The Nature of Necessity

Abstract: I give an account of the nature of absolute or metaphysical necessity. Absolute-necessarily P, I suggest, just if it is always the case that P and there never is or was a power with a chance to bring it about, bring about a power to bring it about, etc. that not P. I display both advantages and a cost of this sort of definition.

brian.leftow@oriel.ox.ac.uk

There are many sorts of necessity. What is nomologically necessary is what must happen given natural law. What is epistemically necessary is what must happen given what we know to be so. Each of these definientia uses "must." This further "must" expresses absolute or metaphysical necessity. I now give an account of its nature.

We learned at Mother's knee that one can define "necessarily" in terms of "possibly" or vice-versa. For the absolute modalities, I define "necessarily P" as "it is not possible that not P."[1] I take this seriously as a definition. Ideally, a definition of "F" tells us what it consists in to be F. So I suggest that absolute necessity consists in a lack of absolute possibility. I take possibility as primitive in giving a logical definition. I do so because I think this leads to the best overall account of the underlying metaphysics. I do not take possibility as primitive metaphysically. Rather, I take as primitive and modal what makes possibility-claims true. What that is emerges below.

One could instead, of course, take necessity as primitive and define possibility as the lack of absolute necessity not- not being ruled out by any necessity.[2] I go possibility-primitive because if we use possibility to define necessity, our metaphysics of possibility can provide our account of what makes states of affairs necessary. If we use necessity to define possibility, we must base our account of what makes states of affairs necessary elsewhere, and as I now briefly suggest, the "elsewheres" are less promising than the overall metaphysics I place beneath the possibility-primitive approach. Some might look to the metaphysics of counterfactuals. This involves the metaphysics of possibility (e.g. Lewis 1973) or else that of powers (Jacobs 2010). I make use of powers myself below,

without a detour through counterfactuals, and I think my powers account costs less ontologically than one that takes possibilities as metaphysically basic. Fine defines necessity in terms of essence (Fine 1994, 1995, 1995). Building this into a metaphysics requires a luxuriant Platonism about essences. Platonism offends against what I soon call the Caution Principle, and essence is a less familiar, less well understood primitive at the definitional level than possibility. Anti-realists about modality might e.g. take some kind of definition as primitive, as a parallel in language or concept to Finean essence primitivism, or use conventions to explain the necessity of logic and then allow absolute possibility to whatever logic does not rule out. I very briefly give reason to reject anti-realism later.

From now on, my modal terms express absolute modalities unless I say otherwise. I read <necessarily P =df. it is not possible that not P>[3] metaphysically as: what makes it necessary that P is that there is no possibility that not P. The transition from "it is not possible that not P" to "there is no possibility that not P" might worry some. For parallel moves don't always work. If it is not funny that P, we can't rephrase this as "there is no funny thing that P."[4] And a positive version of the transition- from "it is possible" to "there is a possibility"- may seem too fast to Quinean souls who see "there is" as adding to one's ontology. But I see the transition as a series of purely verbal transformations:

It is not possible that not P.

That not P is not possible.

That not P is not a possibility.

None of the possibilities is that not P.

There is no possibility that not P.

This works for "funny": just insert "which is" before "that" in the last sentence. (Strictly, that might belong in the last of my moves about possibility too.) I stress that these

moves are purely verbal. The theory I sketch is not committed to entities which are possibilities.

"There is no possibility that not P" is a negative existential. I take this fact seriously. The standard semantics for necessity-claims supports doing so. On that semantics, necessity is truth in all possible worlds. Suppose for the nonce that some entities really are possible worlds. The worlds are not enough to make it true that necessarily P. It is required that they be <u>all</u> the worlds. The P-worlds are all the worlds just if there are no other worlds than the P-worlds, and that is true just if there are P-worlds and there is no ¬P-world. So the semantics of necessary truths involves the negative existential "there is no possibility that not P" expresses. So the metaphysics should take this claim's form seriously. The metaphysics of necessity, I submit, should be determined by the metaphysics of negative existentials and that of possibility. I deal with these in turn. [5]

<u>Negative existentials</u>

Many philosophers think that at least some truths have truthmakers, bits of being whose existence makes them true (see e.g. Armstrong 2004). Whether or not other truths do, I submit that negative existentials do not. Nothing at all makes negative existentials true. There is nothing whose presence grounds their truth. They are true due simply to a lack- an absence- of anything to make the existential they negate true. And absences aren't anything. They are not some sort of being. They are lacks of any sort of being. Nothing real or existing, nor any positive fact, makes a negative existential true. They are true for free. The explanation of their truth is just that things are as they say: it is true that there is no joy in Mudville because there is no joy in Mudville- because of an absence of joy.

This is an attractive proposal. It explains truth in an intuitive way: it is true that P because P. It does so at the lowest possible ontological cost- zero. It is also a hard proposal to argue against, I think. Ontological posits must be justified, by showing work we cannot do at all or as well without them. I posit nothing, and I have just suggested

that the truth-explaining work nonetheless gets done, and done well. If it does, the burden of proof is on those who want to posit truthmakers for negative existentials. Such people need an argument that a truthmaker is needed. And perhaps to defeat the argument I need only display parsimony and show that the work gets done, and done intuitively. For posits must be justified, and if I can show that any work a posit does can be done well without it at lesser ontological cost, I have stripped its justification away. So: what would the case be that negative existentials must have truthmakers? The arguments on offer turn on grounding. Ross Cameron writes,

> Why should it be okay for negative truths to go ungrounded (but) not okay for positive truths?… Truthmaker theory is… about what it is for a proposition to be true; it's just not the kind of theory that can apply only in a restricted domain… If one ever needs to provide a reason for the truth of a proposition, then one always needs to provide a reason for the truth of a proposition (Cameron 2008, 107, 108).

Jonathan Schaffer submits that "The truth-values of propositions are not fundamental features of reality, and as such must be grounded in what is fundamental" (Schaffer 2008, 308). And Gonzalo Rodriguez-Pereyra put it this way: Truth is grounded. Grounding is a relation. Relations link entities. So truth is grounded in entities (Rodriguez-Pereyra 2009, 234).

The reply is simple. Truth is as such <u>explained</u>. <P> is true <u>because</u> P. This is the sense in which there must always be a reason for a proposition's truth. But explanation is a weaker relation than grounding, <u>inter alia</u> because it has no ontological commitments. We can explain precisely by absences, by lacks: the pilot's absence from the wheelhouse explains the ship's wrecking on the rocks. That truths must be explained, in the trivial sense I've displayed, does not imply that they must be grounded. Perhaps when a truth does have an explanation of the right sort that involves some bit of being, the explanation is that the being grounds the truth. But where the issue is precisely whether

the explanation of a kind of truth involves a bit of being at all, it would beg the question to insist that that kind of truth is grounded.

There is also a more general worry here. Karen Bennett articulates it:

truth-value depends on being… what's the alternative? That truth floats free of being? Surely that's the kind of thought that leads to… a job in a bad Comp Lit department (Bennett 2011, 187).

But negative existentials don't float free of being, any more than holes float free of the inner surfaces of the objects they are in. They don't float free of how things are. For how things are is that the relevant entities aren't there.[6] Some absences <u>are</u> grounded; the existence of the shaped doughnut dough grounds the truth of <the hole exists>. But absences need not be grounded. In a wholly empty world, there would be nothing to ground any truth- no "dough"- but everything would be absent. Still, the truth-value of <everything is absent> would be non-fundamental. This would be shown by its being explained, not its being grounded.

<u>The application to necessity</u>

I now apply this account of negative existentials to absolute necessity. As I see it, an absolute necessity just consists in a lack- an absence- of a possibility. And absences aren't anything. So nothing real or existing, nor any positive fact, is an absolute-necessity-maker. We get absolute necessity for free, given absolute possibility. When it comes to absolute necessity, there's nothing to it: it consists in absence of possibility, and absences aren't anything at all. Not just any lack of absolute possibility gives us absolute necessity, though. Suppose Quine were correct that reality is completely non-modal. It would not follow that everything was absolutely necessary. What's needed for absolute necessity is that there be some possibilities and not others.

This approach to absolute necessity has virtues. It is parsimonious, adding literally nothing to our account of the possible, whatever it is. It is completely unmysterious. It also hints at an epistemology: it suggests that warrant to assert an absolute necessity might consist in a certain sort of lack of warrant to assert a possibility. So let's go with it.

It is absolutely necessary that P, on my account, because possibly P and there is no possibility that not P. We have our story about the negative existential. To complete our account of absolute necessity, then, we need a metaphysics of absolute possibility.

Absolute possibility

Absolute possibility is the weakest form of objective possibility, where a form of possibility is objective just if to say "possibly P" of that sort is not to say something relevantly like "for all we know, P." It is plausible that there is at least one weakest form of objective possibility. For the alternative is that there are infinitely many ever-weaker forms. We just do not have that many distinct modal concepts. Of course, we can define infinitely many, in principle. But as we do not have most of these pre-theoretically, nothing intuitive will correspond to most of them. So it will be unintuitive that most of these definitions carve along any joint in modal reality. However, this might just illustrate the poverty of our intuitions. So a better thought is that even if we do define an infinity of objective modal concepts, intuitively there is nothing wrong with talk about all objective possibilities, of whatever sort. But if there is such a thing as all of them, it gives us the extension of some form of objective possibility- and that has to be the weakest form. Maybe absolute possibility is coextensive with physical possibility, or nomological, or what have you. For the moment, its extension is irrelevant. I've given you its intension: absolute possibility is the weakest form of objective possibility.

Nominalism

Three desiderata for a metaphysical theory of possibility are ontological and ideological economy and adequacy to the intuitive data about possibility. The intuitive data- that various things seem possible, as we assess possibility- are the appearances here, and a good theory will inter alia "save the appearances," i.e. respect as many of our intuitions, and in particular of the strongest of our intuitions, as we can consistent with other theoretical desiderata. We want a metaphysics for all the possibilities our standard ways to fix modal belief tell us are there, positing as little as we can get away with; if we can't have them all, we want to get as close to this as is compatible with doing well by other theoretical desiderata.

This suggests looking first to nominalist proposals and enriching our ontology only if these can't deal with the data adequately- i.e. only if they must give up too many or too strong intuitive possibility-claims. So does another point: our evidence for the common-sense and scientific ontology of concrete particulars is better than any evidence intuition and philosophical argument can provide for positing further existents. So when we move from an ontology of concrete particulars to one that adds distinctively philosophical posits, overall, our ontology is less securely grounded, because its evidential base includes weaker elements. It's good to keep as long as we can to things for which we have the best evidence, and move on to more doubtful posits only when the pressure of philosophical work that needs doing comes to justify this. For it's good to keep our beliefs as well-justified overall as we can. This might well qualify as something we rationally ought to do. That is, perhaps we rationally ought to follow the Caution Principle: that the pressure of work to be done does not justify diluting our evidential base as long as the work can be done without a more doubtful posit. I think the Caution Principle is one reason versions of Ockham's Razor appeal in metaphysics. So let's start our modal metaphysics Cautiously, with the sparest nominalism: no tropes, no abstracta, no Williamsonian non-concreta, no non-existents, just concrete existing particulars. Even if we posit things other than existing concreta elsewhere in our metaphysics, it's good to

do without them where we can. That holds out the hope that we might jettison them altogether later, and Caution is a desideratum in given parts of our metaphysics as well as globally. Ockham actually worked this way: he posited tropes for certain sorts of property, where forced to in particular areas of his theory, but did without them elsewhere nonetheless.

In a paper about other things, I haven't space to argue quite generally that this spare a nominalism- call it Concretism- provides an adequate theory of attributes. If it doesn't, it can't provide a viable modal metaphysics if modal metaphysics needs attributes. But we cannot start by assuming that it needs them, and even if this spare a nominalism won't do for attributes, it would be good to know if it could do on its own for modality, and at what cost. So let us just see what we can do with Concretism here. Take our question to be whether Concretism provides an adequate modal metaphysics, whether or not it is viable elsewhere. If it won't do here, that will be a strike against it in our overall evaluation of the view, however strong (or not) it seems in other contexts. I note finally that if this lean an ontology won't do, many enrichments that would still be within the bounds of nominalism will be compatible with the rest of my argument. One could add tropes, or dependent abstracta like classes. That'd be fine, for my purposes.

On Concretism, the choices in modal metaphysics are conventionalism, conceptualism, Lewis' theory that all possible worlds are concrete existing particulars just as our own universe is (Lewis 1986) (including his way of substituting wholes for classes (Lewis 1991)) and (so I shortly suggest) "powers" theories. Conventionalism and conceptualism are anti-realist. For a reason that emerges below, I think we should want to be realists about absolute modality. Caution rules against Lewis at least initially: he adds to our ontology all possible concrete things, existing as full-bloodedly as we do, on the basis of little evidence. Further, they're the kind of things for which we should require empirical evidence- talking donkeys, blue kangaroos, etc.- but on Lewis' views, we can't have it:

Lewis' other universes are causally isolated from our own, so there cannot be empirical evidence for their existence. I have much more to say about these views, but I cannot do it within my present space-limits. At any rate, for these reasons and others, I think we should explore a theory that rests absolute modality on the powers of concrete things.

A Concretist who appeals to powers must sanitize power-talk- must show, in effect, that concrete particulars themselves can play the metaphysical role of their powers. I do so as follows. Powers are powers to effect this or that. They are intrinsically directed toward a manifestation. This is clear even in our typical ways of describing them: we don't have a better way to speak of powers than as the power to think clearly, to freeze, etc. Something has the power to bring it about that P just if in appropriate triggering circumstances, given an absence of blocking factors, it would bring it about that P.[7] So here is my account:

> A has the power to bring it about that P just if A is such that there is (speaking without commitment) a function from A being in certain sorts of circumstances to A bringing it about that P- that is, just if A is such that if things were right, A would bring it about that P.

I parse power-talk in terms of concrete particular causes and their effects, which may be concrete particular events. This is not a purely counterfactual analysis of powers. I am not saying that having a power consists in a subjunctive conditional's being true. Such analyses face daunting counter-examples. Richer ontologies avoid these by taking powers to be items in particulars that ground such counterfactuals- tropes or universals. On Concretism, the something that grounds the counterfactual is the concrete thing itself, but I insist that the concrete thing, not the counterfactual, gives us a nominalised power: that is the import of "A is such that." The conditional's truth does not <u>analyze</u> being powerful. It is just a consequence of the particular's being as it is, of that about it which we call its being powerful, that about it which enables it to play the metaphysical

role of a power. As to that, Concretism says that my shirt is blue, but there is no such thing as blueness, a colour blue things share. So too, on Concretism, my shirt is powerful- it is able to appear blue, and in fact that probably just is its physical colour- but there are no such things as powers, items many powerful things share. For the Concretist, just as things are blue even if nothing is a colour, things are powerful even if nothing is a power. The general Concretist move is to have concrete things play the metaphysical role of attributes. If the general move is viable, as I suggest elsewhere (Leftow 2006), Concretism can deal in powers in good conscience. If modal metaphysics needs power-talk, still power-talk needs only concrete particulars. (As noted above, those who disagree are free to posit power-tropes.) So let's put powers to modal work.

Powers and modality

We ordinarily say e.g. that what makes it possible that I get to class tomorrow is that I have the power (and the opportunity) to walk there: the presence of a power (with an opportunity to operate) makes it possible that things be as the power can make them. I take this locution very seriously. At a very rough first pass, I say that what is absolutely possible is just what powers have opportunities to make possible- what all powers or groups of powers are able to produce or enable to occur.[8] The basic thought in my "powers" approach to modality is this: consider actual history, populated by powerful concrete things with chances to act. These things with these opportunities are able to drive history along many paths. They can bring these things about, or at least enable them to occur. Anything that happens on any such path is possible, because those things have those chances to bring them about or enable them.[9] What makes an unrealized-possibility claim <P> true is the existence of appropriate powers- e.g. powers to bring it about or enable it to occur that P, or bring about such powers, etc.- with chances to act, or chances for there to be chances, etc. Ten billion years ago, there were no natural powers directly to produce homo sap. Nothing then naturally existent could simply act

and have us as the direct result. But there were natural things with the power and chance to produce other natural things with other powers and chances, and so on down a very long line, with the result that eventually, down that line, if all the powers did their bits over time, there would come to be things which given the chance and acting together could produce a homo sap. So at a second pass, possibly P just if there are or have been powers and chances to produce (or enable to occur) powers and chances to produce (or enable to occur), etc., leading to powers and chances to bring it about or enable it to occur that P. Let's say this as follows: possibly P just if a power chain reaches from some point in actuality to its being the case that P.[10]

I say that actual powers and chances are truthmakers for claims about possible events and objects that would be actual, if at all, only far later.[11] I say, for instance, that powers and chances ten billion years ago made it true that possibly a homo sap exists. As a theist, I have an easy way to get this: God existed then and was able to make us. But I think a naturalist can accept it too. Consider a sperm and an egg which in combination would yield a baby, George. If they exist, empowered as they are, and have a chance to meet, it is possible that George exist. They have the power and chance to combine; if they combine and nothing untoward intervenes, George will result; what more could it take for it to be possible that George join us? Their powers and chance make it possible. It is hardly more than a rephrasing to say: the powers and chance make it true that this is possible. If they do the one, they do the other. But given George, many other things are possible. If possibly George exists, and possibly some air persists till he does, then possibly George breathes, possibly George cries, etc. For George <u>with all his powers</u> is possible, and if he can be there with his powers and there can also be suitable chances and cooperating powers, his powers can do what they are powers to do, and so it's possible that his powers do what they are powers to do. The possibility of those chances and co-operators is similarly written into powers available when the sperm and egg exist. The sperm doesn't have the power to have George cry by itself; neither does the air he'd

breathe to do it; neither does the dog whose barking might scare him into it. But it is just a fact about the powers that they are powers inter alia to interact this way. Put them together properly in the right situation and this would result. That's because of the way the powers are, even though we'd balk at saying that somehow this outcome is written into any of them singly or into reality outside them. The objects have powers jointly that are based on their individual powers but go beyond anything they individually can accomplish, and these facts about joint powers are there in reality given only the individual powers they rest on. Joint powers make things possible just as individual powers do.[12] And once we grant that present joint powers can e.g. ground the possibility that George cry, there is no principled stopping point. For George has the power to produce another sperm S, and another possible baby can produce egg E, and if S and E combine and nothing untoward intervenes, there will be another baby, Charlotte. Current powers and chances jointly yield the possibility of Charlotte. And so on down the line.

Note the references to chances or opportunities in my account. Other "powers" accounts overlook these. Thus Williams and Borghini write that

> State of affairs S is possible iff there is some actual disposition d whose manifestation is (or includes) S (Williams and Borghini 26),

and Barbara Vetter writes that

> It is possible that p =df something has an iterated potentiality for it to be the case that p (Vetter 2015, 197),

where an iterated potentiality is a power to have it the case that or produce powers to have it the case that or produce… that p. But powers need chances to act. If a power to bring it about that P has no chance to act, its presence does not entail that <P> can come true as a continuation of that history. It entails at most that <P> could have come true- it

could have, had the power had a chance to act. There are many ways to start from this "could have" and generate an absolute "can." For instance, if something has the power to remove an obstacle and provide a chance for the first power to operate, <P> can come true. But it takes doing, and the second power can do it only if the second power has a chance to act. If nothing has the power to provide a chance for the first power to act, it simply can't act. Perhaps it is then not even true that it could have acted. For the "could have" requires (at a first pass) that something could have given it a chance, and perhaps nothing could have. So the power's presence does not give us a possibility of what it is a power to produce.

Further, one can't reduce opportunities to co-operating active powers or active powers able to co-operate. Consider God alone before Creation, contemplating what to make. He has the power to create just by nature. He has the chance to act because there is no other omnipotent being hell-bent on stopping Him. Having the chance is something different than there being any other powers around to co-operate, because there are none. For a naturalist variation, consider the Big Bang singularity: it had the power and chance to explode, but nothing physical outside it had a co-operative power. Again, consider a steel ball moving rectilinearly in an otherwise empty Newtonian world. The ball has the power to keep moving that way. It also has the chance, as it has room and nothing is around to deflect or stop it. But nothing else in this world has any active power; Newtonian space has no active powers at all.[13] Yet the ball has its opportunity; it could not move if it did not. The presence of empty space provides an opportunity which involves no active power.

One might think to define possibility by power chains alone:

Possibly p =df. There is or was a power chain from some point in actuality to its being the case that P.

But this will not do. Either there was or there was not a first instant of time. Either way, I now show, plausibly there were states of affairs no power chain reached. These were actual. So they were possible. But plausibly nothing in actual history ever was the basis of a chain that would lead to them.

Suppose that time had a first instant. There were no power chains from points in the past to reach whatever was there, since at this point there was no past. Let's call a power-chain containing a power whose effects[14] would occur later than its acting[15] a later-effect chain. No power sited at the first instant could begin a later-effect chain that reached something at the first instant. This leaves only later powers. These can reach earlier times if time-travel is possible: in time-travel, powers' effects later than their acting on the time-traveler's time-line are earlier than their acting in public time, and private time-line ordering takes precedence over public. But if time-travel is impossible, as many think, no power-chain starts after the first instant and loops back through time to the first instant. Even if time-travel <u>is</u> possible, it would be weird to say that the Big Bang was possible because much later, some mad scientist had the power to build a machine with the power to travel back and set it off. For if the Bang causally determined the scientist's existence, that would set up a sort of loop few would think possible. Even if it did not, the Bang would still causally influence its own possibility- which sounds about as bad. So even given time-travel, I think, later-effect chains cannot reach anything at the first instant. So if time had a first instant, no later-effect chain can reach anything at it, and so no such chain can account for the possibility of anything at a first instant.

If effects must follow their causes- i.e. all powers must be later-effect- this settles the matter: power chains can account only for <u>later</u> possibilities. But if cause and effect can be simultaneous, there could be power chains all of whose members exist or occur at the

first instant. So we must ask whether such chains could account for the possibility of everything that exists/occurs at a first instant.

A power chain whose members all do/would occur at the first instant either has or lacks a first member. If it has a first, then if time-travel cannot help, this one cannot be the terminus of any temporal power chain at all. Only an atemporal power could make it possible, if atemporal entities can have powers. If they can, then if there is a chain of atemporal powers, if it has a first member, this will be beyond the reach of any power chain at all. If it has none, this will parallel what I next sketch for an infinitely long temporal power chain at a first instant. So I will not mention atemporal powers again: they do not change the logic of the situation.

Suppose now that a power chain entirely at the first instant has no first member. Then for any point in the chain, all of the chain before that point, taken as a whole, is not the terminus of any temporal power chain (again, if time-travel cannot help). Hume might object here.[16] He might say that in such a chain ABC etc., power A would cause power B, B would cause C, etc., and so the whole, ABC etc., has the power to cause the whole, ABC etc., bit by bit- and so the whole can provide for the possibility of the whole, bit by bit. But consider this state of affairs: there being powers prior to C in the chain. Did B account for that? No, B was too late in the chain. For prior to B, there was power A, and at that point, there were powers prior to C. Similarly, prior to A, there was minus-A, and so ad infinitum. Every power in the chain is too late in the chain to account for there being powers prior to C. So none can be what grounds this possibility: for every power, it was possible prior to that power's point in the series. So there remain states of affairs no temporal power chain can account for. Thus whether or not there can be powers for effects that occur just when the power acts, if time had a first instant, not all possibilities can be accounted for by power chains.

Suppose on the other hand that time had no first instant. Then for any random time t, all of time before t, taken as a whole, was not the terminus of a chain of later-effect powers. The problem here is just like the one for a first instant: it afflicts "the beginning of time," whether this be a single instant or an interval of any length. Hume's strategy fails here for the reason just given. And the story about chains of simultaneous-effect powers is as above. One way or the other, then, there are actual states of affairs no power chain can reach. So a powers view can be extensionally adequate only if it does not insist that powers do it all, but rather lets some states of affairs be possible simply because they are actual.

This does not disadvantage powers views. Any actualism must say too that some things are possible simply because they are actual. Consider van Inwagen's view, on which possible worlds are possibly-true propositions that entail the contents of an entire possible world, and <P> is possible just if some such proposition entails it. Why does a world-proposition Q possibly exist? It would be odd to say "because Q is possibly true and Q entails <Q exists>." So to speak, to entail anything or be possibly true, Q first had to exist. Q cannot entail its own possible existence or be possibly true logically prior to being there. So its possibly existing (as Van Inwagen parses it) cannot be logically prior to its actually existing. Its existence had to come first, and it cannot exist without being possible. So van Inwagen's propositions must possibly exist because they actually exist, though he does not recognize this. Lewis' possibilist view says something similar; his possibilia are possible simply because they exist.

A better "powers" definition of absolute possibility, then, is along the lines of

> POSS. Possibly p =df. It is or was the case that P or there is or was a power chain from some point in actuality to its being the case that P.[17]

This is a simplification; my full definition covers almost a page.[18] The "was" clauses entail that we don't lose possibilities as time passes, thus distinguishing absolute from what

some call "real" or "historical" possibility.[19] Now an account of possibility must make sense not just of single occurrences of "◊," but of iterated modalities involving it. So let us examine a simplest case, to see how it works. On my reading "◊◊P" asserts that

> It is or was the case that or there is or was a power chain to (It is or was the case that or there is or was a power chain to P).

This is equivalent to

1. It is the case that (It is or was the case that or there is or was a power chain to P) or
2. it was the case that (It is or was the case that or there is or was a power chain to P) or
3. there is a power chain to (It is or was the case that or there is or was a power chain to P) or
4. there was a power chain to (It is or was the case that or there is or was a power chain to P).

Given POSS, (1) asserts that ◊P. With (1) as a disjunct of (1)-(4), given POSS, ◊P entails ◊◊P, as it should. (2) states that it was the case that P or there was a power chain to P. Via POSS, both disjuncts give us that ◊P. (3) is equivalent to (there is a power chain to P or there is a power chain to its having been the case that P or there is a power chain to a power chain to P or there is a power chain to there having been a power chain to P). If there are no past-directed powers, this reduces to (there is a power chain to P or there is a power chain to a power chain to P).[20] If there is a power chain to a power chain to P, there is a power chain to P: the second chain just continues the first. The reverse entailment also holds trivially. So (3) reduces to (there is a power chain to P), and (4), similarly, to (there was a power chain to P). Per POSS, both give us that ◊P. So (1)-(4) imply that ◊P. Iterating "◊" makes perfect sense given POSS, and we see that on POSS, □(◊◊P ≡ ◊P), the "□" being justified by the nature of the reasoning that got us the

equivalence: it's not the sort that could fail in some possible world. Thus the logic of my powers account of modality includes S4. And this, I would argue, is as it should be for absolute possibility.

If S4 and B both hold for a modality, its logic includes S5. POSS cashes out the B axiom $P \rightarrow \Box\Diamond P$ (i.e. $P \rightarrow \neg\Diamond\neg\Diamond P$) as

> $P \rightarrow \neg$(It is or was the case that or there is or was a power chain from some point in actuality to its being the case that $\neg$(it is or was the case that or there is or was a power chain from some point in actuality to its being the case that P)).

This is equivalent to

> $P \rightarrow$
>
> 5. $\neg$(It is the case that $\neg$(it is or was the case that or there is or was a power chain from some point in actuality to its being the case that P)), and
>
> 6. $\neg$(It was the case that $\neg$(it is or was the case that or there is or was a power chain from some point in actuality to its being the case that P)), and
>
> 7. $\neg$(there is a power chain from some point in actuality to its being the case that $\neg$(it is or was the case that or there is or was a power chain from some point in actuality to its being the case that P)), and
>
> 8. $\neg$(there was a power chain from some point in actuality to its being the case that $\neg$(it is or was the case that or there is or was a power chain from some point in actuality to its being the case that P)).

(5) is just the definiens of POSS. So $<P \rightarrow$ (5)$>$ is just $< P \rightarrow \Diamond P>$, and so is true. (6) is equivalent to

> 6*. $\neg$(was)($\neg$P and $\neg$(was)P and $\neg$(chain)P and $\neg$(was)(chain)P)).

We're asking what P implies. Necessarily, if P at a first instant of time or timelessly, nothing after the "was" operator then was true. Thus at a first instant of time or timelessly, P $\rightarrow$ (6*), and so (6). Necessarily, if P at any time but a first instant, it wasn't impossible beforehand that P. But given POSS, that is just what (6) says. So at any time but a first instant, P $\rightarrow$ (6). If P $\rightarrow$ (6) timelessly, or at a first instant, or at a non-first instant, then P $\rightarrow$ (6) simpliciter. Given POSS, (7) asserts that there is no power chain to <$\neg\Diamond$P>. If there is not, then given POSS, either actually $\neg\Diamond$P or it is not possible that $\neg\Diamond$P. But if P, it is not the case that actually $\neg\Diamond$P. So given POSS and (7), it comes out true that P$\rightarrow\Box\Diamond$P. (8) is just the past-tensed version of (7). So via (5)-(8), given POSS, the B axiom turns out true. Thus POSS also validates B. Thus on POSS, absolute modality has an S5 logic, as right-thinking minds expect.

POSS neatly generates a definition of necessity. As $\Box$P =df. $\neg\Diamond\neg$P, given POSS, $\Box$P =df. it is not and was not the case that $\neg$P and there neither is nor was a power chain from some point in actuality to its being the case that $\neg$P. Or, simplifying, $\Box$P =df. It has always been the case that P and it has always been the case that there is no power chain to have it the case that $\neg$P, and so

> NEC. necessarily P =df. Always(P and there is no power chain to have it the case that $\neg$P).[21]

It should be clear that if there never was and is not a power chain, there never will be. For if there could be, it would be in a possible future, and so a future made possible by prior powers. So it would continue a present or past power chain, and so there would be a past or present power chain to $\neg$P. Note finally how NEC works if iterated. On my account, that $\Box\Box$P tells us that

Always(always(P and there is no power chain to have it the case that ¬P)) and always there is no power chain to have it the case that ¬(always(P and there is no power chain to have it the case that ¬P)).

This makes good sense, so my account makes good sense of iterated modalities. NEC catches all truths of mathematics and logic and whatever essentialist truths there are. I shortly ask whether it catches too much: this is one of three problems I now raise for my view.

Too much causation?

Some think that if powers ground possibility, it follows that every state of affairs has a cause, a thing there are many reasons to doubt, or that states of affairs made possible by powers must have a cause: thus David Yates says that "The powers that metaphysically explain <p>'s possible truth would causally explain <p>'s truth if combined in the appropriate way" (Yates (2015), 416). But my view allows states of affairs with no cause. For nothing in it requires that anything possible simply because it is actual is caused. Again, powers establish possibility, on my view, but they might establish precisely the possibility that something occur without cause. Perhaps the powers that ground the laws of quantum theory do just that. Suppose that quantum powers make it possible that some event occur uncaused. If that event occurs, it still continues a power chain- it is one thing those powers make possible.

Negative states of affairs

Jennifer Wang has recently asked what on my sort of approach accounts for the possibility of negative states of affairs (Wang (2015), 460-4. If a glass is placed stably on a surface, it will not break. What grounds the possibility that it not break? I'd say that glass' structure gives it the power to resist deformation or shattering, to retain its integrity. To resist and retain just is or implies not breaking. Sometimes there just are

powers to bring about something negative. But Wang focuses particularly on possibilities of contingent objects' non-existence. So let's ask how it is possible that the glass not exist.

Ordinary glasses can fail to exist at least because things can destroy them and had powers and chances to prevent their making, e.g. by interfering with the causal chains that in fact led to them. Now consider an extraordinary glass: it is indestructible and pops into being right now ex nihilo without cause, so that there is no causal chain to interfere with. Still, things can prevent its existence: they have the power and chance to fill all places it might pop up, or enough places that not all of it can pop up and so it does not. They can literally crowd it out of the universe. Theists will note that God could effect this even if we could not, and could also effect it more directly with a "thou shalt not."

A harder story: the indestructible glass existed at the universe's first instant. Then there are a number of cases to consider. It either was or was not caused to exist. If it was, the cause(s) either could or could not have been blocked from producing the glass. If it (they) could, the powers and chance to do so may or may not be available. Dealing with the caused option first, the cases are

9. its cause cannot be blocked.

10. its cause can be blocked and there are power and chance to block it.

11. its cause can be blocked and there is a chance for this, but no active power to do it.

12. its cause can be blocked and there is an active power to do it, but no chance.

(9) first: only God or a prior universe that deterministically causes the glass to exist could be unblockable. God could have refrained from making the glass. So if it's God, possibly the glass does not exist then. If a supposedly prior universe can deterministically cause

the glass, it is not really a distinct universe. To be distinct, universes must be causally insulated from one another. So the prior-universe story denies our supposition that the glass existed at a universe's first instant. So on (9), only God is a candidate cause, and with Him, possibly the glass does not exist then. On (10), per POSS, possibly the glass does not exist then. (11) brings us to the notion of a passive power.

Aristotelians spoke of passive powers, liabilities to be affected in certain ways. I can be impressed by your fluency in Dutch. A glass of water can't. Ice can be melted. Water vapour can't. These differences are something about these things- their passive powers. In (11), the cause and/or the process leading from cause to effect have the passive power to be blocked. There is also a chance for this to come into play: nothing prevents there being a cause able to block the causation, or actually interfering with it. A passive power and a chance suffice for a possibility just as an active power and a chance do: POSS did not distinguish between them, and it need not have done so. So on (11), per POSS and by way of passive powers, we have a possibility of non-existence. Finally, (12) is not actually an option, at least on the simplified account of possibility POSS represents and the simple description of the situation (12) gives. If there is no chance for the power to block the cause, it is not the case that the cause can be blocked. There is no chance for the passive power to come into play. It only could have been blocked: had there been chance to do so. On the full account POSS simplifies, either this result would be borne out or we would get a possibility of non-existence in the end, if (say) there were some power with a chance to produce a chance at an appropriate place in an expanded description of the situation.

(9)-(12) are the alternatives generated by supposing that the glass was caused to exist. Now suppose that the glass was not caused to exist. Even so, the glass has by nature the passive power to be just shattered, just barely separated into shards, i.e. to be responding a certain way to an impact. Since it has this power by nature, it has it at the

first instant. It also has then the chance to be just shattered: nothing about the glass or its circumstances prevents there then being a rock shattering the glass. You may think it takes an actual rock (or the like) in the vicinity for the glass to have the chance. But even if this is correct, the glass has the chance to have the chance- nothing prevents the rock. What has a chance at a chance that P has a chance that P. A glass that is just-shattered does not exist. Only its parts do. So the glass' passive power and opportunity give us the possibility that it not exist.

Of course, this depends on the glass' being composite. For a last, hardest case, consider a causeless, indestructible physical simple that appears uncaused at a universe's first instant. Now nothing physical is necessarily not caused to exist. So just qua physical, it has the passive power to depend on a cause for its existence and have a chance to do so. This gives us that the simple could have depended on a cause. It could have depended on a cause at a first instant of time only if it could have had a cause that acted at the time of its effect. But I think a temporal cause can do so. Consider Kant's ball depressing a cushion. The ball and cushion could have been there at time's first instant, the ball then depressing the cushion. This would have to be a case of simultaneous causation: the cushion depressed then because the ball is pressing it then. This seems perfectly possible. If that's right, our first-instant simple could have then depended on a cause. Perhaps if it did not actually have a cause then, it was then too late for it to have had a cause, and so it has no chance to depend on a cause then. But still it has the passive power, and so it could have then depended on a simultaneous cause.

Even simultaneous causes can be interfered with. For instance, something could keep Kant's ball from causing the depression. At time's first instant, there could have been the ball, the cushion, and Dr. Doom's deadly Freeze-Ray freezing the cushion, preventing its being depressed. So here's the story about the simple: because it has its passive power, it could have depended on a simultaneous cause of its existence. Any cause it could have

had could have been interfered with, unless it's God, who would have the free choice not to make the simple. So if the simple could have depended on a cause, it could have depended on a cause that need not have produced it. Had it so depended and the cause not produced it, the simple would not have existed. This is one way things could have gone: that the simple appear in dependence on a cause that could have failed to produce it, and so appear with a possibility of not existing. What could have occurred is possible. So the simple's passive power grounds the possible possibility that it not exist. But as we've seen, on POSS, any possible possibility is possible. So on POSS, we in the end get a possibility that the simple not exist.

Too much necessity?

A last objection might be that NEC generates too much necessity if time had a first instant. For consider whatever exists or occurs then. NEC tells us that necessarily P iff it is not and was not the case that $\neg$P and there neither is nor was a power chain from some point in actuality to its being the case that $\neg$P. This holds for any P true at a first instant if there is no simultaneous causation. But surely there could be contingency at a first instant. My short answer is: simultaneous causation is possible, and so many P true at a first instant may involve a passive power in something that generates a possibility to have things otherwise. Those P that do not will be genuinely necessary, not forced into necessity by location at a first instant.

Selling points

The theory I've sketched has virtues. It is realist: what powers there are is independent of human thought and convention. It is ontologically lean: it requires only concrete things. It also de-mystifies necessity, for the impossible is just what never obtains and never has a power (-chain) to produce it. Finally, it offers an account of our access to possibility. On conventionalism, it is our access to our linguistic powers; on conceptualism it is our access to our conceiving powers; on a general power theory it is

our access to all powers, which is satisfyingly empirical, though it offers the same role to thought-experiment, conception etc. that science and common sense do. And as noted above, on my approach, our access to necessity may be through our access to possibility.

Finally, modal metaphysicians need to provide for the possibility of particular things- particularly those that never or at least do not yet exist. Prior and those he influenced argue that this cannot be had (Prior 2003, Menzel 1991, Hughes 1998, Miller 1992). Plantinga and many actualists provide it at the cost of positing purely qualitative haecceities, a sort of attribute most others find mysterious. Possibilists provide this by singular possibilia, Williamson by singular non-concreta: a similar expansion of the ontology, and also (I'd argue) a descent into mystery. Power theories need no posits at all, for some powers just are powers to produce particular things. Consider a simple stool, made of a plank and four wooden dowels for legs. All it takes to have that stool is to combine those parts in the right way. So a carpenter and those parts jointly have the power to produce that particular stool, even if the carpenter never comes near the parts. Their powers just are powers inter alia to produce that particular stool, and so they ground its singular possibility. If those powers would produce a singular, they provide a singular possibility: period. We get singular possibility for free. Again, on the night of my conception, a different sperm had the power and chance to fertilize the egg, yielding a different baby, George. That's all we need for the singular possibility of George: the powers of the egg and the sperm. Neither sperm nor egg has on its own a special George-directed power, but in fact, the egg has part of what would be George's genetic code, the sperm has the rest, and so if those two combine, we get a zygote which will if things go well grow into George. If George is just an animal, all we need to get George is that zygote- and so sperm and egg together have jointly a power to produce a particular human, George. If God must create and infuse a human soul to complete George, He can add that, and if He is needed, then it is He, the sperm and the egg that jointly have the proximate George-producing power.[22] If all God need add is a generic human soul, there

is no problem about His having the power to produce that. If it needs to be a special George-soul, then again, if He can produce souls, I don't see why He couldn't produce that one. Prior et al. might claim that all He has is the power to produce some soul or other, not any particular soul- that His producing George's soul is just some sort of cosmic accident, by which George just "happens" when He wills to instance the generic concept of a soul, or perhaps of a George-soul. I show elsewhere that this is not so (Leftow (2012), ch. 16). Thus on the natural level, we get singular possibility, even of things that never exist, as a natural by-product of the view. Singularity is there, and explained, and obtained without any ontological cost. If we bring in the supernatural, I show elsewhere, we also get an explanation of singularity with no posit beyond God (Leftow (2012), ch. 16).

The extension problem

There is however a fly in the ointment: my view is in tension with naturalism. (For present purposes we need only define naturalism roughly, as the thesis that everything is part of nature.) Some "powers" theories are naturalist: they limit themselves to powers of ordinary natural concreta (e.g. Borghini and Williams 2015). They face a problem of extension. Consider the possibility of alternate natural laws. If ours is the only universe and there are only ordinary natural concreta, it has never been the case that $E = MC^3$ and there has never been nor is a power chain reaching it. There has never been anything able to bring it about that $E = MC^3$, bring about anything able to bring it about, etc. For as I now argue, ordinary natural concreta do not have hidden powers to change the laws or to have had the laws everlastingly differ. If they do not, then on naturalism and NEC, it comes out absolutely necessary that $E = MC^2$. But intuitively, this is absolutely contingent.

Ordinary natural concreta do not have hidden powers to change the laws. On Humean views, changing the laws comes close to conceptual impossibility. Suppose as Humeans

think, law-statements record mere exceptionless regularities, or are appropriate generalizations in all best systems of appropriate axioms. Then it's not settled what the laws are till all the particular facts are in. So the facts determining the one set of laws there ever is will include those supposed to have "changed" them. Due just to what Humean laws are, the most ordinary concreta might ever do is falsify what had seemed till then a candidate for Humean lawhood. Again, to change a Humean law would be to violate the law as it is: the law at t would dictate that concreta do A, and instead they would do something else, thereby making the laws differ from what they had been. Violating a law is generally thought to suffice to do a miracle, and ordinary natural concreta can't manage that. Now let's consider non-Humean accounts. Nominalism is compatible with non-Humean laws if one can nominalize power-talk: the Armstrong-Tooley relations-between-universals view becomes for me one about necessary connections between powers, with the power-talk nominalized. Ordinary concreta can't affect necessary connections; if they could, the connections would not be necessary. For nominalists, there are only particulars to worry about in thinking about laws. If we took laws as relations between universals, as in Armstrong-Tooley, it would be even clearer that concreta can't change the laws: how could they change law-making relations between universals?

One might wonder whether instead, ordinary natural concreta might have hidden powers to have had the laws everlastingly differ. If they did, the story would be this: they have always acted as (say) GTR states. But this is because they've only used certain of their powers. They have other powers too. Had they always used those instead, Einstein would have been wrong: the world would have been (say) Newtonian. Now the least one can say about this, trivially, is that one will never have good reason to believe in such powers, since it is part of the story that they never manifest. But there is more. Law-statements report counterfactuals. If L is a law, then things would act as L dictates were conditions different. How different? Well, if there are any restrictions on this, then

L is a law just in certain circumstances- and that sentence seems to violate our idea of what a law should be. So it seems rather that if L is a law, then were there things of the sort L governs, they would act as L dictates, however conditions varied. If so, then supposed hidden powers to have the laws have been different could not have manifested under any conditions in which actually L-governed particulars exist. But there are no powers that cannot manifest.

So on NEC it should be impossible that $E = MC^3$. Yet it seems possible that $E = MC^3$.[23] Intuitively, there could have been laws there are not. Now a naturalist might think to deal with this by adding more natural concreta. If ours is one universe within a multiverse, perhaps elsewhere in it $E = MC^3$, and so on for all possible variations of all possible laws. But to posit all universes needed to actualize all possible laws would give up, rather than provide ontology for, the claim that there are unrealized absolutely possible laws. It would also give up the claim that these laws are possible because there are powers able to bring them into effect. These laws would be possible simply because actual.

Further, there are endless events that could occur only under different laws- e.g. my now leaping ten feet off the surface of the earth unaided. The modal evidence that these could occur is about as good as that for the possibility of the laws themselves. There is no principled reason to care only about ontology for alternate laws. We also need ontology for these particular possible events. Here again, other universes would give up the "powers" approach to these possibilities. Further, they get us the claim that I could have jumped only if we adopt counterpart theory, and they get us the full intuitive range of absolute possibility only if we move to Lewis' full modal ontology. Once we do that, though, there is no work left for powers to do in modal ontology. So positing other natural universes simply is not a way to deal with the extension problem within the framework of a powers theory.

Thus conjoining naturalism with a "powers" theory forces us to restrict the realm of possibility. If we do, we must reject many or most deliverances of our standard ways of assessing absolute possibility. If we do that, we must view our ordinary ways to settle modal belief as fairly unreliable. This is undesirable. Looking at this another way, conjoining naturalism with a "powers" theory delivers a host of unintuitive absolute necessities. It's obvious that absolute-necessarily not 2+2=5. If we conjoin naturalism and a powers theory, it's absolutely necessary that I do not jump ten feet off the surface of the earth unaided. Really? Is it really as impossible as that?

Naturalist powers theorists have so far without exception simply bitten the bullet here; they say that "modality, qua grounded in powers, is not accessible to a priori reflection… If you want to know whether something is possible, ask a scientist" (Yates (2015), 412). But perhaps bullet-biting is not really the right move. One cannot have naturalism, a powers theory and the full intuitive extension of absolute possibility. We got to a powers theory via the Caution Principle (which enjoined a Concretist starting-point) and realism about absolute possibility. So really, we have an inconsistent quartet: we cannot have maximum Caution, realism about absolute possibility, the full intuitive extension of absolute possibility and naturalism. So: what do we drop?

I think three of these things have a presumption in their favor. As noted above, the Caution Principle borders on being rationally required; it is hard to object to keeping one's beliefs as well-justified overall as one can. Caution generates a presumption in favour of theories that do not move beyond common-sense and scientific ontology. Thus it makes Concretism the default ontology, the one with a presumption in its favour.

Again, the full intuitive extension of possibility is, well, intuitive. Quine's maxim of minimum mutilation is also sound philosophy, and tells us to seek reflective equilibrium among our relevant intuitions that preserves as many of them as possible. This creates an automatic preference among otherwise-equal theories for those that preserve more

and/or the stronger of the relevant intuitions ("saving the appearances"). Thus there is a presumption in modal metaphysics in favour of views that preserve the full ordinary extension. Further, if untutored intuition tells us that a given domain's facts are mind-independent, and there is a presumption in favour of the intuitive, then realism about that domain also acquires a presumption in its favour. We do have those intuitions about absolute possibility. Thus realism here is automatically preferred. The question, then, is whether anything creates a presumption in favour of naturalism. If nothing does, then, the presumption is that in the contest between Caution, realism about modality, the full intuitive extension and naturalism, naturalism loses.

Some would contend that naturalism has a presumption in its favour on Caution grounds: it makes do with only natural entities, rather than anything non-natural. But Caution tells us to go beyond the ordinary only when the pressure of work to be done forces it, not to never go beyond the ordinary. The maxim of minimum mutilation tells us that giving up too much in the way of intuition may create just that necessity. So I don't think that Caution can tell in favour of naturalism here, for it is just not clear that there is no need for another entity. If it does not, nothing else creates a presumption in naturalism's favour either. Presumption, then, says that naturalism is the one to drop. Perhaps further argument could overcome this presumption- presumptions are defeasible. But we need to see the argument. In this wrangle, it's the naturalist who has the burden of proof.

To preserve the full intuitive extension within the framework of a powers theory, we need more powers. Further, those powers have to be enough to undergird the full intuitive extension, and so have to approximate the traditional range of omnipotence. For reasons given earlier, these powers are not there in beings within nature. So they must be sited either in nature as a whole- the universe- or in a being or being(s) which is (are) not part of nature. But it is not plausible that the universe as a whole manages to

be omnipotent when all its parts together are so much less: for plausibly the universe just is all its parts together. Further, if the universe were omnipotent, then natural laws would not even be physically necessary, since physical nature would have the power to abrogate or change them. So we should place these powers outside nature. Further, to maximize parsimony, we should site them all in one being- and of course "reduce" the power talk to talk about that being. Thus the best powers theory, I submit, will add one omnipotent non-natural concrete thing to its ontology. This is (I submit) the most Cautious move we can make. The powers are of the same kind as ordinary powers- there are just a lot more of them- and their subject is a concrete existing particular.

This seems to me a reasonable price to preserve a host of intuitions, the reliability of our ordinary a priori methods of settling modal beliefs and a promising approach to modal metaphysics. Getting you to agree with that, though, is a task for another day; if you are a naturalist, you may think that I have given you the beginnings of an argument that can overcome the presumption (in this context) against naturalism. Here I have simply sketched an initially attractive view and made its price-tag clear.[2425]

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[1] This may not be right for other kinds of necessity. Deontic necessity is obligation, and that might be more plausibly primitive than permission. Again, what is epistemically necessary is what is known, and what is epistemically possible is what is not ruled out by what is known, so here the necessary clearly is prior. So going possibility-first in metaphysical modality treats it as fundamentally different from epistemic and deontic modality. Well, fine: to me, it's fairly obvious that it is.

[2] My thanks to Anna Marmodoro and Martin Pickup for raising this.

[3] When "<" and ">" enclose a sentence, the whole including the brackets is a name of the proposition the sentence expresses.

[4] I owe this point to Martin Pickup.

[5] You may wonder how I can treat the move to this negative existential as purely verbal if I assign its logical form metaphysical significance. The rather bald answer is that sometimes, purely verbal moves suffice to uncover the real logical form of a statement or what is metaphysically significant in it.

[6] This places a premium, of course, on saying which truths really are negative existentials. Some things that don't look like negative existentials might "really" be ones: e.g. that there is a vacuum in the room or that all swans are white. And some things that look like negative existentials might in a sense not really be ones: if I say that there are no prime numbers between 3 and 5, that looks like a negative existential, but if I don't believe in numbers to begin with, I certainly don't understand this as true in virtue of some real lack that contrasts with the real presence of some other things. This is a "surface" negative existential, but not a deep one, in the sense that it doesn't require a real lack for its truth. All I can to here is acknowledge the issue. I'm inclined to say that whatever looks like a negative existential and is not relegated to merely surface status by broader philosophical commitments really is one. That's a start, at least.

[7] If there are powers that act probabilistically, as perhaps those in the quantum realm do, we must add a clause: for these, it might be, in appropriate etc., it is n probable that it bring it about that P. From here on, take this addition as read where appropriate.

[8] "Enable to occur" allows for cases where powers make it possible that things occur uncaused.

[9] For discussion of alternate "power" approaches based on counterfactuals rather than possibilities, see Vetter 2011.

[10] I owe this term to Jonathan Jacobs.

[11] My thanks to Amy Seymour for pushing me on what follows.

[12] Barbara Vetter emphasizes this in her (2015).

[13] Does Newtonian space have what I soon call passive powers, e.g. the power to be moved through? I'm unsure, and so do not speak of it as having no power simpliciter. But one can't reduce opportunities to passive powers either. In the God and singularity cases, nothing has a cooperating or cooperative passive power.

[14] Understand by this both anything they would cause and any uncaused event whose possibility they would account for.

[15] Or simply existing, in the case of uncaused events it enables.

[16] For this move see Hume (1980), part IX.

[17] In discussion, Timothy Williamson has suggested smoothing this out by treating "actually P" as "there is a 0-length power chain to P" or perhaps "there is a degenerate power chain to P." This would amount to treating being actually P, for all P, as the effect of a simultaneous-effect power to be such that P. One certainly could do this, and it would make my ensuing argument about S5 simpler. But I just don't see an intuitive case that there really are all the powers making this move universal would require.

[18] Leftow (2012), 352-3.

[19] I simply appeal to intuition to justify these clauses; the weakest objective possibilities shouldn't be lost with time. Whatever has this status even for an instant is surely the sort of thing that can happen, and being that sort of thing should suffice for some sort of possibility by itself. Absolute possibility is the concept some express by "broadly logical possibility." Broad logical possibility descends from an earlier use of "logical possibility," back in the days when people though that whatever did not imply a contradiction had the weakest objective possibility. If a proposition does not imply a contradiction, that is a fact about its content that cannot alter over time. The factors that led to the distinction between broad and narrow logical possibility were just independent of whether possibility alters over time. So I suggest that the successor notion, absolute possibility, should preserve the feature of not being lost over time. The was-clauses raise the issue of what makes them true if presentism is correct, particularly on Concretism. It's a good question- many presentist approaches to past truth are Platonist. And as I am a presentist, ultimately I cannot dodge it. But I cannot address it here.

[20] Even if time-travel is possible, there are no locally past-directed powers, and that's what counts here.

[21] I gave the definition POSS simplifies in Leftow 2012, and NEC is clearly at work in its latter chapters. But I did not there explicitly state it, and I owe the thought of doing so to Yates (2015), 419. I note also that one reason for the first clause in my definition was that I had seen in the book the sort of problem Yates raises at pp. 415-6.

[22] God has made the sperm and egg, so the ultimate George-producing power is entirely His. If God exists, the sperm and egg are just His tools.

[23] Those who think Einstein's law expresses the nature of light can read this as: it's possible that there be schmight, not light, playing the light-role in some universe.

[24] Leftow 2012 argued a theist theory of modality. I have not done that here; I have argued only that if we want the full intuitive extension, we must give up naturalism and allow something omnipotent. I have said nothing about what else that being might be like- in particular, whether it has other divine attributes. So I haven't argued a theist theory of modality. The full-extension argument cannot recommend a theist theory. For as I argue in the book, if God necessarily exists and necessarily is omnipotent, omniscient and morally perfect, there are no possibilities too bad for God to allow to be actual- and yet these are also part of the intuitive extension of possibility. So it's natural to wonder how my argument here relates to my arguments and position there. (My thanks to Tim O'Connor for raising this.) I reply that if neither theist nor naturalist can get the full intuitive extension, both should strive to get as near it as they can, and while neither can make it, the theist gets closer. The theist gives up less than the naturalist does. Compare the states of affairs omnipotence might be able to actualize and those purely natural power chains can reach. Plausibly, some in the range of omnipotence are better than any that purely natural power chains can reach and some are worse. Both theist and naturalist power theorists believe in the possibility of things natural powers can reach. Naturalists must deny the possibility of both those better and those worse than these. Theists must deny only some of the worse.

[25] My thanks to Timothy O'Connor and the audience at the Henle Conference for their very helpful questions and comments.