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Hempel's Dilemma*

1. In the course of a commentary on Nelson Goodman's *Ways of Worldmaking*, Carl G. Hempel formulated a problem for physicalism that has come to be known as "Hempel's Dilemma". He wrote:

> I would add that the physicalist claim that the language of physics can serve as unitary language of science is inherently obscure: the language of what physics is meant? Surely not that of, say, eighteenth-century physics; for it contains terms like 'caloric fluid', whose use is governed by theoretical assumptions now thought false. Nor can the language of contemporary physics claim the role of unitary language, since it will no doubt undergo further changes too. The thesis of physicalism would seem to require a language in which a *true* theory of all physical phenomena can be formulated. But it is quite unclear what is to be understood here by a physical phenomenon, especially in the context of a doctrine that has taken a decidedly linguistic turn. (Hempel, 1980: 194-5. See also Hempel 1969)

Hempel here was contrasting Goodman's position with that of Otto Neurath, the member of the Vienna Circle most responsible for formulating and promoting the thesis of physicalism (see Neurath 1931a, 1931b). For Neurath, or anyway for Neurath as interpreted by Hempel (see Hempel 1949), physicalism was the linguistic doctrine that every statement is equivalent in meaning to—i.e. is synonymous with—some physical statement. And, on its face, Hempel's point is limited to a criticism of physicalists of Neurath's type. But of course few if any physicalists are of

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that type now. Nowadays, physicalism is the metaphysical doctrine that, not necessarily but as a matter of fact, every instantiated property is necessitated by, or supervenes on, some physical instantiated property.[1] So it might appear that, even if Hempel is right about the inherent obscurity of Neurath's physicalism, this is not something with which a contemporary physicalist need be overly concerned.

For most writers on this issue, however, the problem Hempel is posing is a problem not simply for a linguistic version of physicalism but for the metaphysical version as well. Geoffrey Hellman, for example, writing a few years after Hempel, describes it as "perhaps the most serious objection to all efforts in formulating physicalism", and formulates it in the following influential and often-quoted passage:

> …current physics is surely incomplete (even in its ontology) as well as inaccurate (in its laws). This poses a dilemma: either physicalist principles are based on current physics, in which case there is every reason to think they are false; or else they are not, in which case it is, at best, difficult to interpret them, since they are based on a "physics" that does not exist—yet we lack any general criterion of "physical object, property, or law" framed independently of physical theory. (Hellman, 1985: 609).

Moreover, in supposing that the problem is a problem for physicalists in general, Hellman has been followed by many others. Hempel's dilemma has become, as Jeffrey Poland puts it, the (1993; XX) "the stock objection" to the idea that physicalism admits of a clear formulation.

What should we say about the stock objection? My answer will be that Hempel's dilemma is fallacious because its main disjunctive premise is false. So far as I can determine, to the extent that standard discussions of the dilemma focus attention on this premise at all, it seems to be assumed that it is an obvious or even a logical truth—in Hellman's words, "either

[1] Of course, there is a very large philosophical literature on what it means to say one fact or set of facts supervenes on or entails another, but I will operate here with a rough and ready. That should be enough for our purposes.

physicalist principles are based on current physics…or else they are not". However, far from being an obvious or logical truth, the disjunctive premise is, at least when properly understood, a substantial falsehood. Once the premise is rejected, as I think it should be, we are faced with a number of difficult problems about the concept of the physical; but one problem we are *not* faced with is Hempel's dilemma.

The paper is organized as follows. In §2 I set out what I take Hempel's dilemma to be. In §§3-6, I develop and defend my objection. In §§7-8, I compare this objection with two others. I end the paper, in §9, by briefly examining the motivation that Hempel himself offered for formulating his dilemma, a motivation that lies in ideas about philosophical methodology associated with the so-called linguistic turn.

2. We have so far talked informally about Hempel's dilemma—what is it exactly? No doubt the precise formulation is a matter of debate, but in my view it is reasonable to work with the following version of the argument:

H1. If physical properties are by definition the properties expressed by the predicates of a current physical theory, physicalism is false.

H2. If physical properties are by definition the properties expressed by the predicates of an ideal physical theory, we don't know what physicalism says.

H3. Either it is the case that physical properties are by definition the properties expressed by predicates of a current physical theory that is current, or it is the case that physical properties are by definition the properties expressed by predicates of an ideal physical theory.

HC. Ergo, either physicalism is false or we don't know what it says.

Understood this way, Hempel's dilemma is a valid argument for a prima facie significant conclusion. What reasons are there for the premises? I will address this question by focussing on each premise in turn.

2.1. Support for H1.

We may think of a physical theory as a theory that aims to provide a complete inventory of the properties and relations required in the explanation of ordinary physical objects and related phenomena. But surely *current* physics does not provide a complete inventory. That is, surely we are in the midst of an on-going investigation, rather than being at the end or close to the end of the investigation. On the other hand, *if* current physics is indeed incomplete, presumably there is a possible future physical theory that is complete, or at least is more complete that current physics is. Let us now imagine such a theory, and in particular imagine that a predicate of such a theory expresses a property—call it "F." If physical properties are *by definition* those that are expressed by the predicates of *current* physical theory, F is not physical. This is not say that F is spooky or ethereal, nor that F conforms to any paradigm we might have of what a non-physical property is; in fact, since we have no idea what F is, F conforms to no paradigm at all. It is just to say that if physical properties are by definition contemporary physical properties, F is not physical.

Now, that F is not physical is not by itself a problem for physicalism. The beauty of Venice is a property of Venice, but not a physical property of Venice. But that is no problem for physicalism, for physicalism is not the thesis that every property *is* a physical property. It is rather the thesis that every instantiated property is necessitated by some instantiated physical property—and this formulation permits the instantiation of some non-physical properties. However, while F's not being physical is not by itself a problem for physicalism, there is a related consideration that is. For not only is F *not* physical; it is also *not* necessitated by any physical property. For consider: F was introduced as a property not on the list of properties given by current physics. But 'not being on the list' in the relevant sense, means, I take it, not only 'is

numerically distinct from' but also 'is not necessitated by' any property on that list. But now it does indeed follow that physicalism is false: F is property that is neither physical nor entailed by anything physical; physicalism entails that there is no such property.

In sum the reason for H1 is that current physics is incomplete. If current physics is incomplete, then, if physical properties are by definition those expressed by contemporary physics, physicalism is false.

2.2. Support for H2.

Suppose that the Peircean limit of inquiry is reached at C.O.B. on November 5th, 3027. Presumably the scientists leaving work on that fateful day—of course they may not *know* that the day in question is the fateful one—will have formulated some physical theory, and the theory in question will say at least that there are various properties, let us call them 'F', 'G', and 'H', which do various things. If physical properties are by definition the properties expressed by the predicates of this ideal physics, then the physical properties are F, G, and H. Similarly, if physical properties are by definition the properties expressed by the predicates of ideal physics, then physicalism tells us that F, G and H entail every other (instantiated) property, either singly or in combination. But what then does physicalism say? For those of us who are not at the Peircian limit the answer seems to be that we have no idea. Physicalism says that every property supervenes on some complex of F, G and H. But since we don't know what F, G and H are, we don't know what physicalism says. Of course we can in a sense name these properties and refer to them; I have just done so at least schematically. But naming is different from knowing. Even if we can name the properties, we still don't know what they are, and nor do we know what physicalism says. In effect, we are like the people in Gareth Evans example who can refer to Julius as 'the actual inventor of the zip', but do not know who Julius is (Evans 1983; see also Stalnaker 2004).

Suppose then we don't know what physicalism says—what follows? Well, if we do not know what it says, we are in no position to know it, no position to deny it, no position to believe or disbelieve it with justification. Nor are we even in a position to speculate about whether it is

true. In fact the whole project of rationally assessing physicalism—providing reasons for and against it, declaring oneself for it or against it, saying it is a good bet at least in the long run—seems to presuppose that we know what it is, at least in outline. But if that presupposition is false, physicalism is unworthy of assessment.

In sum the reason for H2 is that, in view of the incompleteness of current physics, we don't know what an ideal physics says. If we don't know what ideal physics says, then, if physical properties are by definition the properties expressed by the predicates of ideal physics, we don't know what physicalism says.

2.3. Support for H3.

H1 says that if physical properties are defined one way, something bad happens, and H2 tells us that if physical properties are defined some other way, something different but also bad happens. H3 tells us that these methods of definition exhaust the field: either physical properties are defined in terms of a theory that is current or they are defined in terms of a theory that is ideal.

Why believe H3? Later on in our discussion we will discuss Hempel's motivation for H3. If H3 is false, as I think it is, this motivation must be less persuasive than Hempel, at least, thought it was, and I think that an analysis of it bears this out. For the moment, however, I will content myself with making two points about the case for H3. The first is that, while it is true that we may extract from Hempel's discussion a consideration in favor of H3, in point of fact most contributions to this debate fail outright to provide such considerations, and pass over this part of the argument without comment. As I noted before, many people seem to think H3 is just obvious.[2]

[2] Evidence for this claim derives in part from the fact that the standard responses to the dilemma assume that H3 is true. For example: one group of philosophers, such as Mellor (1973; see also Crane and Mellor 1990) and Daly (1998), takes the dilemma to establish what it purports to, viz., that physicalism has no true formulation that is worthy of assessment, and draws the moral that discussions of physicalism in philosophy of mind that concern the doctrine are without point or incoherent. Another group, such as Melnyk (1997, 2001) and Hellman (1985) himself, agrees that the dilemma establishes what it purports to, but draws a different moral, namely that physicalism can be philosophically significant even if false. A third group, such as Smart (1978) and Ravenscroft (1997),

Why do people think that it is just obvious? I am not sure. However, as I mentioned at the outset, it may be that they confuse it with a logical truth. One possibility is that they confuse H3 with the truth that physics is either current or it is not. But this can hardly be the premise that is in operation in Hempel's dilemma, if only because it says nothing about how physical properties are to be defined.

A more likely possibility is that H3 is being confused with H3*:

H3* Either it is the case that physical properties are by definition the properties expressed by predicates of physical theory that is current, or it is the not case that physical properties are by definition the properties expressed by the predicates is current.

But again it is implausible that *this* is the main premise of Hempel's dilemma. If this were the disjunctive premise of Hempel's dilemma, the second premise would have to be, correlatively, this:

H2* If it is not the case that physical properties are by definition the properties expressed by the predicates of a current physical theory, we don't know what physicalism says.

But we have no reason for believing H2*! In particular, the reason we had for believing H2 is not likewise a reason for believing H2*. The reason for believing H2 was that we did not know what ideal physics says. But we know perfectly well what various non-current physical theories say, and so we know perfectly well what various versions of physicalism say if they are defined with reference to those theories. (We know perfectly well what

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denies that the dilemma establishes its conclusion, arguing either that contemporary or near contemporary physics is in fact true, or at any rate true as far as philosophy of mind goes. And fourth group, such as Poland (1994), Wilson (2005) and Dowell (2005), agrees that the dilemma does not establish its conclusion but argue instead that a version of physicalism based on some ideal or future physics may, contra the dilemma, be worthy of assessment after all. These proposals all raise interesting issues on their own terms but what they all share is the tendency to agree with H3.

physicalism says if it is defined with reference to the physics of the nineteenth century, for example.) What this suggests is that in order to formulate Hempel's dilemma we need to operate with a contrast between the physical theory that we currently adopt, on the one hand, and the physical theory that will be true in the ideal limit, on the other. But then it would seem that in order to formulate Hempel's dilemma, we need H3 and not H3*.

The possibilities about why people think H3 is obvious that I have just mentioned are speculative; as I said, I don't know why people think this. But in any case—and this is the second of the two points I said I want to make about H3—they are wrong if they do. H3 is a *substantial*, and so not an obvious, claim. In particular, H3 might be false in either of two ways. First, it could be that physical properties are not defined by a physical theory at all. Second, it could be that, even if physical properties were defined by a physical theory, they would not defined by one that is either current or ideal.

3. So far I have set out Hempel's dilemma and said something about the plausibility of its premises. Turning now to criticism, my own focus—as I have indicated—will be on the disjunctive premise of the argument, viz.

H3. Either it is the case that physical properties are by definition the properties expressed by predicates of physical theory that is current, or it is the case that physical properties are by definition the properties expressed by the predicates of a physical theory that is ideal.

But why is H3 false? Well let us focus first on a very simple version of a view about physical properties—we may call it 'the theory view'—that is suggested by the first disjunct of this premise:

(1) *F* is a physical property if and only if *F* is property expressed by a predicate of a current physical theory.

It is a very easy to find counterexamples to (1). Thus, consider impetus, the property attributed to physical objects by medieval impetus physics. Impetus, or having impetus, is not a property expressed by a predicate of a *current* physical theory. Yet having impetus *is* a physical property. Hence (1) is false.[3]

Is this just the first premise of Hempel's dilemma all over again? Not so, for imagine replacing (1) with (2):

(2) *F* is a physical property if and only if *F* is expressed by a predicate of an (the?) ideal physical theory.

On the assumption—which I will adopt—that the ideal physical theory is a *true* physical theory, the example of impetus refutes (2) as a definition of what it is to be a physical property just as surely as it refutes (1). For, while the true physical theory will tell us which physical properties are instantiated, and what they do, it will not tell us about impetus for the simple reason that impetus is not instantiated. Hence impetus is not a physical property by this definition.

It might be objected that (as we indicated before) we have no idea what ideal physics says. If so we are in no position to say that it will not mention impetus—maybe impetus *is* mentioned in ideal physics after all! But this objection doesn't get to heart of the matter, as so far developed.

[3] The notion of impetus was expressed by the medieval philosopher and scientist, Jean Buridan. He wrote: "A mover, while moving a body, impresses on it a certain impetus, a certain power capable of moving this body in the direction in which the mover set it going, whether upwards, downwards, sideways or in a circle. By the same amount that the mover moves the same body swiftly, by that amount is the impetus that is impressed on it powerful. It is by this impetus that the stone is moved after the thrower ceases to move it; but because of the resistance of the air and the gravity of the stone, which inclines it to move in a direction opposite to that towards which the impetus tends to move it,this impetus is continually weakened. Therefore the movement of the stone will become continually slower, and at length, the impetus is so diminished or destroyed that the gravity of the stone prevails over it and moves the stone down towards its natural place." (A. C. Crombie, Medieval and Early Modern Science (Harvard U.P., Cambridge, MA, 1963), Vol.II. p.67.) The concept of impetus has also been of interest to developmental psychologists, some of whom suggest that common sense physics conforms to the principles of impetus physics. See e.g. McCloskey 1983. Construed as a counterexample to proposals about how to define physical properties impetus is mentioned but not developed in my 2001a, 2001b.

The heart of the matter as so far developed is that any true physical theory will tell us only about the physical properties that happen to be instantiated at this world. But it is very plausible that there are physical properties that are not instantiated at this world; impetus is my example of such a property, but any property like this will do. On the other hand, if there are physical properties not instantiated in the actual world, then (2) is false. Another way to put the point is to say that presumably the ideal theory will rule out any false theory. But properties postulated by false physical theories are nevertheless physical. So an ideal physical theory will not tell us what it is for a property to be physical.

The impetus example tells us that (1) and (2) are both false. But it also tells us something very important about Hempel's dilemma, viz., that its third premise, H3, is false. For consider: H3 tells us that physical properties are by definition those expressed by the predicates of current physics or ideal physics; in effect, H3 is just the disjunction of (1) and (2). But we have already seen that both (1) and (2) are false; hence H3 is false too. So impetus tells us not only that (1) and (2) are false. It tells us also that H3 is false and that Hempel's dilemma as stated collapses.

4. I have argued by counterexample that H3 is false, and in consequence that Hempel's dilemma collapses. But arguments by counterexample only go so far, and you may already have thought of ways to respond. I will come back to some of these ways in a moment, but first I want to point out that, when we reflect on why the impetus case is persuasive, it emerges that our dispute with H3 concerns an issue of principle, and not simply an issue of how to respond to one example.

The persuasiveness of the impetus example is due, I think, to an unclarity in the theory view I have so far been ignoring. The unclarity has to do with what is meant by 'physical theory'. On the one hand, when one speaks of 'physical theory' one might have in mind a *particular* physical theory, such as medieval impetus physics, or Einstein's theory of gravity, or that physical theory, whatever it is, that scientists will formulate in the Peircian limit. On the other hand, when one speaks of 'physical theory' one might have in mind a *kind* of theory of which each of these particular

theories are instances. So, in particular, one might think of a 'physical theory' as a theory of a certain general kind, say distinguished by its subject matter. One might distinguish here between theory-types and theory-tokens, but the phrase 'theory-token' I find grating, so I will speak instead about individual theories versus kinds of theories.

Now, what interpretation of the phrase 'physical theory' is at issue in Hempel's dilemma? It seems clear that what is intended is the idea of a *particular* physical theory. Hempel asks "the language of *what* physics is meant?" and he clearly means to be asking: language of what *particular* physics is meant? Similarly, H3 says that physical properties must be defined either in terms of one particular physical theory—viz., current physics—or another particular physical theory—viz.ideal physics. In short, Hempel's dilemma tacitly assumes that by 'physical theory' one means 'particular physical theory', and so far we have taken over this assumption uncritically.

However, on reflection this assumption is false, and it is impossible that the notion of a physical property might be defined in terms of any particular physical theory. For suppose you pick some particular theory, T, and say, "the physical properties are by definition the properties expressed by T". It should be clear that there will always be some other particular theory T*, and if that other theory is similarly a physical theory, then the properties that are expressed by this other theory will also be physical. Hence one's purported definition will fail. It is this fact, I think, that explains why the impetus example works. Both current physics and ideal physics are two particular physical theories; impetus physics is another. If you define the physical properties by reference to current physics, then the existence of impetus physics will refute you. More generally, if you define physical properties by reference to any particular physical theory, the existence of other particular physical theories will refute you. But since, for any particular physical theory, there will always be another possible physical theory, no version of the theory view founded on particular theories will be true.

How might this conclusion be avoided? If the argument will be replicated no matter what *particular* physical theory you pick, the only

response that is plausible at this point is to abandon particular physical theories for kinds of theory. But this means in turn that the only version of the theory view that has a chance of being true is the one that defines physical properties in terms of a theory of a certain kind, i.e. the physical kind. But in turn, if this is right, we arrive again at the conclusion that H3 is false. The problem with H3 is that it presupposes a version of the theory view that tries to define physical properties in terms of particular physical theories. Since that presupposition is false so too is H3; and if H3 is false, and Hempel's dilemma collapses.

5. I have objected that any version of the theory view that defines physical properties in terms of a particular physical theory is false, and that in consequence Hempel's dilemma, which presupposes such a theory, is unsound. How might a proponent of the argument respond to this objection?

One response starts from the point that I have not so far argued against *any* version of the theory view. In particular, I have left open the idea that a version of the theory view defined in terms of a kind of theory might be true. Might such a theory be exploited to resurrect Hempel's Dilemma?

The answer to this question is 'no.' The 'kind of theory' version of the theory view is, I take it, something like (3):

(3) *F* is physical property if and only if *F* is expressed by a predicate of a theory of a certain kind, viz., the physical kind.

An attractive feature of (3) is that it immediately avoids the impetus problem. Having impetus might have failed to be expressed by any predicate of a particular theory, but it could not have failed to be express by a predicate of a theory of a certain kind, viz. physical theory. So impetus counts as physical by the lights of (3).

But while (3) avoids the impetus problem, it is no help to the would-be defender of Hempel's dilemma. Suppose a property is physical just in case it is expressed by a predicate of a theory of the physical kind.

It does not follow that a theory of that kind must be either current or ideal. An ideal theory means, in this context, the physical theory that turns out to be true in the actual world. But this is a particular theory, not a kind of theory. So we are no closer to a defense of H3 than we were before.

Of course, one might point out that, in addition to being no help to the would-be defender of Hempel's dilemma, (3) faces further problem. What is it for a theory to be of the physical kind? Take all the actual and possible theories that are physical; what is that they have in common in virtue of which they are physical? These are obviously *exceedingly* difficult questions—it is certainly not obvious what kind of theory a physical theory is. But while this is a problem, it is a problem that I want to set aside here. Whatever issues we confront when we confront the issue of explaining what kind of theory a physical theory is, Hempel's dilemma will not be among them. For Hempel's problem starts from the assumption that you must employ one of two particular theories to define what it is to be a physical property. My objection is precisely that this assumption is clearly no good.

6. The first response to our objection to H3 is to appeal to a 'kind of theory' version of the theory view. The second response points out that I have so far considered only very simplified versions of the 'particular theory' version of the theory view. Might not a more sophisticated version do better? This is obviously a very natural thought. Its only problem is that when we examine what some of these more sophisticated versions of the theory view are, it becomes apparent that the basic problem remains untouched.

The *first* alternative involves adjusting the theory view so that the primary idea concerns, not whether the theories in question are *true*, and not whether they are physical, but whether they have been *formulated at some point in time*:

(4) *F* is a physical property if and only if *F* is expressed by a predicate of a formulated physical theory (that is a theory formulated at some point in the present, past or future).

This proposal does not face the impetus problem, for there is a formulated physical theory contains a predicate that expresses impetus, viz. impetus physics. But a variant on our main example can be constructed to get around this. For take some property that we agree to be physical, say having a certain mass or impetus for that matter. Suppose mass were not expressed by a predicate of formulated physical theory. Would it still not have been physical? For example, suppose that humans lost out in their competition with Neanderthals, and Neanderthals never developed sciences of their own. Then mass would not have been expressed by a predicate of *actual* physical theory. But surely having mass or impetus would nevertheless have been physical properties. A scientist might say: "if the physical constants of the universe were different, life would not have evolved." For a philosopher to retort "the more different than you realize—for the constants would not even have been physical" is just silly, but that is what (4) commits one to.

The *second* alternative is to adjust the theory view so that it involves, not simply what predicates are in fact contained in current physics, but what predicates might be defined in terms of those that are contained in current physics:

(5) F is a physical property if and only if: either F is expressed by a predicate of current physical theory or F is expressed by a predicate definable in terms of the predicates of current physical theory.

Like proposal (4), this avoids (or seems to) the impetus problem. The predicate 'has impetus' is not a predicate of current physical theory, but perhaps it is definable in terms of those. But nevertheless (5) does not get around the principled objection that the impetus problem brought to light. Unless *every* physical property is expressed by a predicate definable in terms of current predicates, there will always be a property like impetus. But it is implausible that this every physical property is so expressed—this

would entail, for example, that current physics is a universal theory in the sense that *this* theory has the expressive resources of *any* physical theory.

One might respond that while it is implausible that current physics is a universal theory in this sense, it is not implausible that ideal physics is such a theory; more generally, it is not implausible that there is a particular theory T which is such that T has the expressive power to capture every physical theory. However, there are two problems with this proposal. In the first place, it seems to be to be extremely speculative to suppose that there is a physical theory like this—in particular, it does not follow from the fact that a theory is one we would adopt in the ideal limit that it is universal in this sense.[4] In the second place, to argue in this way is in effect to reintroduce the idea of a kind of theory. A physical theory is a kind of theory that translatable into T. And, as we have said, if that is so, then we no longer have any reason to believe H3.

The *final* alternative—I mention it mainly because it itself is so often mentioned in the literature—is to appeal to resemblance:

(6) F is a physical property if and only if: either F is expressed by a predicate of current physical theory or F is sufficiently similar to a property expressed by a predicate of current physical theory.

The problem with this view is it that it succeeds only by being overtly coy about what the dimensions of similarity are. For example, is the property of having impetus sufficiently similar to the properties expressed by current physics to count or not? If not, then impetus will refute (6) just as it did (1) and (2). If so, then there is some dimension of similarity that ties current physical properties together with impetus. But what could that dimension of similarity be?

[4] In fact, I think it is can be shown that there is not physical theory like this, owing to the impact of twin-earth examples on the topic of what it is to be a physical theory. But this point will have to be left to another occasion. See my forthcoming and Susman 1981.

7. Our objection to Hempel's dilemma is that its third premise—H3—presupposes a particular theory version of the theory view, and no such theory could possibly be true. But the interest of this suggestion would be limited if there were any number of *other* reasons to resist the dilemma. Are there such reasons? More generally, how does our objection compare with others in the literature?

One objection is that Hempel's dilemma is unsound because it fails to appreciate the sense in which the contemporary physicalist is a fallibilist in epistemology. The fallibilist in epistemology holds that, at least for any empirical belief, the evidence that one has for the belief does not entail that the belief in question is true. Fallibilists emphasize that at least in empirical matters, there is no certainty, no ruling out all possible alternatives. And the contemporary physicalist certainly is by nature a fallibililist. Indeed, the very idea that physicalism is kind of empirical, but abstract, hypothesis is suggestive of fallibilism.

However, while physicalists are fallibilists, what is the connection between fallibilism and Hempel's dilemma? Well, as we have seen, the reasoning in support of both H1 and H2 presupposes that contemporary physics is incomplete. In the case of H1, the incompleteness of current physics supports the idea that if physicalism defined in terms of it, then physicalism is false. In the case of H2, it supports the idea that we don't know what an ideal physics will say. But perhaps a physicalist could insist that, in their view, physics *is* complete—it is simply that, compatibly with what we know, it *might not* be complete. In sum, fallibilism permits one to respond to Hempel's dilemma by denying the incompleteness of physics. "It is not true that physics is incomplete," you might say, "all that is true is that it might be; that is, it is consistent with our evidence that it is."

Without further development, this response to Hempel's dilemma is unsatisfactory. It is true that both the completeness and the incompleteness of current physics are logically compatible with the truth of what physics tells us about the world now, and it is certainly true that physicalists are fallibilists and reasonably so. However, this does not mean that it is

plausible to believe that current science is complete. On the contrary, there seem a rather large number of reasons for supposing the opposite:

- There may be *cosmological* reasons: We may think of ourselves (or humans in general) as a occupying a very small pocket of the universe; it is amazing to think that cognitive mastery could be achieved from such a vantage point.
- There may be *evolutionary* reasons: We may think of ourselves (or humans in general) as evolved creatures whose cognitive capacities have been shaped by millions of years of evolution; surely in that case it is implausible that minds like ours could form a complete picture.
- There may be *psychological* reasons: We may think of our mind (or the human mind in general) as being subject to various kinds of barriers, constraints or filters; surely it is implausible that minds of our kinds are likely to know all sorts of facts.
- There may be *historical* reasons: We may think that the science of our own day as like that of previous epochs in that it contains mistakes, confusions, wrong turns, approximations; the natural inference is that present circumstances are no different from previous circumstances in these respects, even if present science is better than, closer to the truth than, other sciences.
- There may be *methodological* reasons: We may think that the practice of science or rational inquiry presupposes that he doesn't know various types of facts; the very point of scientific inquiry seems to presuppose ignorance.

In summary, while it is true that both the completeness and incompleteness of current physics are logically compatible with what science tells us about the world, it is not hard to motivate the hypothesis that current physics is indeed incomplete. So appealing to fallibilism will not help the physicalist respond to Hempel's dilemma.

Of course, one might respond that, while these considerations are true enough in their way, they nevertheless do not actually entail that

current knowledge is incomplete; hence it remains open for an optimist to insist in the face of them that current physics is complete. But at this point the issue seems to degenerate into a stalemate between the optimist and the pessimist about current physics (and current science or knowledge more generally). The optimist and the pessimist may agree about what is currently known, and may agree about all of the claims just reviewed. And yet it may be the optimist thinks that current knowledge is complete (or very nearly so) while the pessimist thinks not.

How do we decide this issue? So far as I can see there is no way (or at any rate, no practical way) to resolve it, though on the other hand it seems clearly a dispute about a matter of fact. If correct, that is an interesting observation that deserves further discussion. But for the moment, the important thing is the connection between the unresolvability of this dispute and the fallibilist response to Hempel's dilemma. In particular, it would appear that fallibilism not going to provide a successful response to Hempel's dilemma, for the success of that response turns on an unresolvable dispute between the optimist and pessimist about current physics.

8. The fallibilist objection says that Hempel's dilemma fails because, while it is possible that we have incomplete knowledge, in fact we have complete knowledge. The other objection that I want to consider takes a different tack. We have seen the key observation in the dilemma is the incompleteness of current knowledge, and, that it is at least dialectically ineffective to deny this. Nevertheless, it might be objected that even if we acknowledge that current physical theory is incomplete, the argument may be resisted. "Sure, current physics is incomplete, and in consequence we don't know exactly what the true physics will say," the proponent of this objection will say, "but nevertheless we know enough to know that the true physics will not contain sui-generis psychological phenomena, and this is enough for the purposes of philosophy of mind." In sum, the main thrust of this objection is to accept Hempel's dilemma but to de-fang it, arguing that the conclusion does not have the significance that many have supposed.

What can we say about this objection? To begin with the objection does contain an important insight. It is common to suppose that Hempel's dilemma is significant because, if it were sound, many famous discussions in philosophy of mind would lose their rationale. For example, take the knowledge argument in philosophy of mind. This is an argument to the conclusion that physicalism is false. And people who debate the argument often describe themselves as 'physicalists' (if the don't like the argument) or 'anti-physicalists' (if the do). On the other hand, if Hempel's dilemma is sound, the whole rationale of this discussion of the knowledge argument seems to have been removed. If Hempel's dilemma is sound, we know, and on grounds that have nothing to do with the knowledge argument, that physicalism is either false or unworthy of assessment. What then would be the point of discussing whether some other argument establishes that it is false?

However—and this is the insight embodied in the response to Hempel's dilemma that we are now discussing—this reason for finding the dilemma significant is mistaken. While it is true that discussions surrounding the knowledge argument go on in the name of physicalism, it is much less clear that this is essential to the enterprise. For the knowledge argument would if successful tell us not only that phenomenal facts—such as the fact that I have a pain in my toe—are not entailed by physical facts. It would tell us that this fact is not entailed by *any* fact that is not itself phenomenal fact; that is, it would tell us that phenomenal facts are not entails by any other facts. But if that is right, physicalism construed as a thesis about the world drops out of the picture. It doesn't matter for the purposes of the knowledge argument whether the contrasting facts are physical or not; what matters is that they are not phenomenal. If this is so, however, physicalism per se is inessential to the argument. And that means that, even if Hempel's dilemma were sound, it would have a very limited impact on arguments such as the knowledge argument.

So there is an element of truth in this 'know enough to know' objection to Hempel's dilemma. Nevertheless it remains in my view unsuccessful as a response. For the objection assumes that Hempel's dilemma is significant, if it is, for one reason only, viz, because of its

impact or alleged impact on arguments in philosophy of mind such as the knowledge arguments. However, while this is certainly *one* way in which Hempel's dilemma is significant it is not the only way. In fact, the dilemma is incredible on its face (which is not to say that it might not be sound). Philosophers from Hobbes to Smart have endorsed physicalism; and philosophers from Descartes to C.D.Broad have denied it. Surely it is incredible that these philosophers are as confused as they would have to be if the conclusion of Hempel's dilemma were true. In sum the reason for thinking that Hempel's dilemma is significant (or at any rate of considerable interest), is this: it is an apparently obvious fact from the history of philosophy that physicalism is a substantive doctrine; hence it is not the case that it is either false or we don't know what it says.

9. My assumption has been that Hempel's dilemma is an argument from premises of the form 'A v B', 'If A then C', and 'If A then D' to a conclusion of the form 'C v D'. Focusing on this structure in turn focuses attention on the main disjunctive premise of the argument, and what I have been suggesting is that when we do focus on this premise it emerges that it is false and so that Hempel's dilemma is unsound.

But it is important to be aware of the limits of my discussion. I have said nothing about the truth (or falsity) of the conclusion—only that Hempel's dilemma is *not* a good argument for that conclusion. And I have said nothing about what the correct view of physical properties or facts is—only that one can conclusively dispose of Hempel's dilemma without doing so. Rather than taking up these larger questions here, I will in this final section turn to Hempel's own motivation for advancing the dilemma.

A very common methodological move in twentieth century philosophy is the attempt to restate metaphysical issues as linguistic ones: to move, as Quine famously put it, from talk of miles to talk of 'miles'. In one way of looking at it, the theory view is precisely an instance of this strategy—for it trades in the question of what a physical property is for the question of what a physical theory or language is. To the extent that we think of this strategy—Quine called it 'semantic ascent'—as *the* method of clarification in philosophy, we will be friendly to the theory view.

It is this motivation that is most prominent in Hempel's own discussion of the dilemma. The last sentence of the passage I began with he says: "it is quite unclear what is to be understood here by a physical phenomenon, especially in the context of a doctrine that has taken a decidedly linguistic turn." By 'linguistic turn' here, Hempel means, I think, exactly what Quine means by 'semantic ascent.' In fact, the role of semantic ascent in Hempel's dilemma seems to me to be strangely unnoticed in the literature. It is often pointed out that the remark on Goodman continues a theme developed in a much longer paper, published 10 years earlier; indeed the 1969 paper is often cited together with the comment on Goodman as the source of Hempel's dilemma as discussed here. But it is almost never pointed out that, in that earlier paper, Hempel's (1969, p. 180) stated goal is to "reflect on the rationale of this linguistic turn and to explore some of its implications for current problems in the theory of reduction"—the phrase 'the linguistic turn' here again is used by Hempel for Quine's semantic ascent. In fact, what he primarily refers to as a dilemma in that 1969 paper is not Hempel's dilemma as discussed here but a larger dilemma that contains Hempel's dilemma as a proper part. The larger dilemma goes roughly as follows: either we adopt the method of semantic ascent, and so adopt the theory view, or we do not. If we do adopt it then we face what I have called here (following tradition) Hempel's dilemma. If we don't adopt it, then, Hempel seems to suggest, we have no way to clarify metaphysical disputes about physicalism. It is this second claim that provides a motivation for H3. If the theory view is nothing less than the linguistic turn applied to the question of the physical, and if the linguistic turn is the method of philosophical clarification, then the thesis of physicalism will remain unclear unless and until we can bring to bear the linguistic techniques upon it.

In my view it is doubtful that this larger dilemma is successful. For one thing, why view semantic ascent as *the* method of clarification in philosophy, as opposed to one of a whole barrage of methods of clarification and explanation? For another, Hempel seems to run together the idea that one might *clarify a notion by switching focus to* the language we use to express it with the quite different idea that we might *explain a*

notion in terms of the language we use to express it. Nevertheless, while it might be that the larger dilemma Hempel offers us fails, there is in my view something right in the thrust of his thinking here, something that connects with our earlier discussion.

For suppose you attempt to explain what a physical property is in terms of a physical theory or, following Hempel, a physical language. The language in question must be either a *particular* language or a *kind* of language. Suppose that what you have in mind is a particular language. Then you will run into the problem I outlined earlier, namely that whatever particular physical language you pick, the existence of other particular physical languages will refute you. So suppose now that what you have in mind is a kind of language—a language of the physical kind. As we saw before, the notion of a language (or theory) of the physical kind is somewhat obscure. But it seems reasonable to say that, whatever precisely it is, a language will be of the physical kind just in case it can be used to talk about a particular subject matter, i.e. the physical. (Similarly, a physical theory is a theory of a particular subject matter, i.e., the physical.) But now it is plain that, just as you can't explain what a physical property is in terms of particular language, you can't do so in terms of a kind of language either. For consider: if a language is one of the physical kind *because* it has a certain subject matter, you would need to identify that subject matter *before* you identify the kind of language in question. But then one could not explain the subject matter in terms of the language in question; if anything, it is the other way around. The problem just outlined is close to both the versions of Hempel's dilemma we have discussed in the paper, but is not quite either of them. Its resolution will have to be left for another occasion.

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