Excerpt from RMM, on use of modal premises to get non-modal conclusions (Section 6 of Introduction)

6. Nonlogical Modalities.

I have defended the need and intelligibility of what are in effect modal operators of a certain sort: a "necessity" operator 'it is logically true that', and other operators definable from it alone, such as a logical implication operator and a "possibility" operator 'it is logically consistent that'. As I have mentioned, these operators are thoroughly non-essentialist, and in this regard are quite atypical of the modal operators typically discussed by philosophers.

A recurrent theme in the last two papers in this volume is that less austere notions of possibility and necessity need to be treated with extreme caution. I do not say that no sense can be made of less austere modal notions: on the contrary, it is often possible to give fairly "hygienic" explanations of modal notions (even essentialist ones) by explaining them in terms of logical possibility and other fairly clear notions. For instance, one might explain "It is physically possible that A" as "A is logically consistent with all true physical laws"--I forego a discussion of some complexities about the formalization of this. I do not contend that such a definition makes the notion of physical possibility entirely clear, for the notion of physical law is not entirely clear. (Is the non-existence of tachyons a law, assuming it true?) But for many purposes it makes it clear enough.

Unfortunately these hygienic explications of modal notions often do not serve the purposes that friends of modality are inclined to put them to. For instance, one use to which the less austere modalities are frequently put is to serve as surrogates for ontology: one hears that physical space should be dispensed with in favor of geometric possibility, or mathematical objects in terms of mathematical possibility, or whatever. The first question that should arise about such proposals is, what is the concept of possibility being employed. Physical possibility is consistency with *true* physical law. Are geometric possibility and mathematical possibility consistency with *true* claims about physical space and with *true* claims about mathematical objects? If so, it is hard to see how we avoid an ontology of physical space, or of mathematical objects: for the objects seem to be needed in the account of this sort of truth. And if not, it is important to specify exactly how the notions of possibility *are* being understood; without this, one cannot evaluate the proposals for dispensing with the ontology in question.

It is not just in connection with ontology that a clarification of the less austere modalities seems important: I think that a vast majority of philosophical disputes about modality are largely verbal, turning on different uses of the modal operators by the protagonists in the dispute. More importantly, I think that nearly all attempts to apply modality to get non-modal conclusions turn on equivocation between different senses of an unclarified modal notion. To say that the modal notion one has in mind is *metaphysical* possibility is to give a pseudo-clarification, whose practical effect I think is to serve as a license to equivocate.

As an illustration of this cynical diagnosis of talk of metaphysical possibility, consider Leibniz's modal argument against substantivalist views of space-time. (Here I will be elaborating a footnote in Essay 6 that many readers have found cryptic.) Substantivalism, I take it, is the claim that space-time regions exist as entities in their own right, not as logical constructions out of matter. Leibniz thought that we could use modal considerations to argue against this ontological thesis. He asks us if we can make sense of the idea of a possible world distinct from ours, but just like ours except that throughout history everything has been shifted one mile away in some specific direction. His answer is 'no': any possible world qualitatively like ours throughout its history would just *be* our world. But, he says, the substantivalist can't say this: the substantivalist has to regard the two possible worlds as genuinely distinct, and this seems absurd.

The argument may at first seem persuasive; but let us ask, following Paul Horwich 1978, whether the argument doesn't seem equally forceful against entities that we have no doubts about--electrons, say. Just as it seems odd to think

(DS) that there is a possible world distinct from ours but qualitatively identical to it, differing only in that throughout history everything is shifted over one mile,

doesn't it seem equally odd to think

(DE) that there is a possible world distinct from ours but qualitatively identical to it, differing only in that Electron A and Electron B have been switched throughout their entire history?

It seems to me that it does. But if the reality of space-time regions implies (DS), doesn't the reality of electrons equally imply (DE)?

It is hard to believe that the "Leibnizian argument against electrons" is any good. If it is not good, is that because the existence of electrons fails to imply (DE), or is it because (DE) isn't such a bad conclusion after all? My answer is that you can say what you like: these are just two alternative conventions for talking about possible worlds. [Or about possibility: (DE) can be reformulated so as not to mention possible worlds, by saying that it would have been possible for the world to have been just like it actually is except with Electrons A and B switched. And of course there is an analogous reformulation of (DS).]

If I had to choose between these conventions, my choice would be the one that says that (DE) simply doesn't follow from the existence of Electrons A and B. It seems to me that we do not normally differentiate between isomorphic "possible worlds"--worlds isomorphic over their entire history, not just at a particular time. Rather, we accept the Principle of Identity of Indiscernibles, *as applied to possible worlds*, simply as a matter of convention. So (DE) is false by convention; but obviously this convention does not rule out the existence of electrons. The point can be put as a point about our principles for individuating objects across possible worlds: normally I think we regard individuation as sufficiently tied to qualitative characteristics (including relational qualitative characteristics, like spatial relations to other qualitatively described objects) that if there is a unique isomorphism between possible worlds (over their entire history, not just at a moment) then we regard it as making no sense to suppose that identity goes via anything other than this isomorphism. (If there are multiple isomorphisms between one world and another (due to complete symmetries in the worlds), I think that we normally regard there as being no fact of the matter as to which isomorphism is the transworld identity; but we regard it as making no sense to suppose that the identity goes by anything other than one of the isomorphisms.)

It might be thought that Kripke 1972 casts doubt on the idea that this "qualitative" viewpoint is our normal convention for transworld identity, but I do not think that is so: what Kripke's examples show is that our normal transworld identifications don't go by considering only qualitative similarity *at a time*. That is, suppose there is another possible world exactly like ours up through the birth of Nixon, but which then diverges: in it, the person X born of the people qualitatively like Nixon's parents ends up looking different and having a different career and personality than Nixon does in the real world; and someone else Y ends up with the looks, character and career of Nixon. Kripke's point is that we individuate things across worlds in such a way that the isomorphism of the initial segments of the worlds (up through Nixon's birth) counts as identity; this settles that it is X, not Y who is Nixon, so the *local* qualitative similarity of later stages of Y to Nixon is overruled.

The idea that we normally regard transworld identification as independent of qualitative characteristics (even relational ones) has no support from Kripke's arguments. (I don't know if it was intended to.) Even Kripke would regard it nonsensical to suppose there a world isomorphic to ours in respect of all qualitative characteristics, even relational ones, but in which the (presumably unique) isomorphism maps Nixon into someone else.

Nor does it help to say that we don't look at possible worlds through telescopes and make trans-world identifications on the basis of what we see, but that instead we stipulate worlds. For my point can be recast into the language of stipulation: as we usually talk about possibility, considerations of qualitative similarity provide limits on the possibilities we can stipulate. We can't stipulate a possible world completely isomorphic to ours in which Nixon there is like Humphrey here throughout his history (even in having parents, grandparents, etc. that are just like Humphrey's parents, grandparents, etc.). We can't stipulate a world completely isomorphic to ours in which Electron A is where Electron B in the real world is throughout its history, and vice versa. (Here I'm assuming not only that B is distinct from A in the real world, but also that no complete symmetry of the real world with respect to all qualitative characteristics maps A onto B.) And we can't stipulate that there is a world completely isomorphic to ours in which space-time region A has the properties that space-time region B one mile away from it has here; for instance, in which A has the properties (containing a 450 pound man, say) that the region one mile away from it does here. (Again, I'm assuming that there is no complete symmetry of the real world with respect to all qualitative characteristics--or at least, none that takes A onto B.)

It is evident that if we employ this qualitative criterion of trans-world identity, or this qualitative constraint on what worlds can be stipulated, then (DS) is as false as (DE), and no more follows from the existence of space-time regions than (DE) follows from the existence of electrons. But there is no need to insist on this qualitative standard of cross-world identification: in my view, possible worlds are just fictions, and one can speak of them as one likes. (Perhaps it would be more to the point to say that there are multiple conceptions of possibility and of possible worlds, and one can employ whichever one likes.) Thus one can perfectly well say that (DE) is true: the isomorphic worlds in the electron case are genuinely distinct. Indeed, this is the position that one would take if one were to take 'possible' in (DE) to mean *logically* possible, i.e. formally consistent. It is also the position that Horwich takes. He argues that if it sounds counterintuitive to assert (DE), that is because usually when we have multiple possible worlds there is an epistemological problem as to which one we're in. But, he points out, in this case an epistemological problem can't arise: if there were an epistemological problem it would have to be "How do I know that Electron A isn't where Electron B actually is instead of where Electron A actually is, and vice versa"--hardly worrisome (since settlable by appeal to the meaning of 'actually'). Now if this solution is acceptable in the electron case, it is equally acceptable in the space-time case: we can say that (DS) is false, but that it's falsity is unworrisome because the only "epistemological problem" that it licenses is, how do I know that everything isn't one mile away from where it actually is. To say that (DS) is true strikes me as a slightly unnatural way of talking, but I think it just a matter of convention whether one talks this way or talks in the way suggested in previous paragraphs. What I do want to insist is that whichever way one talks in the electron case, one can just as well talk that way in the space-time case, and for the same reasons.

One often hears the view that the Leibniz argument undercuts the idea of space-time regions as "individuals" or "substances", but allows the view that they are properties of objects. This seems to me roughly backwards. I think that the Leibniz argument may actually have some force against the view that regions are properties of matter--see the end of note 15 of Essay 6. But, I have been arguing, it no more shows that space-time regions are not substances than it shows that electrons are not substances. Any appearance to the contrary rests, I think, on a vacillation between a sense of 'possible' in which (DS) follows from the existence of regions and a distinct sense of 'possible' in which (DS) is absurd. That these senses of 'possible' must be distinct can be seen from the electron example. When we employ the Leibniz argument to something that we may have less confidence about, like space, it is easy to confuse the senses of possibility so that we end up thinking the argument sound.

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I have had an ulterior motive in defending substantivalism against Leibniz's argument: a substantivalist viewpoint is important to my position on the applications of mathematics in physical theories. But my main point has been to illustrate my contention that the use of modality to draw non-modal conclusions almost always turns on an equivocation in the modal concepts employed. Various other illustrations could be given of the same point. (Descartes' argument that he was not a material being is an obvious one, as are the modal versions of the ontological argument for the existence of God.) Some illustrations that are specially relevant to the topics of this volume can be found in the last two sections of Essay 6, in Section 2 of Essay 7, and in Section 7 and the Appendix of the same Essay.

There is one final instance that I would like to comment on. In Hale 1987 and (drawing heavily on Hale) Wright 1988, it is alleged that modal considerations undermine my version of anti-platonism. Hale and Wright both note that I regard mathematics, and the existence of mathematical entities, as consistent (indeed, as having a strong form of consistency that I call conservativeness); and that I take consistency as a primitive modal notion, a sort of possibility. They then argue that since I regard it as false that there are mathematical entities, I must hold the existence of such entities to be "contingently false"; and they both proceed to interpret "contingently" in some non-logical sense (i.e. some sense other than "neither logically true nor logically contradictory"), to make the position seem absurd. For instance, Wright says

> Field has no prospect of an account of what the alleged contingency is contingent *on*. This world does not, in Field's view, but might have contained numbers. But there is no explanation of *why* it contains no numbers; and if it had contained numbers, there would have been no explanation of that either. There are no conditions favorable for the

emergence of numbers, and no conditions which prevent their emergence. (pp. 46-7)

(Wright describes this as "the Achilles' heel of Field's position" (p. 26).) It should be noted that if this objection were good, it would apply equally well against any platonist who was not a logicist: that is, any platonist who agreed that mathematics goes beyond mere logic, and hence that the denial of mathematics is logically consistent and hence "contingent". But of course it is not good, for as I've said it turns on an equivocation on the meaning of 'possible'.[1]

To be fair, I should note that in both Hale's and Wright's presentations, the above argument is made to look a bit better by being intertwined with two other more interesting arguments.

Their first supplementary argument is that without the assumption that mathematics consists of necessary truths, the view that mathematics is conservative looks unjustifiable. (A related argument would be that without the assumption that mathematics is true, the view that it is consistent looks unjustified.) The idea behind this argument is that a platonist who holds that mathematics is in some sense necessary *can* justify the view that it is conservative: the justification is simply that conservativeness follows from necessary truth. (Similarly, the platonist can justify his belief that mathematics is consistent, by noting that consistency follows from truth.) The obvious reply, of course, is that one can in a similar sense "justify" any belief by providing a logically stronger belief from which the first follows. What would be necessary for Wright or Hale to sustain their point would be to show that the platonist has better reasons for the view that mathematics is necessary (or true) than the anti-platonist has for the view that mathematics is conservative (or consistent). It is not *out of the question* that this could be defended: sometimes the best way to argue for a logically weaker position is to argue for a logically stronger position; sometimes the logically weaker position when separated off from the logically stronger one looks *ad hoc*. (An example, I would argue, is the view that the observational consequences of a theory are true, separated off from the view that the non-observational consequences are true.) But neither Hale nor Wright offers the slightest reason for thinking that that is so in this case, and I have been unable to construct a plausible argument for the claim.

Their second supplementary argument is that anyone who holds both that the existence of mathematical entities is "contingently false" and that mathematics is conservative can offer no reason *not* to believe in mathematical entities. More fully: the conservativeness of mathematics means that any internally consistent combination of nominalistic statements is also consistent with mathematics. Consequently, the argument goes, no combination of nominalistic statements can provide reason for or against the belief in mathematics. So how can there be any reason not to believe in mathematics? "It seems, then, that Field has no choice but to admit that he has *no* evidence for his nominalism.... It follows that he ought not to be a nominalist but an agnostic."

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[1] If anyone doubts this, I suggest that they try out the analogous argument in theology. "Surely the existent of God is logically consistent, so if there is no God, it is *contingently* false that there is a God. But the atheist has no prospect of an account of what this alleged contingency is contingent *on*. There is no explanation of *why* the world contains no God, and if it had contained one, there would have been no explanation of that either. There are no conditions favorable for an emergence of God, and no conditions that prevent His emergence." This is in effect what is known as Anselm's second ontological argument.

(Wright, p. 44.) The reply to this, of course, is that Wright is ignoring the relevance that I claim for issues of dispensability and indispensability. The conservativeness of mathematics does not in itself show that there can be no reason to believe mathematics: as I have repeatedly stressed from the time of my book *Science Without Numbers*, to combat the argument for platonism one must also show mathematics dispensable (in science, and as I have more recently emphasized, in areas such as metalogic as well). The other side of the coin, it seems to me, is that if the dispensability program *can* be carried out, that gives us reason to not literally believe mathematics but only to adopt a fictionalist attitude towards it. Admittedly, we can't have *direct evidence* against mathematical entities. We also can't have direct evidence against the hypothesis that there are little green people living inside electrons and that are in principle undiscoverable by human beings; but it seems to me undue epistemological caution to maintain agnosticism rather than flat out disbelief about such an idle hypothesis. I think that platonism has seemed a plausible position because it has been assumed that the existence of mathematical entities is *not* an idle hypothesis. But if it can be shown that the hypothesis is dispensable without loss (in explanations, in descriptions of our observations, in accounts of metalogic, and so on), then I think it natural to go beyond agnosticism and assert that mathematical entities do not exist. I suppose there is no need to insist on this: perhaps agnosticism would be a sufficient conclusion. In any case, there is nothing in this supplementary argument, nor in the previous one, that can serve to rescue the modal argument on which Wright and Hale primarily depend.