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## Potentialities

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### ACTUALIZED AND UNACTUALIZED DISPOSITIONS

Nomological necessity and physical possibility vary inversely. As Necessitarians narrow their class of nomologicals, allowing that only some contingent universal truths are physical laws, their class of physical possibilities must thereby increase. The Necessitarian, thus, is committed to more existential statements being physically possible than is the Regularist. In what might the truth-conditions of such unactualized possibilities be grounded?

One idea worth exploring is that of grounding these unactualized possibilities in the dispositions of actual items in the world. Various examples Necessitarians have cited in advancing their theory (see, e.g., Pap 1962, pp. 273–306, and Madden 1969) have suggested that there is an intimate connection between nomicity, warrant for counterfactuals, and dispositions<sup>1</sup> of things in the world. For example, a standard warrant for the counterfactual conditional “This undissolved lump of salt would dissolve if placed in water” is that this tacit physical possibility arises from salt’s *disposition* to dissolve when placed in water. Suppose we were to extend the state-description model (see Chapter 7) by allowing the singular statements that comprise a state-description to include reference to dispositional properties (e.g., is soluble) as well as to manifest ones (e.g., has dissolved).<sup>2</sup> Could the unactualized physical possibilities of the Necessitarian be grounded in such an augmented factual base?

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<sup>1</sup> Alternative nomenclature includes “capacities,” “abilities,” “powers,” and “potentialities.” Stochastic dispositions are called “propensities” (more on this in Chapter 12).

<sup>2</sup> How, precisely, state-descriptions might be modified to accommodate dispositional properties is relatively unimportant for present purposes. Our first order of business must be to examine whether Necessitarians, by invoking dispositions, can ground their attributions of unactualized physical possibilities.

(For an early attempt to incorporate dispositional properties into an extensionalist language and hence into a state-description model, see Carnap 1953.)

Let us see how this might be thought to work. The New York mansion of Cornelius Vanderbilt II, built in 1880 and enlarged in 1894, was demolished in 1927. Suppose that a crazed anticapitalist had tried to set fire to the landmark in 1918. Obviously, the fire did not catch. Suppose, too, that this was that house's only near-conflagration. On the Regularist's account, as we have seen, it would logically follow from these facts that it was physically impossible that the house (given a unique description of it in purely descriptive terms) should be consumed by fire. But the Necessitarian objects, and he wants to insist that, in spite of the failure of the attempt, the torching of the house was nonetheless physically possible.

In the view now being explored, the Necessitarian will ground the physical possibility of the building's burning not in its actual burning but in its disposition to burn in this world.<sup>3</sup> According, now, to the Necessitarian Theory being assayed, even if the building were never to burn, it was nonetheless physically possible that it should have, and this for the reason that the building was *flammable*. Allow "is flammable" as one of the predicates figuring in a state-description along with "burns," and one has, it would seem, the means to prevent "It is physically impossible that *x* burns" being necessitated by "Nothing burns" or by "Item *x* never burns."

The discomfort some philosophers have felt with postulating dispositional properties is at least as old as the debate about physical laws themselves. Dispositional properties seem mysterious and hidden, and hence suspect. Indeed, many philosophers who have thought little about the wider debate between Regularity and Necessity have been puzzled about dispositions.

According to the Regularity account, whatever dispositions the Regularist is inclined to attribute to things, he does so on the basis of things of that sort actually exhibiting, at some time

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<sup>3</sup> It is trivially simple to explicate potentiality in terms of physical laws. E.g.:

"disposition to burn (in the actual world)" =<sub>df</sub>

"incineration in some possible world having the same physical laws as the actual world"

But what the Necessitarian is after, recall, is to pull the trick off the other way around: The particular Necessitarian program being examined in this chapter requires that physical laws have their truth-conditions grounded in potentialities. It is the potentialities that are being assumed – for the moment – to be logically or ontologically basic, and the physical laws derivative or dependent.

or other, the actualization of the disposition, or on the basis of that very thing itself having exhibited the realization of the disposition. “This ruler on my desk now is flammable” is true (i) because this ruler happens to be made of wood, and (ii) because wood is the sort of stuff that burns; that is, there are instances of wood that has burned, is now burning, or will burn. In short, because wood’s burning when held to a flame is a *regular* feature of this world, the Regularist is prepared to allow that wood may be said to have the dispositional property of flammability. Similarly, because her tape recorder has exhibited a certain kind of behavior in the past, a Regularist would have no difficulty in saying of it, “This tape recorder would seize up if it were left running for more than two hours.”

But the account we are to give of the dispositional properties of particular items (razed mansions, tape recorders, etc.) and of natural kinds (“wood burns,” “copper melts at 1083.4° C”) is not the principal issue here. The question we have to keep in mind is whether by invoking dispositions, Necessitarians can provide the truth-conditions for all those propositions that they regard as being physically possible although drawn from among the class of timelessly false existential propositions.

Although invoking dispositions does seem to allow attributing physical possibility to some of the propositions that the Necessitarian wants to be so imbued, introducing dispositions will not readily capture all of the class of nominated possibilities. The recalcitrant cases range from those in which the attribution of the relevant disposition is ‘out of character’ to those cases in which there does not seem to be any candidate whatsoever to bear the disposition.

Certain examples, particularly those attributing potentialities to *specific* items, would be, admittedly, plausible cases in the Necessitarian’s armor. It is certainly plausible to attribute the physical possibility of burning to the Vanderbilt mansion and the physical possibility of conducting electricity to the Cellini saltcellar. But even among this class of specifically identified individuals, there are problem cases. In his adult years, as legend has it, Churchill was hardly temperate in his consumption of distilled beverages. One presumes, however, that it is in the spirit (!) of the Necessitarian approach to claim that it was nonetheless physically possible that the prime minister should have been more abstemious. That is, we may presume that the Necessitarian will want to argue that a person’s refraining from drinking brandy is not

inconsistent with any physical law. In the proposed account, this means that we should want to attribute to Churchill a disposition or potentiality for temperance. Does it matter that this attribution is entirely out of character? Similarly, it is, one supposes, in the Necessitarian view, physically possible (even if unlikely and hardly to be expected) that Cesare Borgia should have been a saint rather than a cardinal. Did Borgia have a disposition toward saintliness? By all accounts, that was pretty unlikely.<sup>4</sup>

This is only the beginning of difficulties. The theory becomes increasingly problematic when we turn to examples of *indefinite* attribution.

Back in the days before Roger Bannister became the first person in history to run a mile in less than four minutes, persons used to wonder whether it was physically possible for a human being to accomplish such a feat. The question was answered definitively on May 6, 1954, at a track meet in Oxford. If one is going to plump for potentialities, then Bannister clearly had the potential to run a four-minute mile (as did Landy and a great many other athletes, it now turns out).

Given this history, it is easy to ground the claim “It is physically possible to run a mile in less than four minutes” in potentialities. Bannister had such a potential, as did Landy. For it to have been true, let us say in 1950, that it is physically possible to run a mile in less than four minutes, it was sufficient that someone or other should have the potential to accomplish the feat, and that was *true*: Bannister (as evidenced by his subsequent success) had that very potential.

But what if Bannister, and everybody else, had failed to run the mile in less than four minutes? Suppose the world had come to an end on May 3, 1954, three days before Bannister became the first person to run the four-minute mile. Well, there is a *prima facie* plausibility in attributing to him the potential anyway: After all, he was getting pretty close to that speed in his latest track meets. He certainly looked at the end of April as if he might very well some day soon break the four-minute barrier.

But the Necessitarian position cannot make do solely with cases of success and near success. So long as one is going to argue that physical possibilities are grounded in potentialities, rather than solely in actualities, there will have to be *some* cases where the feat in question is physically

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<sup>4</sup> Perhaps we should contemplate introducing grades of potentiality, from bare capacity to strong proclivity. But we will not pause over this question. Whatever its resolution, greater problems are in store below.

possible and yet no attempt at realizing it even comes close. Indeed, there will have to be some cases in which the feat is physically possible and is not even attempted. No Necessitarian can argue that physical possibility is restricted just to actualities or to failures-that-are-very-close-to-successes. The general point is that mere failure – even repeated, habitual, unrelieved, indeed eternal failure – must not by itself constitute logically adequate grounds for physical impossibility. So even if one is going to allow potentialities in the case of success, and even – reluctantly perhaps – in cases of near success,<sup>5</sup> there will still remain the problem of locating potentialities in cases where nothing comes close to success.

To clarify the latter problem, let's change our present example slightly. Suppose, as before, that the world is at an end, but this time the year is A.D. 4059. Again, the four-minute barrier remains unconquered. But this time suppose that Bannister's lifetime best performance had been only 6 min., 31.89 sec. And suppose further that the best anyone ever managed had been 5 min., 42.33 sec. Had that been the case, where then should we want to locate the potential for running a four-minute mile? In every human being? A very implausible suggestion. *I* certainly do not have that potential. (And it is safe to assume that the vast majority of readers of this book do not either.) Well, how about locating the potential in the world's very best runners, in Bannister, Landy, etc.? This is more plausible, but only minimally so. After all, they all tried the feat, many repeatedly for years, but not one of them – as we are now telling the tale – came close.

Nonetheless, the Necessitarian *must* say that running a four-minute mile under the circumstances latterly described is physically possible. Remember, we are talking about *this* world, and in this world, the feat *is* possible: It's been done (and from this it follows that, even if it hadn't been done, it could have been.) But according to Necessitarians, it was an accident that Bannister should have been the one to do it; even more to the point, it must be considered an accident that anyone did it.<sup>6</sup> In other words, according to Necessitarians, what is physically possible in this world doesn't depend on the accidental singular facts (antecedent conditions) of

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<sup>5</sup> But do recall the Regularist's two-part reply on pages 75–6.

<sup>6</sup> We may say that it is an accident because – according to Necessitarianism – there will be other possible worlds having the same physical laws as this world, but in which no one runs a mile in less than four minutes. As a matter of note, in some of these worlds that have the identical physical laws, there aren't even any persons.

this world (recall the quotation from Popper in Chapter 5, footnote 7). But if none of us were athletic, or – to take an even more extreme case – if none of us had existed in this world, where then should we locate the potential for running a four-minute mile?

Need there be a determinate (even if unknowable) answer to this question? Might we not just attribute the potential to some individual without being committed to its being a property of anyone in particular? For example:

“It is physically possible that someone win the Nobel Prize and the Miss America Pageant.” Who? Anyone with Einstein’s genius and Bo Derek’s sex appeal.<sup>7</sup>

But against this, consider this case. Suppose I were being given a tour of an anthropological museum by the curator and we stopped in front of one display containing a handsome basket woven in the style of the Salish Indians. I ask the curator, “Who wove that basket?,” and she replies, “No one in particular.” Now if by “No one in particular” she means, as we often do using that expression in ordinary speech, “No one famous” or “No one you would have been likely to have heard of,” I will understand her perfectly. But if, instead, she explains that the basket was woven by somebody but that somebody was not any particular person in the history of the world, I will think she is making a joke. Of course the basket was woven by *somebody*; but that is because it was woven by some *specific* (even if totally unknown) individual.<sup>8</sup> It certainly was *not* woven by some indefinite (or general) individual. Indeed, this latter claim – that the basket was woven by someone, but by no specific person – could not possibly be true.

The *manifest* property of weaving a Salish basket is attributable to someone only if it is attributable to someone or other, that is, to *a* or *b* or *c* or ... , where *a* and *b* and *c*, etc., are actual (past, present, or future) persons. Parallel reasoning would suggest that attributing *potential* properties to someone ought to be assumed to imply that there *is* (at some time) somebody or

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<sup>7</sup> My thanks for this example to an anonymous reviewer for Cambridge University Press.

<sup>8</sup> We may put the point perspicuously this way: The *existential* (general) proposition “Someone wove the basket” is true just in case some *singular* (nongeneral) proposition (of the form) “Person *a* wove the basket” is true, and it is false otherwise.

other who in fact actually has that potential property. If not, then if we are to persist with the hypothesis that physical possibilities are to be grounded in the potentialities of actual items, we would have to believe that we need not have our potential properties actually, but may have them potentially. Now although I have no definitive argument that we do not, it would seem that a theory that postulates our having potential properties potentially rather than actually has forfeited any claim it might have had initially to being grounded in common sense or to capturing our prephilosophical intuitions. Do I *actually* have the potential to run a four-minute mile? As I said a moment ago, I assuredly do not. Might I, perhaps, have the *potential* of having the potential to accomplish such a feat? I do not know how to answer. I have utterly no idea what would count for, or against, an answer's being true.

Necessitarians' own examples of unactualized possibilities include, as we know, a moa's living longer than any actual moa lived and there being silver coins in your pocket even if you never have any. So long as one considers straightforward, easy examples such as these latter ones, the special problems of Necessitarianism will remain hidden. For in these cases, it is plausible to assign the physical possibilities to specific individuals: "Take the oldest moa, *it was* the one that had the potential to live to fifty. Or consider yourself: Surely you do have the potential of putting some silver coins in your pocket." But Necessitarianism cannot restrict its attributions of physical possibility merely to the mundane, or to cases of success and near success. It is the essence of that theory to insist that there will be some cases at least that are physically possible and yet remain far from having been realized, for example, as we saw suggested a moment ago, someone's receiving the double accolade of the Nobel Prize and the Miss America title, or (my example) someone's running a mile in four minutes even though the best anyone ever manages is 5 min., 42.33 sec. It is cases such as these that, I suggest, are the most troubling for any attempt that would explicate physical possibility in terms of potentiality. For in these latter cases – where there is no attempt that comes close to success, or no event or thing or person that comes close to realizing the physical possibility in question – there doesn't seem to be any reasonable candidate to bear the potentiality.

This is a serious difficulty for Necessitarianism. It means that the truth-grounds of physical laws are not exhausted by the actual (or manifest) properties of things in the world, not even when the class of properties is extended to include the dispositions of things. Physical possibility, according to this theory, must finally transcend the actual and potential properties of items in the world.

There is, however, one remaining way, which we have not yet examined, for the Necessitarian to try to ground unactualized possibilities. And that way is to ground them, not in the potentialities of these or those items in the world, but in the world itself. One Necessitarian, von Wright, says precisely this. (I don't want to suggest that considerations such as the ones we have reviewed in this chapter are what led von Wright to his particular theory, but it is illuminating to see that he does ground potentialities in the world as a whole rather than in items in the world.) He writes that  $p$  (a generic state of affairs) may be "a *potency* or *latent possibility* of the world" (1974, p. 20). Here it is the world itself that has a potential to actualize (or "materialize," in von Wright's vocabulary) an instance of some generic state.

But this latter way of grounding physical possibilities presents its own special problems. For one, it raises the immediate problem as to what we shall understand by 'the world.'

How are we to regard 'the world'? As an *abstract* object (in particular, a class or collection) whose members are the physical items of the universe, for example, subatomic particles through to galaxies? Or as a *concrete* (merological) object, a gigantic physical object whose material parts are scattered about at varying distances one from another? Either way, there are difficulties.

How can an abstract object ground *physical* possibilities? Arguably, an abstract object can have *contingent* properties, that is, properties that that object has in one possible world but not in another. Although the existence of abstract objects is necessary, some at least of their properties will vary from possible world to possible world. For example, the abstract object that is the class of planets will in some possible worlds have the property of having no members; in other possible worlds, including this one, the property of having nine members; and in still other possible worlds, the property of having eleven members. Similarly, the abstract entity, the proposition that Harvard College is located on the banks of the Charles River, has the contingent, intentional property of being believed by me. Other properties of abstract objects are, of course, essential or logically necessary ones, ones that those objects bear in all possible worlds. For example, the number nine bears the property essentially of being the positive square root of eighty-one; and the proposition that there are twelve Apostles bears its contingency of logical necessity. But none of these properties – whether contingent or necessary – of abstract objects is a

*physical* property. (This is a truism.) Whatever further properties abstract objects may have, they surely lack mass, position in space, color, temperature, valence, electrical charge, sex, dexterity, viscosity, flammability, fallibility, fear, passion, toothaches, and rhythm – to name just a few. Abstract objects are just not the right sorts of things – ontologically speaking – to ground, account for, or constitute the truth-conditions of, physical possibilities. That this world might, according to the Necessitarian’s account of physical possibility, actualize a river of Coca-Cola, a fifty-year old moa, or a four-minute miler even if there never had been rivers, Coca-Cola, moas, or persons, etc., cannot be explained or accounted for by the properties of any abstract object, whether that object is a class of few things or the class of every physical thing that exists.

We turn then to the second contemplated way to ground unactualized possibilities. To construe ‘the world’ not as an abstract entity but as a large, very large, physical (concrete) thing itself, presents quite a different set of problems, but in the end allows of no more satisfactory a solution. For if one were to try to ground unactualized physical possibilities in the physical object that is the universe itself, one would then be faced with accounting for the manner in which a thing managed to have properties that its parts apparently do not have.

Now, in general, this is not an insuperable problem. Indeed, the relationship between the physical properties of any physical thing and the physical properties of its parts is always a contingent one. Even in the case of mass, for example, one cannot blithely assume that the mass of a physical thing is just simply the scalar sum of the individual masses of its originally spatially separated parts. As a sheer contingent fact about this world, that assumption is false: The mass of a spatially connected, integral whole is often less than the scalar sum of the masses of its parts. A certain amount of the mass of the parts (the so-called mass defect) may be transformed into the energy needed to bind the parts together. And in other cases, too, wholes (e.g., tables) often have properties (color and temperature) that their parts (atoms) do not have; and the parts, in their turn, often have properties (electrical charge) that the whole does not have. Thus, in general, one need not have global concerns at the prospect of wholes having properties different from their parts. But the case at hand is special, for it advances the thesis that the universe, taken as a whole, has certain dispositional properties – for example, to actualize a fifty-year old moa, a river of Coca-Cola, or a four-minute miler – that are not to be accounted for by the properties of any of its parts.

Now if anything has been true of science's treatment, and indeed of our extrascientific conception, of dispositional properties it is that dispositional properties of things are to be accounted for in terms of, or by means of, the properties, both manifest and dispositional, of things' *parts*. If a liquid (e.g., gasoline) is flammable, this is because its molecular constituents have a disposition to unite in certain chemical bonds with oxygen; if a wine glass is fragile, this is because its molecules are not bound together in the kinds of lattice arrays typical of metals; if a person is intelligent, again it is because (we assume) her neural cells are actually configured in so and so a manner rather than in such and such a manner. Nowhere in our entire conceptual scheme is there a single case of a disposition that we would not be inclined to account for (if we only knew enough) by reference to the properties of its constituent parts.

Nowhere, that is, except in the suggestion under review that the Necessitarian's unactualized physical possibilities are ultimately to be grounded in the world itself and need not be grounded in the potentialities of any of the items in the world. In this regard, the Necessitarian's physical possibilities are *sui generis*; they are nothing like any of the familiar unactualized potentialities we daily encounter, for example, the flammability of gasoline and the solubility of salt.

But even this is hardly the end of it. In insisting that a world may have unactualized physical possibilities that are never, ever realized, we then must allow that there should be two worlds identical in all their actualities but different in their possibilities. This claim is implicit (and very near the surface) in Popper's talking of possible worlds that share the same physical laws but differ in their singular facts, their initial (i.e., antecedent) conditions. But this means that the physical possibilities are not grounded in anything, or to be accounted for by anything, that happens in those worlds. Two worlds that would be utterly indistinguishable at the empirical level would nonetheless differ in their eternally 'hidden' properties, in their potentialities. It is for this reason that I spoke in Chapter 3 of the 'Autonomy Theory of Physical Laws.' The Necessitarian account, it seems to me, must eventually maintain that the truth-conditions of physical laws are *not* grounded in the facts of the world, certainly not in anything that might conceivably be regarded as an *empirical*<sup>9</sup> fact. If two possible worlds can be identical in what

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<sup>9</sup> I.e., as something knowable through sense experience however broadly construed. Even if one had perfect extrasensory intuitions of these unactualized possibilities, one could never know – either empirically or a priori – that one's intuitions were in fact accurate and not mere fantasies.

happens in them, and yet differ in their respective physical laws, then it does seem warranted to say of their physical laws that they bear their nomicity ‘autonomously,’ that is, in a manner not to be accounted for by what happens. Actual truth is a *necessary* condition for nomicity; but not a sufficient condition. *Sufficiency* arises from something other than what happens in a world. What is nomic in a world, then, is a conceptually distinct feature from what is true in a world (although the latter is a necessary condition for the former). Nomicity implies truth, but not conversely. But if this is so, then what happens in a world cannot be thought to account for the physical laws of that world. Quite the contrary, the Necessitarian picture is – as I will endeavor to show in Chapters 10 and 11 – quite the opposite: Physical laws determine what the facts are to be in a world. What does happen as well as what *can* happen in a world, according to Necessitarianism, is ‘determined’ by the physical laws of that world. This is an exact mirror image, so to speak, of the Regularist account, which argues instead that what happens in a world is what accounts for the physical laws of that world.

#### SUMMARY

*This latest characterization, that to the Regularist, the Necessitarian appears to make the nomicity of physical laws autonomous, may appear surprising. The route to this conclusion has been lengthy. It will, perhaps, be useful to review the argument briefly, attending to its several stages.*

There are a number (an infinite number, perhaps) of true universal, material conditional statements (propositions), all of whose terms are perfectly descriptive, that is, make no reference to any particular time, place, person, or thing in the world. The Regularist is content to allow that all these true universal, material conditionals are physical laws, but the Necessitarian wishes to divide this class into two mutually exclusive and jointly exhaustive subclasses: the nomologically true and the accidentally true. The difference is to be explicated this way: The nomologically true are logically inconsistent with the physical possibility of their existential contradictories; the accidentally true are logically consistent with the physical possibility of their existential contradictories. For example, the (presumably true) universal material conditional that there is no river of Coca-Cola would – in the Necessitarian’s account – be a nomological truth

only if it were physically impossible that there be a river of Coca-Cola; but it would be a mere accidental truth if, instead, it were physically possible that there should be such a river. Thus the two problems – (i) stating truth-grounds for nomicity, and (ii) stating truth-grounds for physical possibilities – are interchangeable in that solving either one automatically provides a solution to the other. Nomicity and physical possibility are interdefinable concepts, and thus the problem of providing truth-grounds for nomicity may then be construed – equivalently – as finding the truth-grounds for physical possibility. But of course, doing the latter should not itself involve nomologicals, for then either the analysis is circular or merely postponed.

Actual truth is, of course, a *sufficient* condition for physical possibility. Whatever is actual is physically possible. But it is central to the Necessitarian account that actual truth is not a *necessary* condition for physical possibility. How, then, might one account for physical possibility in the absence of actual realization?

The most obvious recourse is to dispositions. For example, a piece of wood need never actually burn to be regarded as having the physical possibility of burning; and one need not subject a specific piece of glass to an actual test to say of it reasonably that it lacks the physical possibility of conducting electricity.

But these straightforwardly attributable dispositions are insufficient to ground the entire class of the Necessitarian's nomologicals. It is of the essence of Necessitarianism to argue that some events or properties are physically possible even though there may be nothing in particular in the actual world that has a disposition to realize those properties. For example, the theory requires that it be physically possible that someone should run a four-minute mile even if everyone were (accidentally) lame; indeed, that someone should run a four-minute mile even if there never had been any persons at all.

It is these latter kinds of cases of physical possibility that mark the sharpest dividing line between the two rival theories. The Regularist does not comprehend *how* such existential propositions might acquire their modality. He does not understand what it is about the world that these propositions are supposed to be describing.

In the absence of specific items in the world to which to attribute the physical possibilities in question, it would seem then that these physical possibilities must be features, not of this or that part of, or item in, the world, but of the world itself taken as a whole. Thus, of the two uninstanced universal truths, for example, "All As are Bs" and "No As are Bs," the Necessitarian

is prepared to allow that one of them might be a nomological truth while the other is not, even under the condition that there never are – in the past, present, or future of the world – any As. The Regularist cannot see how such a distinction can come about. For the Regularist, the claim that there are truth-grounds for these two true propositions that would allow the one to be nomological and the other a mere accident remains unexplicated. Attributing the source of the nomicity of the one and of the accidentalness of the other to a physical possibility of ‘the world as a whole’ remains unintelligible. World-potentialities look to the Regularist to be sheer invention, postulated just so that there should be some ‘fact’ for irreducible physical possibilities to correspond to. To the Regularist, these irreducible general truths seem to bear their nomicity autonomously.

#### DISCUSSION

*Nec(essitarian)*: I don’t understand your squeamishness about admitting physical possibilities. After all, you have had no misgivings yourself in invoking all sorts of metaphysical arcana, for example, propositions, possible worlds, logical possibilities, classes, etc. It strikes me as arbitrary, indeed as theoretically inconsistent, to become suddenly diffident at the prospect of introducing physical possibilities.

*Reg(ularist)*: You are right that I am gravely suspicious of your brand of physical possibilities. But my concerns have little, if anything, to do with the prospects of increasing the set of abstract entities. My concerns have to do with the reasons given for wanting to introduce these entities and with their very intelligibility ultimately.

*Nec*: How so? Why should physical necessity cause you any more concern than, let us say, logical possibility?

*Reg*: To begin with, there are determinate, effective procedures in *at least some cases* for making the distinction between what is logically possible and what is not. Many propositions can be symbolized by finite, manageable sentences, and some of these sentences, in their turn, can be assessed for self-contradiction by purely formal, indeed literally mechanical, means. Many others yield to conceptual analysis. Although there are problem cases aplenty, there are at least *some* cases in which a definitive verdict can be reached as to logical possibility. Logical possibility, then, is established as being distinct from actual truth. But there is no analogous procedure for distinguishing between accidental falsity and nomological impossibility, or –equivalently – between accidental truth and nomological necessity. A priori reasoning is certainly not going to work. And

every empirical test Necessitarians have suggested amounts to careful watching of the world or to manipulating experimental variables and attending to what results. But this is just what a Regularist does in his attempt to find out what is universally true. Nothing that anyone might advance could possibly answer the question of what *would* happen if the antecedent conditions were never actually to be realized.

*Nec:* Does your criticism then, finally, come down to a concern about the lack of an empirical test for nomicity?

*Reg:* In part, yes. But it is not an objection of the sort one might raise about there being no empirical test that would settle, for example, whether an ancient shroud really was placed over the body of the historical Jesus. My objection is not that there isn't any empirical test; my objection is that in principle there couldn't be any such empirical test. Indeed, I don't see how there could be any test whatever, either empirical *or* a priori.

My worries about nomological necessity and its distinctive correlative notion of physical possibility are akin to my concerns about postulating a material substance underlying, supporting, or unifying the physical properties of ordinary material things. I have no notion of a conceptually distinct thisness in ontological union with a whatness. The postulation of the former, to the extent that it is even intelligible, seems to me to be perfectly idle. So, too, with nomological necessity. I know what physical possibility means when it is predicated of an event-kind that occurs in this world. I am at a loss to understand what physical possibility is supposed to mean when predicated of an event-kind that never occurs. Logical possibility presents no such equivalent problem. A false existential proposition is logically possible if it is not self-inconsistent; and there are determinate tests for self-inconsistency in at least some cases. But there are no comparable tests for physical possibility beyond actual truth, nor have I ever seen any argument to make plausible the contention that there could be. Indeed, it seems to be intrinsic to the concept that there couldn't be. I must then retain my skepticism as to the very claim that the concept is intelligible.