangement of the actual world or a way of looking modally at actual states of affairs and existing objects. The name of a “possible world” is a

<sup>27</sup> Dummett, “Realism”, p. 66.

<sup>28</sup> If in an actual language there are not enough names for every object in the domain, Frege’s style approach helps us to handle the problem: We construct an interpretation not for the given language but for an expanded language obtained by enriching the original language with at least as many individual constants as the number of objects in the domain of our interpretation such that for each object in the domain there is an individual constant which refers to it.



shorthand for this package of sentences. So, the domain to which our quantifiers are relativized in an interpretation of the possible-worlds language is a set of inscriptions as sentence-types which purportedly designate actual objects and states of affairs which comprise them. Hence, everything which the quantifiers range over is something actual, after all.

(d) In particular, for the issue of the relation between modal discourse and possible-worlds discourse, the anti-realist semantics sketched before has the following bearing:

- (1) For technical purposes such as the validity of modal arguments I shall take the modal language as the class to be reduced and the possible-worlds language as the reductive class.
- (2) For metaphysical issues, however, the reverse relation is to be sought. The possible-worlds language is the class to be reduced, and the modal language is the one which gives the meanings to possible-worlds sentences.
- (3) A true substitution-instance of " $(\exists w)P(w)$ " whose meaning is given by a reverse-translation into " $\Diamond A$ " requires a singular term which refers rigidly to that entity that is called the "possible world" at which "P" holds.
- (4) Since " $(\exists w)P(w)$ " stands in a reductive relation to " $\Diamond A$ ", with respect to its meaning, the grasp of the meaning of " $(\exists w)P(w)$ " only requires the grasp of the reductive relation of " $(\exists w)P(w)$ " to " $\Diamond A$ ", and of the meaning of " $\Diamond A$ " itself. It does not require the existence of an object called "a possible world" which, unless it exists and satisfies the open sentence " $P(w)$ ", " $(\exists w)P(w)$ " could not be rendered meaningful and true. Thus, it is not a strong requirement whose fulfillment is indispensable that the variable " $w$ " which is bound by " $(\exists w)$ " should be assigned a possible world, which therefore must exist, in order that " $(\exists w)P(w)$ " be meaningful and true. Of course, I don't claim that this anti-realist position proves the metaphysical claim that there are no possible worlds. However, there is at least no need for us to assume their existence in order to make sense of the language of possible worlds, and thus to be entitled to make use of it when we do possible-worlds semantics.

## Bibliography

Dummett, Michael

1982 Realism, *Synthese*, vol. 52, pp. 55-112.

Fine, Kit

1985 Plantinga on the reduction of possibilist discourse. In *Alvin Plantinga*, J. E. Tomberlin and P. van Inwagen, eds., D. Reidel Publishing Company, pp. 145-186.

Forbes, G.

- 1985 *The Metaphysics of Modality*, Oxford, Clarendon Press.

Humberstone, L.

- 1981 From worlds to possibilities, *The Journal of Philosophical Logic*, vol. 10, pp. 313-339.

Lewis, David

- 1973 Possible worlds. In *The Possible and the Actual*, M. Loux, ed., Cornell University Press, 1979, pp. 182-190.  
1983 Anselm and actuality. In D. Lewis, *Philosophical Papers*, vol. I, Oxford University Press, pp. 10-25.  
1986 *On the plurality of worlds*, Basil Blackwell.

Loux, M. ed.

- 1979 *The Possible and the Actual*, Cornell University Press.

Plantinga, A.

- 1976 Actualism and possible worlds. In *The Possible and the Actual*, M. Loux, ed., Cornell University Press, 1979, pp. 253-274.

Prior, A. N., and K. Fine

- 1977 *Worlds, Times, and Selves*, University of Massachusetts Press.

Stalnaker, R. C.

- 1976 Possible worlds. In *The Possible and the Actual*, M. Loux, ed., Cornell University Press, 1979, pp. 225-235.