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## MODAL REALISM: THE POISONED PAWN

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Geller came closer to actual qualification than Ljubojevic ever did. Very few could have expected that the so-far undefeated Portisch would suffer his first and only defeat just in the last round against Polugaevsky, thus allowing the uncertainty of a further competition in which either he, Polugaevsky or Geller would be eliminated from the candidates. Later, in Portoroz, if Geller had only whispered to Portisch the word "draw!" a few seconds before his flag fell while a pawn up and unaware of the approaching time control, Geller and not Polugaevsky would have been among the candidates [S. Gligoric, "The Unlucky Ones," *Chess Life and Review*, 29 (1974), 17].

### A PREJUDICE IN FAVOR OF THE ACTUAL

**L**JUBOJEVIC might have won the Petropolis Interzonal, for the quality of his play in previous tournaments, his inventiveness, and his ability systematically to surprise his opponents were sure signs of an extraordinarily talented chess player. Up to the time at which he was leading the Interzonal he had played very strongly, he had scored brilliant victories, and all he needed to go on and win was simply to play less inventively and more quietly.

The conclusion of the argument, that Ljubojevic might have won the tournament, is modal; it concerns what might have happened. But the argument concerns the world as it actually is, its chess players, tournaments, and games. We think that all reasoning about modality is about actual objects, facts, and processes. "Ljubojevic might have won the Petropolis Interzonal" gives just as definite and objective a report about actual individuals and situations as "Mecking won the Petropolis Interzonal" does. We think that this is true of most modal assertions: "*a* might  $\phi$ ," "*a* would  $\phi$ ," "*a* could  $\phi$ ," "*a* would  $\phi$  if . . .," "*a* might  $\phi$  if . . .," the dispositional "-ble" ("-ible,"

“-able”), and so on. When such statements are true, understood in the ordinary nonepistemic way, they are true by virtue of actual facts about actual individuals; their truth is not determined by human convention or human knowledge, nor by facts about any exotic metaphysical apparatus.

As David Lewis has written, “Modal facts are grounded in facts about actual character, not mysteriously independent.”<sup>1</sup> And as Hilary Putnam has written, “Introducing the modal connectives . . . is not introducing new kinds of objects, but rather extending the kinds of things we can say about ordinary objects and sorts of objects.”<sup>2</sup> We will develop the ideas expressed in these two quotations. Our project is metaphysical rather than linguistic. What interests us about modality is the difficulty of reconciling the truth of modal statements with the common-sense view of the world as composed of individuals, possessing properties and connected by relations, interacting in various causal processes. If this is the way the world is, what makes it true, for example, that *if* Geller had whispered the word “Draw!” to Portisch a few seconds before his flag fell, *then* Geller would have been among the candidates? What is the constitution of this kind of fact? Our primary aim is to answer this question. Our main claim is that one can answer it, one can give a naturalistic analysis of modality, without giving extensional, or otherwise nonmodal, paraphrases of modal idioms. While this is what the reader is likely to find most interesting about what we say, it makes it difficult to see the relations between our analyses and well-known theories in the field, which do mostly seem to be trying to describe what modality is about by finding other ways of saying what modal idioms say. The difficulties are real; it is not at all clear what the relations are, and while we will refer to other people’s views we will not describe ours in terms of them.

Just as it is the ordinary physical world that interests us, our concern is with the ordinary modal idioms that we have used and mentioned above rather than with the philosopher’s and logician’s domesticated “it is possible (necessary) that . . . .” We mistrust these expressions, that modal logic is intended to capture and clarify. And

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<sup>1</sup> *Counterfactuals* (Oxford, 1973), p. 40. But Lewis has developed a model of the metaphysics we dislike. He claims that “insofar as we understand modal reasoning at all, we understand it as disguised reasoning about possible beings,” “Anselm and Actuality,” *Nous*, 4 (1970), 175.

<sup>2</sup> “Mathematics Without Foundations,” *Journal of Philosophy*, 64 (1967), 21. See also A. Prior, “The Notion of the Present,” *Studium Generale* (1970).

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we are not sure that modal logic *has* at all captured and clarified them in a philosophically interesting way. We suspect that the intuitions that guide one's reactions and allegiances to modal logic are at best a confused and indiscriminate composite deriving in large part from one's intuitions about the larger and more ordinary list. No doubt it is in principle possible to discover which of one's prejudices about "It is possible that . . .," "It is necessary that . . .," or "Necessarily" actually come from one's use of these idioms, which from one's knowledge of philosophy, and which from one's use of "might," "must," "has to," and others, but we would rather not try. We shall concentrate instead on the sturdier laboring class of idioms that we have listed above.<sup>3</sup> First, however, we make a few remarks on the notions of objectivity and realism.

### OBJECTIVITY AND REALISM

Modality might have the appearance of objectivity if it were concerned with objects which though independent of human conception were specific to modality itself, objects about which all one knew was that they were the objects of modal discourse. After all, mathematics is objective, and is "about" its own unnatural objects.

There is a very general temptation here. One wants to argue that a category of belief or discourse is objective, and so one posits a kind of object, facts about which are to be the required objective correlate of truths of the category in question. This is the realist's gambit. He offers one a pawn, the objectivity of the subject matter; he hopes to gain something strategic, the admission of objects peculiar to that subject matter. We think that the realist's strategy is faulty: one can accept the pawn without being forced into the trap. The pawn is not poisoned. But we do not want to seem to deny the general virtues of realism. We believe that most of our discourse is indeed true or false by virtue of being about real objects. But if one wants to understand how this objectivity is achieved, one must understand the objects that are referred to. One must have independent reasons for believing them to exist and independent characterizations of their natures.

In the philosophy of mathematics acceptance of the realist's gam-

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<sup>3</sup> Two qualifications. First, the semantics of modal logics may well do more to help us understand modality than the logics themselves. And second, the investigations of the counterfactual conditional now in vogue are considerably more to our point than the classical investigations of the box and the diamond.

bit results in mathematical realism, sometimes called Platonism, the view that there is a domain of specifically mathematical objects such as numbers and sets, by reference to which mathematical statements acquire their truth values. In the philosophy of modality it results in what we shall call *modal* realism, the doctrine that there are specifically modal objects: possible worlds, counterparts of actual objects, positions in logical space, or what have you, which are the specific subject matter of modal discourse, by reference to which modal sentences are true or false. It has been most clearly and bravely defended by David Lewis in his Counterpart Theory and his indexical analysis of actuality.<sup>4</sup> It seems to underly a number of attempts to understand modality by use of "possible-worlds" semantics.

The general problems of objectivity and realism have been most explicitly discussed not in the philosophy of modality but in the philosophy of mathematics. By referring to it we can explain our intentions with respect to modality most easily. It is worth noting that on several attractive accounts of mathematics the problems of objectivity and realism in mathematics are a special case of the corresponding problems in modality, for according to these views mathematical assertions can be seen as covertly modal.<sup>5</sup>

Kreisel once remarked that the problem is not whether or not there are mathematical objects, but whether or not mathematical statements are objective.<sup>6</sup> In a similar vein, Putnam has claimed that "The issue of the 'existence' of 'mathematical entities' must be separated from the question of the objectivity of mathematical statements."<sup>7</sup> Objectivity is fairly easy to formulate for mathematical statements because of the presence of the notion of proof. To say that mathematics is objective is to say that all statements expressed in the vocabulary of mathematics are either true or false, independently of whether we can *prove* them. This does not entail—not obviously, anyway—what we have called mathematical realism: the view that there is a domain of specifically mathematical objects such as numbers and sets, by reference to which mathematical statements acquire their truth values.

<sup>4</sup> "Counterpart Theory and Quantified Modal Logic," *Journal of Philosophy*, 65 (1968), 113-126; "Anselm and Actuality," *op. cit.*, esp. pp. 184-188.

<sup>5</sup> See Putnam, *op. cit.*, and Parsons, "Ontology and Mathematics," *Philosophical Review*, LXXX (1971), 151-176.

<sup>6</sup> See the Introduction to Benacerraf and Putnam (eds.), *Philosophy of Mathematics* (Englewood Cliffs, N.J., 1964), p. 9, n. 5.

<sup>7</sup> "Foundations of Set Theory," in R. Klibansky (ed.), *Contemporary Philosophy - la Philosophie Contemporaine* (Florence, 1968), p. 284.

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Mathematical realism is, however, the only way of arguing for the objectivity of mathematics that has been formulated coherently. This is one of the reasons it is at all plausible. The other main reason it may seem plausible is almost the opposite: the truth of mathematical realism is sometimes taken to consist just in that of mathematical objectivity. The claim that mathematical objects exist simply amounts—according to this view—to the claim that mathematics is objective. Michael Dummett, for instance, seems to argue this.<sup>8</sup> Now surely there is something right about such a view, for very likely the almost universal recognition that mathematics is objective lies behind the almost universal recognition that it is in some sense harmless to admit that there are numbers and sets.

If one could explain why mathematics is objective without appealing to mathematical realism, then mathematical realism would become practically harmless. For we could then take the existence of mathematical entities to consist just in the objectivity of mathematics (and in particular in the objectivity of certain quantified mathematical truths). And in fact much work in the foundations of mathematics can be seen as just this: as attempts to understand the objectivity of mathematics without appealing to specifically mathematical objects. This work can coexist with more Platonistic accounts of mathematics, for it attempts to understand what it is that makes the Platonistic accounts work.

Our project is to understand why modal realism works, just as much foundational work in mathematics tries to understand why mathematical realism works. To the extent that we succeed we will have shown that it is possible to be a realist with respect to modal truth without being a modal realist. The feeling among modalists tends to be that possible worlds, and the like, are harmless if properly understood; we would like to agree, and so hope to find a proper understanding.

We will operate with a rough characterization of the objectivity of modal assertions, which we will sharpen later. A modal assertion is objectively true if its truth does not depend on what people believe or agree. For example, a modal sentence whose subject is a referring proper name (for example, “Ljubojevic might have won the Petropolis Interzonal”) is objective if its truth or falsity depends just on whether the object named is as it is said to be, independently of our

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<sup>8</sup> See, e.g., *Frege: Philosophy of Language* (London, 1973), pp. 464 ff., 506 ff.

beliefs or conventions.<sup>9</sup> To put it differently, such a sentence is objective if there is a property such that the sentence is true if and only if the object has it.

#### DISPOSITIONS

One function of modal operators such as “might,” “must,” and “can” is to operate on predicates of individuals to make other predicates of individuals. From “breaks” we can make “can break,” “might break,” “would break if . . . ,” “breakable,” and so on. Let us begin by discussing what seems to be the very simplest case, that of dispositional suffixes. “Dissolves” applies to things that actually do dissolve when immersed (for a minute in lukewarm water, say), “soluble” to things that would dissolve if immersed. “Dissolves” is true of things that possess a certain straightforward property, that of being immersed in water and of turning from a tangible solid to a visually inseparable component of the liquid. “Soluble” is true of things which possess a rather more recondite property, of which only physical chemists can give a very explicit characterization. The presence of this property accounts for the truth, and objectivity, of “*a* is soluble”; it is true whenever *a* has the property.

It does not follow that solubility just is this microstructural property. What to identify solubility with is a dismayingly subtle question, depending in part on how one chooses to individuate properties. The limitations of individuating them by the meanings of predicates denoting them have been pointed out by several recent writers.<sup>10</sup> One can individuate properties in terms of their definability in terms of the basic properties of physical theory.<sup>11</sup> Or one can individuate properties by their role in the workings of the world, their function in the production of phenomena. On the first of these, solubility may be the microstructural property that accounts for things dissolving. On some versions of the second it will not be, for had the world been somewhat different, a different microstructural property would

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<sup>9</sup> Except of course modal assertions *about* beliefs or conventions. These are objective if their truth value does not depend on beliefs or conventions about beliefs or conventions.

<sup>10</sup> See Jaegwon Kim, “On the Psycho-Physical Identity Theory,” *American Philosophical Quarterly*, vol. 3. (1966).

<sup>11</sup> See Putnam, “On Properties” in N. Rescher (ed.), *Essays in Honor of C.G. Hempel* (Dordrecht, 1969), pp. 267-268.

have been involved in dissolving, but solubility would still be solubility.<sup>12</sup> We might therefore take solubility to be the property of having whatever microstructural characteristics are responsible for things dissolving, when they do.

The issue is evidently very tricky. But it does not really matter for our purposes which way it is settled. For in any case “soluble” applies to an object if it has a definite physical property—namely, that property which is responsible for things of the kind dissolving, if they are immersed.<sup>13</sup> As a theory or analysis of dispositions this is little more than common sense, but it is all that is needed to see why one’s natural inclination to take ascriptions of dispositions as objectively true and false is right, and why nothing at all exotic is involved. In miniature, this has the essential features of the analyses we will suggest for other modal idioms. A dispositional predicate is true of an object by virtue of the physical properties it possesses; the relevant properties can rarely be described without using modal words (“*responsible* for things of that kind dissolving, *if* they are immersed”); the analysis can therefore be used not to eliminate modality but to see what in the world makes it work.

Modal idioms are not all as guileless as dispositions. Our treatment of dispositions cannot be directly extended to other modal idioms—for instance, “might have.” To see why, suppose we were to try and adapt a suggestion of Goodman’s<sup>14</sup> and construe “Ljubojevic might have won the Petropolis Interzonal” as “Ljubojevic is Petropolis Interzonal winnable.” We would be unable to analyze the latter along the lines indicated in the previous paragraph. We cannot say, for instance, that Ljubojevic is Petropolis Interzonal winnable in virtue of possessing some property that is responsible for players’ winning tournaments, for there is no such property. Neither can we say that Ljubojevic is Petropolis Interzonal winnable in virtue of sharing with some other tournament winner—say,

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<sup>12</sup> If fully spelled out this would be a complicated argument, but it is like others in the literature. See, e.g., Kripke on the necessity of true identities, in “Naming and Necessity” in Davidson and Harman (eds.), *Semantics of Natural Languages* (Dordrecht, 1972). Note, however, that Kripke argues that since various identities are true they are necessary, while the argument here is that since an identity is not necessary it is not true.

<sup>13</sup> Quine says something like this in “Natural Kinds,” in Quine, *Ontological Relativity and Other Essays* (New York, 1969), pp. 130 ff. He seems to require, however, that, in order for a disposition to be intelligible, we know how to describe the property in question. We see no reason for this.

<sup>14</sup> In *Fact, Fiction, and Forecast*, 2nd ed. (Indianapolis, 1965), pp. 53 ff.



Bronstein or Larsen — whatever property he owes his success to. For even if Ljubojevic were to possess this property it would not follow that he would win the tournament. Indeed it may well be that if Ljubojevic had acquired the relevant characteristics of Bronstein or Larsen it would have been *impossible* for him to have won.

So we cannot treat all modal idioms as dispositions. Still, just as it is clear that “*a* is  $\phi$ -ible” is true or false by virtue of physical facts, it is plausible that, for example, “Ljubojevic might have won the Petropolis Interzonal” is true by virtue of physical facts. (We include psychological facts among physical facts; think of this as a terminological aberration, if need be.) For the reasons that Ljubojevic might have won are, as we said in the first paragraph of this paper, physical ones. We try to work this out in the next section.

#### MIGHT

If at some time *t* during the Petropolis Interzonal “Ljubojevic might win the Interzonal” or “Ljubojevic should (be able to) win the Interzonal” or “Ljubojevic can yet win the Interzonal” or “Ljubojevic has all it takes in order to win the Interzonal” were true, then “Ljubojevic might have won the Petropolis Interzonal” is true now, by virtue of the same facts.<sup>15</sup> And the objectivity of the former predications may be argued for as follows.

Before the tournament the facts were symmetrical between Ljubojevic’s winning and his losing. If he had won, it would have been essentially by virtue of a chain of events and facts which began with certain events and facts leading up to the twelfth round of the tournament; these would have been perfectly objective, and responsible for his victory. And although he did not win, that which was true of him up to the twelfth round of the tournament, which would have been the basis for his victory if he had won, *was* in fact true of him. It provides the actual objective reasons for the assertion that he might have won.

In short, if Ljubojevic might have won, then there was a time at which “he might (should, can yet, has all it takes to) win” was true,

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<sup>15</sup> Michael Dummett makes a similar observation, *op. cit.*, p. 131. Dummett says that “It may truly be said of President Nixon, . . . , that he might never have been a politician, because there was a time in his life at which it would have been true to say that he might never become a politician.”

and the facts that made this true then make it true now that he might have won. The truth at  $t$  of “ $a$  might  $\phi$ ” entails the truth at  $t'$  of “ $a$  might have  $\phi$ 'd,” where  $t'$  is any time later than the time at which  $a$ 's  $\phi$ 'ing does or does not occur.<sup>16</sup>

This is so because possibilities pass. The past is a linear array of actualized possibilities, and the future is a branching maze of things that may or may not happen.<sup>17</sup> Possibilities that have yet to pass are expressed by “might” idioms (“might,” “can yet,” “should be able to”) and “might have” is made true by “might” and the passing of time. What makes “might” true? There usually is not much doubt about the general category of the relevant facts. In the Ljubojevic example they presumably consist in Ljubojevic's great chess talent, the quality of his play up to a certain point during the tournament, the quality of his opponents' play up to that point, and the history of the tournament up to that point.

There is no shortage of objective physical facts to account for the truth of “might” sentences. The difficult thing is to be sure *which* facts are responsible, which are the facts that are necessary for the relevant possibility to be. To identify these facts one has to know what in the physical workings of the world brings about events of the kind in question. More precisely, in order to know what facts are responsible for the truth at  $t$  of “ $a$  might have  $\phi$ 'd” one has to know the properties which  $a$  possessed at some earlier time  $t$ , which, if he had gone on to  $\phi$ , would have been the major part of the reason for his  $\phi$ 'ing. Rough as this is, it seems true, and gives us a way of circumscribing and picking out the actual facts, conditions, and so on, about an object which determine what might have been true of it.<sup>18</sup>

<sup>16</sup> So “might have” is not exactly a past (perfect) tense of “might.” The past truth of “might” does not entail the truth of “might have” until the time at which the event in question happens or does not. It is not true today, November 12, 1974, that Karpov might have taken the championship away from Fischer, although it was true yesterday that Karpov might take it from Fischer (next year). Tenses like “might have” are a sort of future in the past, just as the future perfect tense is a past in the future. For such a “perfect future” construction is indexed *twice* to the past: first, to the time at which the corresponding “might” statement is true and, second, to a time which is *future* with respect to the first time.

<sup>17</sup> This is a familiar idea from the semantics of tense logics. It is also implicit in Aristotle's attitude to time; for a recent discussion of this see Dorothea Frede, “*Omne quod est quando est necesse est esse*”, *Archiv für Geschichte der Philosophie*, 54, (1972), 153-167.

<sup>18</sup> In this connection see pp. 313 and 314 of Saul Kripke's “Naming and Necessity,” already cited.

It is important to realize, and important for us to admit, that to know which physical facts are relevant to the truth of “*a* might have  $\phi$ 'd” one usually has to have knowledge about these facts that one can only express in modal terms. To know that someone was in a position to win a tournament one might have to know that various generalizations hold—for example, that imaginative players get out of tight spots more often than unimaginative players—and moreover one may have to know that this generalization is a law of nature, or at any rate of chess nature, for one may have to know that it would have held even if the player had got himself into a particular tight spot. But the generalization itself, as a fact relevant to the modal truth, describes a simple physical fact, that imaginative players get out of tight spots more often than unimaginative players.

Although it is not in general possible to say a priori what makes a “might have” statement true, there are exceptions. There are cases in which we can completely specify the required facts. “The game might have been won” is a case in point, for its truth depends just on the existence of a winning strategy (at some time or other during the game). A borderline case is provided by the following passage: “Petrosian is not a player who likes vague sacrifices, but Tal—as Black! [Tal was in fact White]—might have considered here 11. . . . KN-Q4 . . . .”<sup>19</sup> Here the truth of “Tal—as Black!—might have considered 11. . . . KN-Q4. . . .” seems to depend almost exclusively on the fact that Tal is a player who likes vague sacrifices.

General “might have” statements such as “There might have been no winner of the tournament” or “All winners might have been Russian” are certainly not true by virtue of any *particular* player's characteristics at any point in the tournament. Nor do they seem to depend just on properties of the players who satisfy their predicates—for instance, the actual winners of the tournament. In fact, however, the same is true (up to a point at least) of singular “might have” statements, for what made it true (at some time *t*) that Ljubojevic might win was not just his state at *t* but also the state of his opponents and of the tournament generally. Facts not only about Ljubojevic's strength and inventiveness, but also about the constitution of his immediate environment at *t* and the history of the tournament up to *t* were such that they would have been a major part of what would have been responsible for his victory if he had won. Similarly, if there might have been no winner of the tournament,

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<sup>19</sup> P. Keres, “Battle of Chess Styles,” *Chess Life and Review*, 29 (1974), 249.

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then there was a time at which the tournament itself, the players and the psychological atmosphere, was so constituted as to make it possible that there be no winner.

The syntactical contrast between singular “might” or “might have” statements and general ones is thus not very important. In either case the references to actual objects have to be taken as establishing a reference to an actual causal process involving those objects, which is such that it might have eventuated in the result indicated.

Instructive cases are provided by such statements as “Eric Ambler might not have existed,” “‘L’empire des lumières II’ might not have been painted,” “*Tristram Shandy* might not have been written,” and so on. Their truth cannot be accounted for in terms of any particular object’s properties at any time during its history. But they too refer to actual causal processes—namely, those which resulted in Eric Ambler’s coming into existence, in “L’empire des lumières II,”’s being painted, and in *Tristram Shandy*’s being written.

To say that Eric Ambler might not have existed (or that “L’empire des lumières II” might not have been painted, or that *Tristram Shandy* might not have been written) is to say that the processes in question might not have resulted in Eric Ambler’s coming into existence (in “L’empire des lumières II”’s being painted, in *Tristram Shandy*’s being written). And the analysis of this is essentially the same as that of any other “might have” statement: at some time in the past the facts about that process at that time were symmetrical between the process’s resulting or not resulting in Eric Ambler’s coming into existence, in “L’empire des lumières II”’s being painted, and so on. These facts could form a large part of the explanation of either. The truth or falsity of a “might” (or, *mutatis mutandis*, a “might have”) sentence depends on the existence or nonexistence of certain states and causal processes. In most cases these clearly exist or do not, independently of what people believe or agree. Our analysis thus goes some way toward characterizing and establishing the objectivity of these idioms.

## COUNTERFACTUALS

We consider only counterfactuals of the form “if  $e$  had occurred then  $f$  would have occurred,” where  $e$  and  $f$  are descriptions of events. Counterfactuals are more complex than “might” idioms, just

as “might” idioms are more complicated than dispositions. “If  $e$  then  $f$ ” is not the same as “ $e$  cannot (may not) occur without  $f$ .” This is evident from the quotation which introduces the paper. If Geller had whispered “Draw” to Portisch at the right moment, and Portisch had accepted the offer, Geller would have been among the candidates. But the reason for this is not that Geller could not have whispered “Draw” to Portisch and not have been among the candidates. For the counterfactual may be true even if there might have been circumstances—for example, Ljubojevic’s playing better than he did (from the twelfth round on in the Petropolis Interzonal)—under which Geller might have whispered “Draw” to Portisch and not have been among the candidates. The reason that this possibility is consistent with the truth of the counterfactual is just that, as the quotation puts it, Geller came closer to actual qualification than Ljubojevic ever did: it is more possible that Geller whisper “Draw” to Portisch and subsequently be among the candidates than that Geller whisper “Draw” to Portisch and Ljubojevic have played so well (from the twelfth round on in the Petropolis Interzonal) that he rather than Geller was among the candidates. That is, the truth of this counterfactual requires that at the relevant point in time it be more possible that Geller whisper “Draw” to Portisch and subsequently be among the candidates than that he whisper “Draw” to Portisch and subsequently *not* be among the candidates.<sup>20</sup> This entails neither that Geller might nor that he might not have whispered “Draw” to Portisch without becoming one of the candidates.

There are, however, resemblances between “might” and the counterfactual. In each case it is essential that there be a point in time—we call it the *nodal time*—at which things have not yet been decided. For “ $f$  might occur” the nodal time is that at which  $f$  has not yet occurred or failed to occur and there are facts which would largely explain its occurrence if it did occur. For “if  $e$  occurred  $f$  would occur” the nodal time is that at which neither  $e$  nor  $f$  has occurred or failed to, and certain facts could explain the occurrence of both  $e$  and  $f$ . But beneath the similarity there is a difference. In the case of “might” we may find actual facts at the nodal time which would be largely responsible for  $f$ ’s occurrence, were it to occur. But in the case of the counterfactual the facts that would be responsible for  $f$ ’s

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<sup>20</sup> This is a formulation of the basic idea of R. Stalnaker’s “A Theory of Conditionals,” in *Studies in Logical Theory*, ed. by N. Rescher (Oxford, 1968), pp. 98-112; see also D. Lewis, *Counterfactuals* (Oxford, 1973), esp. pp. 52-56.

occurrence—in particular those involved in  $e$ 's occurrence—may not in fact ever become actual. Beneath this difference there is a similarity. In both cases if  $f$  were to occur it would be explicable in terms of the occurrence of a physical process that begins with actual events and ends with  $f$ . In the “might” case what is required is just that the actual facts are such as to permit such a process; the counterfactual requires somewhat more.

What has to be taken into account is the fact that if the counterfactual is true, then any physical process beginning with actual facts at the nodal time and leading to  $e$  and  $f$  would be more possible, make fewer demands on the way the world actually is, than one that leads to  $e$  but not to  $f$ . We must say something like the following: the actual facts at the nodal time would have made up a larger part of any explanation of  $f$ , had  $e$  occurred and  $f$  ensued, than they would have of any explanation of  $f$ 's failing to occur, had  $e$  occurred and  $f$  not ensued.<sup>21</sup>

In particular cases we can fill out this vague formula in accordance with our understanding of how things work. Thus Geller's offering Portisch a draw at the appropriate moment and subsequently being among the candidates is a process that could have been accounted for in terms of the situation of the play-off match at that moment, current F.I.D.E. regulations, and the fact that Geller needed only half a point in order to qualify for the candidates' tournament, while to explain Geller's offering Portisch a draw and not subsequently being among the candidates one would have had to place greater reliance on events that might have occurred but did not occur.

Therefore the crucial fact for the truth of “If  $e$  had occurred then  $f$  would have occurred,” that “ $e$  and not  $f$ ” involves a greater departure from actuality<sup>22</sup> than “ $e$  and  $f$ ” does is itself a fact about actuality. It follows that counterfactuals can be said both to describe unrealized possibilities (as expressed by, for example, “ $x$  whispers ‘Draw’ to Portisch and subsequently  $x$  is among the candidates”) and

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<sup>21</sup> It would be hard to translate this back into possible-worlds terms, such as those of Stalnaker and Lewis. Our comparison of two potential explanations depends on reference to the nodal time, and it would be hard to translate this into a comparison of two possible worlds whose time axes are not very intimately correlated. For this reason what we say here seems not to run afoul of Jonathan Bennett's examples in §8 of his “Counterfactuals and Possible Worlds,” *Canadian Journal of Philosophy*, 4 (1974), 381-402.

<sup>22</sup> The notion of departure from actuality is due to David Lewis. See his “Causation,” *Journal of Philosophy* 70, #17 (1973), p. 560.

to be true, not by virtue of those possibilities, but by virtue of the way things actually are in the world.

MODAL PROPERTIES

We have argued for the objectivity of modal idioms. The content of this claim has turned out to be that modal statements have truth values which depend on the presence or absence of physical properties and conditions of actual objects, independently of our knowledge or conventions. But these conditions and properties have a curious feature. What is responsible for the fact that one person might win a chess tournament can be very different from what is responsible for another person's being able to win. Ljubojevic might have won because of his sparkling imagination, while Portisch might have won because of his prudence and meticulousness. Yet if we say of each person that he might have won we are in a clear sense saying the same thing of each of them, and thus, in a somewhat less clear sense, ascribing the same property to each of them.

We propose to express this by saying that "might have won the Petropolis Interzonal" expresses a *modal property*—being a possible winner of the Petropolis Interzonal—related, in ways we discuss below, to the physical properties of the people to whom it applies.<sup>23</sup> Modal properties suffer in even more acute form the sensitivity to differences in criteria of property individuation that complicated our account of dispositions. *Sometimes* a disposition to exhibit  $\phi$  is based on one microstructure as things actually are and another in a counterfactual situation. Moreover, *sometimes* two objects (two actual objects) are disposed to  $\phi$  as a result of their possession of quite different microstructures. "Might  $\phi$ " is sensitive in both these ways. *Usually* its applicability is accounted for by different microstructures and other physical properties in counterfactual situations, and usu-

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<sup>23</sup> Using the notation of Thomason and Stalnaker in "Modality and Reference," *Nous*, 2 (1968), 359-372, we could express "a might have  $\phi$ 'd" by means of " $\hat{x} \Diamond \phi(x)$  (a)." The only trouble with this notation is that it does not allow us to distinguish between such properties as *possibly  $\phi$ 'ing* and such properties as *possibly having  $\phi$ 'd*. Notice, further, that Thomason and Stalnaker provide an analysis of modal properties in possible-worlds terms, whereas on our view they ought to be understood in terms of actual conditions and properties. The philosophically clearest treatment of modal predicates as having extensions, thus permitting there to be modal properties, is found in Kripke's "Naming and Necessity," already cited.

ally different (actual) objects fall under “might  $\phi$ ” for quite different reasons. (Recall Ljubojevic and Portisch.)

We should therefore not describe the causal grounds for possession by, for example, Ljubojevic of the modal property *possibly having won the Petropolis Interzonal* as “that by virtue of which the Petropolis Interzonal might have been won” but as, say, “that by virtue of which *Ljubojevic* might have won the Petropolis Interzonal” (or, stylistic considerations aside, “that by virtue of which *Ljubojevic* has *possibly having won the Petropolis Interzonal*”).

If we are right, whenever one makes a modal predication one is referring directly to a modal property and indirectly to whatever accounts for its possession. The semantical analysis of what one is doing is somewhat like that of what happens when one first introduces a nonmodal predicate. For just as, to quote Kripke, “the reference of ‘yellowness’ is fixed by the description ‘that (manifest) property of objects which causes them, under normal circumstance, to be seen as yellow (i.e., to be sensed by certain visual impressions),’ ”<sup>24</sup> so too we can say that the reference of a modal predicate—say, “might  $P$ ” (in application to a given object  $a$ )—is “fixed” by some such description as “that property (or set of properties), possession of which by  $a$  causes it to be able to  $P$ .”

Notice that, strictly speaking, this is not a case of fixing of reference in exactly Kripke’s sense, for one of Kripke’s requirements for reference-fixing is that, if “ $a$ ” fixes the reference of “ $b$ ,” then “ $a$ ” and “ $b$ ” have the *same* reference. In the case we have just described, however, this condition is not satisfied, for “might  $\phi$ ” in “ $a$  might  $\phi$ ” does not refer unambiguously. It may be taken to refer either to that set of properties possession of which by  $a$  enables it to  $\phi$  (and here we have a genuine case of reference-fixing), or to the modal property itself by virtue of which different objects have “might  $P$ ” (and here Kripke’s condition for reference-fixing is not satisfied).

Are modal properties physical? It all depends on what one means by “physical.” Quite often there may be a potential characterization, in terms of the basic predicates of physics, of what is predicated in a particular modal predication of a particular individual. (We say “potential” because it may be too long for anybody to bother stating it, and require too much physical knowledge for anyone to get it exactly right.) But even when this can be done one has not characterized the modal property in physical terms, for other objects may

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<sup>24</sup> Kripke, *op. cit.*



possess it on the basis of quite different physical facts. There is rarely a set of conditions in the language of physics such that *all* the objects possessing a modal property do so as a result of satisfying all the conditions.

Yet modal properties are, for all that, possessed by physical objects, as a matter of objective independent fact. They are part of the physical workings of the world, but we cannot always describe them in terms of our basic vocabulary for describing these workings.

We think that the contrast between modal and nonmodal properties is not an ontological one. That is, it consists *just* in the fact that we have to use modal words to pick out modal properties.<sup>25</sup> If we had chosen other terms to do physics with, then we might be treating mass, for example, as a dispositional property (perhaps as a disposition to accelerate in accordance with Newton's second law when affected by a force.) It would require something like a miracle for this not to be so; for the contrast to originate in the world rather than in language, language would somehow have to embody the knowledge of which properties are really, independently, involved in the working of nature and which are merely modal or dispositional. We see no reason for believing this.

#### PARAPHRASE

At this point it would be natural to suspect that we have left out something important. For while we have indicated in very general terms the (kinds of) facts that make a "might" statement true (and hence account for possession of a given modal property by a given object), we have not, it would seem, provided a general explanation of the meaning of "-able" or "might" or "would-if." For what we have said does not provide a noncircular paraphrase of modal idioms in terms of the objective conditions, properties, and so forth on which we put such emphasis. Our specifications of modal properties are themselves expressed in modal terms, and a complete specification

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<sup>25</sup> Technically speaking (in the language of *Principia Mathematica*), modal properties are second-order properties of type one. That is, they are properties of individuals whose characterization involves a reference to first-order (nonmodal) properties of individuals. (Notice that the same may be said of, e.g., solubility, at least given our account in "Dispositions," above.) But it is important to remember what Russell never appreciated, that the distinction of predicates into orders is relative to a language. See also Thomason and Stalnaker, *op. cit.*, pp. 370-371.

## MODAL REALISM

of the relevant nonmodal properties is simply impossible.

Now we think that the demand for a paraphrase of this sort is unreasonable. It is unobtainable and unnecessary. It is unobtainable on anyone's account. If one uses the sort of account we are trying to construct one finds that, for reasons we have already discussed, one cannot describe in nonmodal terms the properties which account for different objects' satisfying the same modal predicate. And if one constructs a more orthodox, modal realist account one finds that one cannot give any clear sense to the technical terms of one's theory—for example, "possible world" and "accessible from," except by explaining them in terms of possibility and necessity. One says, "One world is accessible from another when what is true in the one is possible in the other." It is unnecessary because, if our analysis is correct, modal assertions have perfectly clear truth conditions which can be described without the help of a paraphrase.

The feeling that paraphrase is necessary may come from a subtle confusion. It is natural to suppose that the real facts about the world are given by the physical data about the location, motions, and so on of the objects in it. These can be described in nonmodal terms; one might therefore suppose that anything that cannot be so described is somehow ungrounded in the real facts. But we have already seen the mistake in this. Each particular modal predication—for example, each "*a* might  $\phi$ "—is indeed grounded in nonmodal fact, but the grounding is tied to the particular *a* and  $\phi$ . We may not be able to find a specification general enough to apply when *a* is different, let alone when  $\phi$  is different. To say in one breath what properties make an operator like "might" apply one would have to do both.

## THE GAMBIT REFUTED

It may not be clear that our account gives a genuine escape from modal realism. For instead of a weird universe of possible worlds it presents a weird universe of modal properties. But we think that this is wrong, for three reasons.

First, on our account modal properties are not in their nature different from any other properties. If one ignores human language and human knowledge there is no distinction between modal and nonmodal properties; our inability to know the reasons why everything happens and our inability to express in common terms the reasons why different individuals have the same property make us

unable to pick out certain aspects of the world without using modal idioms. But this reflects upon us rather than on the world.

Second, the objectivity of modal predications does not on our view depend on the existence of modal properties. For each particular modal predication is true and objective by virtue of the presence of certain properties, facts, or processes. The modal properties were a luxury that we introduced in order to have something which stands to a modal predicate as a nonmodal property does to a nonmodal predicate. But they do not have any ultimate explanatory power; it is not they but the physical facts that underly the particular true predications, that are the ultimate parameters of modal, as of non-modal, truth.

Third, a theory like ours is not simply a rewriting of the usual modal semantics in terms of explanatory relations between actual facts and processes. For we have had to take account of features of ordinary modal idioms, particularly their reference to particular moments in time, that are ignored in the usual semantics. It is a substantive question which strategy will give the best theory of the ordinary concept of modality. Realistic modal semantics has its formal elegance to commend it. Theories like ours have a systematic untidiness which may fit that of our unformalized modal discourse. The respect that our account pays to the relation between tenses and modality (see footnotes 16 and 21), and the stress it puts on the actual temporal origin of objects and events, are evidence that this may be the case.

One can accept the realist's gambit. For one can take the pawn, one can agree that modality is objective, without being forced into the realist's trap. Our analysis is clearly not complete; there is clearly a lot more to say about the ways in which modal sentences come to be true or false. But we think that we have provided enough evidence to make it plausible that one can be a realist about modal truth, and hold it to be objective, without being a *modal* realist.<sup>26</sup>

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<sup>26</sup> David Lewis, Margaret Wilson, the referee for the *Philosophical Review*, and especially Michael Slote have given us valuable comments on earlier drafts. Lewis persists in believing that our views are consistent with his.