Images of Empiricism

Essays on Science and Stances, with a Reply from Bas C. van Fraassen

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Six Degrees of Speculation: Metaphysics in Empirical Contexts

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1. Introduction: Beyond Experience

Metaphysical inquiry often exemplifies characteristics that do not meet with approval in the estimations of empiricists. Most distasteful to them, it seems, is a perceived distance between many of the speculations of metaphysics—about things such as causation, laws of nature, and unobservable stuff more generally—and the sorts of investigations they take to constitute proper empirical inquiry. Like any overarching movement in the history of philosophy, empiricism has recognized different interlocutors at different times, but it appears that all share a fascination for this kind of speculation. In relatively recent times, the influence of logical positivism encouraged a neglect of metaphysical issues in discussions of general philosophy of science that lasted well past the demise of positivism itself. Metaphysical disputes surfaced nonetheless, of course, both there and in the philosophy of particular sciences: space and time, evolutionary biology, quantum mechanics, and so on.

Among post-positivist philosophers of science, no one has done more to reformulate the challenge of empiricism to metaphysical speculation than Bas van Fraassen. My goal here is to suggest that one may accept the many gifts

of his reformulation of empiricism, and yet find value in the metaphysical investigations he asks us to sacrifice in return. At first glance, the prospects for having so much cake and eating it must seem dim. Those who would offer strict constraints regarding knowledge based on experience are lined up against those who are at least partly at home in the armchairs of reason. Is there not an unbridgeable chasm, here? Perhaps there is, but things are not as simple as my caricature would suggest. For one thing, it is not entirely clear what the relevant contrasts are here between what I have labelled 'metaphysics' and 'empiricism'. It is not clear, for example, what it means for some philosophical speculation to take place 'at a distance' from empirical inquiry. Neither is it especially clear what 'proper empirical inquiry' is, exactly. And even if one has a workable understanding of what is intended by these notions, there remains the task of understanding whether one can or should forego metaphysical investigations in favour of exclusively empirical ones.

In the following I hope to shed some light on all of these questions, in three stages. I will begin by considering van Fraassen's reformulation of empiricism, and argue that despite the fertility of his epistemology, the case for the rejection of metaphysics cannot succeed. For one consequence of this epistemology is a form of relativism concerning the rationality of adopting the epistemic strategies characteristic of things like metaphysics and empiricism, and this relativism ultimately renders the critique of the former question-begging. Secondly, I will suggest that it is a good thing that the case against metaphysics fails, for almost all inquiry is metaphysical to a degree. Not only are prima facie plausible candidates such as scientific realism metaphysical theories, but as it turns out, so are most varieties of empiricism, including that to which van Fraassen himself subscribes. Finally, I will contend that what empiricists should oppose is not metaphysics *simpliciter*, but degrees of metaphysical speculation that fall outside the remit of what they recognize as proper empirical inquiry. These degrees reflect both an experiential 'distance', of the objects of inquiry from sensory experience, as well as an epistemic 'distance', measured by the epistemic risk we take in formulating theories about such objects. Risk is here understood primarily in terms of how theories accommodate the data, and make or fail to make novel predictions.

Ultimately, there is little reason to suppose that there should be any one, correct answer to the question of what degrees of metaphysical speculation a rational agent should accept. Different epistemic agents inevitably draw the line in different places. The choice is to a large extent conventional, for it

is made in accordance with standards that need not be shared among those who take an interest in investigating and thereby understanding aspects of the natural world. This conclusion is very much in the spirit of van Fraassen's post-positivist epistemology. But it stands opposed to his own conclusion regarding the poverty of metaphysics. To start, let us consider this epistemology and its conception of metaphysics and empiricism.

2. Stance Empiricism

I began with the claim that often metaphysical inquiry does not sit well with empiricists, but this is to paint with too broad a stroke. Simply to say that there is a conflict is too strong, since many empiricists do metaphysics as it is understood most broadly, as the study of the first or basic principles of philosophy, being qua being, and the natures of things that exist. In order to appreciate what is at stake in the conflict at issue here, we must identify more precisely those aspects of metaphysical inquiry that offend against empiricist sensibilities, and that are apparently separable from metaphysics as it is conceived more generally.

Here is a first pass at describing the relevant undesirability of many if not all metaphysical inquiries. The metaphysics that many empiricists disavow concerns the unobservable, and thus any position that endorses speculation leading to substantive beliefs about things not amenable to unaided sensory experience is unacceptable to them. This injunction applies not only to speculations about things like universals and causal necessity, which are familiar topics within metaphysics, but also to speculations about cellular organelles and subatomic particles, which are familiar topics within the sciences. Empiricists are generally happy to do metaphysics so long as it does not involve believing speculations about the unobservable. Thus Hume gives an account of causation, not in terms of unobservable necessary connections, but solely in terms of observable events that follow one another. And thus nominalists speak of properties, not as abstract entities like universals, but as sets of observable things to which the predicates associated with these properties apply. The unobservable is likewise anathema to many empiricist accounts of science.

That was a first pass, but let me qualify it immediately, for some may be puzzled by this characterization of the conflict between at least some

metaphysics and empiricism. After all, some self-proclaimed empiricists do in fact endorse claims about unobservable entities. Especially in the context of the sciences, many who are sympathetic to an empiricist approach to the study of nature see nothing wrong in having beliefs about genes and electric currents. It may be helpful here to distinguish a weaker sense of the term 'empiricism' from a stronger one. The weaker sense is traditionally associated with the idea that sensory experience is the *source* of all knowledge of the world, and this by itself does not preclude substantive beliefs about unobservable things. A weak empiricist might consistently believe that she can infer claims about unobservable entities on the basis of the evidence of her senses. A stronger sense of empiricism traditionally takes weak empiricism for granted, and adds the idea that all knowledge of the world is *about* experience. It is this latter tenet that conflicts with metaphysical speculations leading to substantive beliefs about unobservables.

So now we have an important clue about what it means to say that there is a conflict between metaphysics and empiricism. What it means is that there is a conflict between the common metaphysical practice of coming to hold beliefs about unobservable things, and the common empiricist practice of privileging knowledge of the observable. When I refer to metaphysics and empiricism henceforth, it is this sort of speculative metaphysics and this sort of stronger empiricism I have in mind. It is traditionally part of this empiricist view that this metaphysics is fruitless and philosophically misconceived. In pressing this claim, logical positivism ultimately lost its way, but van Fraassen argues for a reconceptualization of empiricism, one of whose goals is to demonstrate the superiority of empiricism over metaphysics. In the remainder of this section let us consider his reformulation, and the question of whether it succeeds in the task of banishing metaphysical inquiry.

Van Fraassen's recasting of empiricism occurs within a general framework for thinking about epistemology, the core of which can be described in terms of a tripartite distinction between 'levels' of epistemological analysis.[1] At the ground level there are matters of putative fact, or claims about the nature of the world; these are potential objects of belief. Consider, for example, the claim that mammals are warm-blooded, or that neutrons are electrically neutral, or that possible worlds exist, or that the only source of knowledge of the world is

[1] For a discussion of these issues from which part of the present exegesis is summarized, see Chakravartty (2004).

experience. These are claims about aspects of reality, and if we believe them we take them to describe these aspects correctly. Factual beliefs do not generate themselves, however. Knowing subjects must acquire them, and when we reflect on how this is done, we arrive at the second level of analysis, the level of stances.

The notion of a stance is intended to be construed rather broadly, but I will use the term here to refer to epistemic stances in particular. A stance is a cluster of commitments and strategies for generating factual beliefs. It makes no claim about reality, at least not directly. We might think of them partially, after Teller (2005), as combinations of epistemic 'policies' with respect to the methodologies we adopt in generating factual beliefs. For example, consider the idea that we should think of explanatory virtue as an important desideratum in determining what to believe, or that we should privilege the methods of the sciences. These are policies regarding the generation of factual beliefs, and policies are not themselves true or false. Certainly, it may be true or false that adopting a particular stance is likely to produce facts as opposed to likely falsehoods, but stances are not themselves propositional for the most part. They furnish guidelines for ways of acting. One does not believe a stance in the way that one believes a fact. Rather, one commits to a stance, or adopts it—they are possible means to realms of possible facts. Crucially, holding a stance is a function of one's *values* as opposed to one's factual beliefs, and though values may be well- or ill-advised, they are not true or false. (For those critical of the fact/value distinction, it may be possible here to speak simply in terms of different sorts of beliefs.) On van Fraassen's view, metaphysics and empiricism are stances.

The third and final level of epistemological analysis is what I will call the level of meta-stances. Here we find various attitudes towards the nature of front-line, epistemic stances, and thus ultimately towards the putative facts they generate. One issue at the level of meta-stances is particularly important to the present discussion: the question of which of innumerable possible stances one should adopt. Van Fraassen advocates a view according to which it is rationally permissible to hold any stance and believe any set of facts that meet certain minimal constraints; for example, but not exclusively, those that harbour no logical inconsistency or probabilistic incoherence. This account of rationality, which he calls 'voluntarism', is opposed to the idea that any one stance (and associated set of beliefs) is rationally compelled. I will return to the matter of voluntarism shortly, but first let us consider what stance metaphysics and stance empiricism are, precisely.

Earlier I described the metaphysical approach with which empiricists are unhappy as that which endorses speculation about unobservables as a route to beliefs about unobservable things. Van Fraassen identifies this with a tradition of analytic metaphysics stretching from seventeenth-century philosophers such as Descartes and Leibniz to contemporary ones such as David Armstrong and David Lewis: 'characterized by the attempted construction of a theory of the world, of the same form as a fundamental science and continuous with (as extension or foundation of) the natural sciences' (2002: 231, note 1). The claims of metaphysics annoy the empiricist, to be sure, but this annoyance is most economically understood at the level of stances. Rather than list the countless factual claims of which empiricists disapprove, we can simply observe that metaphysics is a stance of which empiricists disapprove, which generates annoying factual claims. On van Fraassen's account, stances are generally rich fabrics of interwoven commitments and attitudes, but let me summarize the basic elements of metaphysics very concisely. The core of the metaphysical stance comprises the following epistemic policies:

M1 Accept demands for explanation in terms of things underlying the observable.
M2 Attempt to answer such demands by speculating about the unobservable.

Why should anyone disapprove of these policies? Traditionally, empiricists hold that via M1, metaphysicians seek to explain things we already understand. And via M2, metaphysicians generate explanantia that are less comprehensible then the explananda with which they begin. These are familiar responses of empiricist philosophers to metaphysics throughout the ages. The empiricist wonders, for instance, why she should accept the demand for a deeper explanation of why and how green things form an identifiable group—as she already knows, they are green. And postulating the existence of universals such as greenness and mysterious relations such as instantiation is surely more obscure than the fact that some things are green. So argues the empiricist.

Empiricism, conversely, is a stance opposed to the excesses of metaphysics, shared by many historical positions. Again, let me summarize very concisely the core of this position, in terms of the following epistemic policies:

E1 Reject demands for explanation in terms of things underlying the observable.
E2 A fortiori, reject attempts to answer such demands by speculating about the unobservable.
E3 Follow, as a model of inquiry, the methods of the sciences.

E1 and E2 are directly opposed to the metaphysical stance, but these policies must be qualified if they are to be consistent with van Fraassen's earlier (1980) work. There, in discussions of scientific realism and anti-realism, he distinguishes between belief, which involves taking a theory to be true, and mere acceptance, which involves believing only a theory's observable consequences (along with certain practical commitments, such as a commitment to use the theory in the course of scientific investigation). Presumably E1 and E2 concern taking the relevant explanations to be true, for there may well be pragmatic reasons for pursuing metaphysics in some cases, even for an empiricist. Speculating about unobservables may facilitate, for example, the construction of more empirically adequate theories. I will return to the idea of metaphysical speculation as a guide to empirical adequacy, as well as to the question of what sorts of unobservables may play a role here in the sections to follow. In the meantime, let it suffice to note that the qualification above is important, not least because without it, E1 and E2 on their face would appear to be in tension with E3. After all, the methods of the sciences generally favour M1 and M2, not E1 and E2.

E3 itself is somewhat puzzling. It is not obvious that the sciences share any particular, substantive, methodological principles, or if they do that favouring them is a feature of the empirical stance alone. Van Fraassen does suggest, however, that one aspect of the sciences of which empiricists approve is a certain tolerance for different beliefs. Scientists routinely disagree, but conflicting beliefs are tolerated and respected as rivals worthy of consideration. One reason he is concerned to portray empiricism as a stance is that he is wary of the charge that, understood as a factual claim such as 'the only source of knowledge of the world is experience', empiricism may defeat itself. For if empiricism is a factual thesis it will be contrary to other, perhaps metaphysical theses, and though any statement of empiricism would be inconsistent with statements of other views, the principle of tolerance in accordance with E3 demands that one respect contrary factual claims as rivals worthy of consideration. So much for the rejection of metaphysics by empiricists! By ascending to the level of stances, van Fraassen hopes to rid empiricism of any worry of incoherence in its critique of metaphysics.

In any case, E3 is puzzling in part because a tolerance of contrary factual claims seems too liberal an attitude for an empiricist. Some factual claims are metaphysical, and it is the very business of an empiricist to be intolerant of these claims. Statements about the existence and nature of universals,

causal necessity, and possible worlds may be mistaken, but they are putatively factual, and a position that takes such claims as rivals worthy of consideration would be a strange sort of empiricism. Nevertheless, rising to the level of stances does I think help the empiricist to avoid a form of self-defeat. Any plausible definition of empiricism in factual terms, such as 'the only source of knowledge of the world is experience', is likely to make a claim that reaches beyond that which can be learned by experience. When she defines empiricism as a factual doctrine, the empiricist commits the same sin as the metaphysician: she speculates about the world in such a way as to reach beyond the observable. But this is to engage in metaphysics, and that is why van Fraassen's empiricism cannot be understood as a factual thesis, on pain of defeating itself. One can hardly oppose metaphysics by embracing a metaphysical thesis. The empirical *stance*, conversely, is not part of the metaphysical stance, and merely to adopt the empirical stance is not to do metaphysics in disguise. Recasting empiricism at the level of stances thus seems a means of formulating the position in a way that is not obviously self-defeating.

3. The Critique of Metaphysics

Later I will consider whether empiricists can, in fact, avoid metaphysics altogether, but first a preliminary matter. Why should anyone adopt the empirical stance, as opposed to its metaphysical counterpart? The reasons had better not make recourse to arguments employing metaphysical premises. or the empiricist will again find herself opposing metaphysics by doing metaphysics. And so we find ourselves with two stances, the empirical and the metaphysical, and wanting an argument for why the former is preferable to the latter. What, then, is the case against metaphysics? I submit that there can be no case, or more correctly, no case that does not beg the question. To understand why this is so, we must engage a specific concern at the level of meta-stances: identifying an appropriate criterion or criteria with which to facilitate choosing a stance. Van Fraassen suggests two criteria; one is uniformly applicable to anyone's choice of stance, and the application of the other varies across stance holders. The uniform criterion is rationality. One should adopt a stance that is rational, and reject those that are not. The variable criterion is the set of values that leads an agent to adopt one stance over another.

I will return to the issue of values momentarily, but first consider van Fraassen's conception of rationality, which is famously thin. It is rationally permissible, he says, to hold any stance or believe any set of facts that is logically consistent and probabilistically coherent. Incoherence was originally explicated (1989) in terms of holding combinations of beliefs that are exploitable by Dutch Books to the detriment of the belief holder (making bets, all of whose possible outcomes are unfavourable), and consistency and coherence are usually understood as logical constraints, straightforwardly applicable to propositional things like factual beliefs. Stances, however, are in large part non-propositional, so in this context mere logical consistency and coherence will not suffice. At least part of what is intended by incoherence here must have a pragmatic dimension, and van Fraassen (2005: 184) recognizes this in the claim that the 'defining hallmark' of irrationality more generally is 'self-sabotage by one's own lights'. Self-sabotage is broad enough to include such unfortunate circumstances as believing contradictions and probabilistically incoherent combinations, as one might do on the level of facts, but it may also include circumstances in which the stance one adopts has pragmatic failings, such as consisting in combinations of attitudes or policies that tend to undermine or conflict with one another. Note that on this view, different and mutually incompatible stances may be rational—no one stance and resultant set of beliefs is compelled. Van Fraassen calls this meta-stance 'voluntarism'.

Let us now return to values. Recall that in addition to rationality, an agent's values furnish a criterion for her choice of stance. If one's values promote a commitment to the empirical stance, one will reject metaphysics. After all, E1 and E2 are directly opposed to M1 and M2. The empiricist rejects metaphysics by committing to epistemic policies that are incompatible with it. But does this make for a case against metaphysics? To the consternation of the empiricist, it does not. For if rationality is the only constraint that applies uniformly to all agents adopting stances, and different, mutually incompatible stances are rational, then the framework for debate on the level of stances is relativistic. Relativism is premised on the idea that there is no view from nowhere, no view that cuts across perspectives so as to serve as a sufficient common ground from which to debate. If it turns out that metaphysics is rational, the empiricist may nevertheless claim that it is wrong-headed from her perspective. But the qualifying phrase 'from one's perspective' is inseparable from any statement of

the correctness of adopting a stance. Saying that different communities have different values is shorthand for saying that correctness and incorrectness are relativized to perspectives, and have no meaning otherwise.

Comparing M1 and M2 with E1 and E2, we find different policies supported by different intuitions, or values, concerning two things: what needs explaining; what counts as obscure or unilluminating. Many criticisms of stances that meet the constraint of rationality are cogent only from within the confines of some other stance, and this cogency is not preserved 'outside'. Thus, if the empiricist hopes to offer a case against metaphysics that is telling for the metaphysician, not merely for someone who adopts empiricist values that metaphysicians need not share, she must demonstrate the *irrationality* of metaphysics, because rationality is the only stance-transcendent criterion for choosing a stance. In other words, the empiricist must show that metaphysics sabotages itself, or more specifically, that if one adopts the epistemic policies of metaphysics, there are derivable consequences of which even metaphysicians would disapprove.

The task, then, is to demonstrate that metaphysics fails by its own lights, but how? Perhaps one could argue that the factual claims of metaphysics are problematic. Van Fraassen (1989) himself argues, for example, that the concept of a law of nature is incoherent, and laws are undoubtedly a subject of metaphysical speculation. But even if it turned out that *every* metaphysical concept was incoherent, this would not amount to a demonstration of irrationality. One interesting consequence of understanding metaphysics and empiricism as stances is that they are not exclusively identifiable with any one set of factual beliefs. Stances underdetermine the factual beliefs they produce. Over philosophical time, both metaphysics and empiricism have survived changes in the beliefs with which they are associated and no doubt will again. Thus, van Fraassen (2002: 62) is clear that stances are not identical to the factual claims with which they may be associated at any given time. For this reason, no demonstration of the irrationality of believing such factual claims can entail the irrationality of adopting a stance.

Let us focus, then, on the stance itself, and try to substantiate the charge of irrationality another way. Perhaps there are standards, commitments, or principles accepted by metaphysicians that the metaphysical stance fails to meet or exemplify. If so, this would constitute the sort of pragmatic incoherence the empiricist requires in order to demonstrate that metaphysics

is irrational. There are suggestions to this effect throughout van Fraassen's critique. Let me summarize the principles he suggests as follows:

P1 No form of inquiry into the nature of the world should be immune to the possibility of error, or failure.
P2 Correct logical or grammatical form should not be considered sufficient to render claims about the world substantive.
P3 The epistemic status of our criteria for theory choice should be linked to the epistemic status of our theories.

It seems eminently reasonable that both metaphysicians and empiricists should accept P1–P3. Let us examine each in turn, and consider why one might think that metaphysics fails to satisfy them.

First, consider P1. Empiricists are sometimes heard to complain that metaphysics has the character of a particularly futile game. Its futility is evidenced by the fact that no one ever wins or loses, and perhaps most damagingly, it never ends! If some part of metaphysics is shown to be inconsistent, it simply reinvents itself. One always has the option, it seems, of retreating to another position within the game of metaphysics that is immune to the criticism applied, and this violates P1, the idea that no form of inquiry should have this kind of immunity. Among those interested in the sciences, it would be surprising not to find at least some measure of sympathy for this complaint. A great deal of speculation in metaphysics is too far removed from the sciences to generate much interest or care on the part of many scientific realists, for instance, in the context of thinking about scientific knowledge. This, however, merely expresses a taste, and expressions of taste are not demonstrations of irrationality. Metaphysicians should accept P1, since metaphysics is fallible, but one must take care not to conflate metaphysical claims and theories with the metaphysical stance itself, any more than one would conflate the empirical stance with any particular empirical claim or theory. When metaphysical claims are found to be problematic, metaphysicians try something else. Clearly, then, particular theories *can* lose, and it is not a pointless game after all. It is in the nature of the stances that generate these candidates for knowledge, however, to go on. Thus it appears that P1 is no threat to the metaphysical stance.

Consider P2. Van Fraassen challenges the metaphysician to show that her claims are substantive. They should amount to more, he says, than 'coherent nonsense'. Merely correct logical or grammatical form is insufficient

to demonstrate that metaphysical claims are reasonable attempts to say something substantive about the world. Again, I suspect that metaphysicians would agree with P2, but it is an odd thing to be asked to prove the substance of one's claims, let alone in the context of one's own inquiry! In response to the question of how anyone could think that M1 and M2 lead to substantive contentions, one might legitimately wonder what sort of answer would suffice. There is an interesting question here of the burden of proof. In just the same way that the empiricist queries the reason anyone might have for thinking that metaphysical claims are substantive, the sceptic might well ask the constructive empiricist, for example, to show that her claims about the world are, in fact, something more than coherent nonsense, and so on and so forth. Perhaps only the solipsist of the present moment is safe from this line of questioning. At the end of the day, the only thing anyone can *do* in response to this sort of question is to point to her own epistemic practices, and the values that favour them, and this takes us to P3.

Metaphysical theories, says van Fraassen, are evaluated in terms of purely subjective values and probabilities of success. These values, however, such as preferences for theories that maximize simplicity, scope, or explanatory power, are not *epistemic* values. That is, they are not linked to truth, or at least we have no reason to think they are. The metaphysician thus suffers from a form of 'false consciousness': she applies her subjective values and probabilities of success in pursuit of truths, but there is no reason to think that such application leads to anything other than theories she likes. I submit, however, that van Fraassen is not in a position to make this charge, given his voluntarism. Once again, it seems reasonable that the metaphysician should accept P3, but she disagrees with the empiricist's evaluation of the epistemic status of her criteria for theory choice. Consider the case of scientific theories and their epistemic status. Under certain conditions, scientific realists think it reasonable to infer the approximate truth of theories involving unobservables, and their criteria for theory choice include such things as maximizing simplicity, scope, explanatory power, and so on. The empiricist demurs. Such pragmatic criteria are at best indicative of truths about observables, and perhaps not even that, he might say. But does this disagreement entail that at least one of the parties is being irrational? It is hard to see how it could—neither position is rationally compelled, and neither, it seems, is guilty of inconsistency or incoherence.

Both metaphysicians and empiricists generally make a leap from what is strictly entailed by the evidence, as a matter of faith, perhaps, but in different

ways, consistent with the values to which they subscribe. It should thus be clear that P3 is no threat to metaphysics. It is precisely *because* metaphysicians think their criteria for theory choice are epistemically significant that they believe their theories might well be close to the truth. There is no pragmatic incoherence in this. As we shall see, there are certainly interesting differences in degree between different forms of speculation about the unobservable. There is no rationally compelled answer, however, to the question of how much or how little such speculation is required in order to make a form of inquiry acceptable. Where one draws the line here will depend on the values one has, not on matters of rationality.

Thus, we have arrived at the first major contention of this chapter: the empiricist critique of metaphysics cannot have the force empiricists hoped it would. This is because the critique is subject to a form of relativism that renders it effective only to the ears of empiricists. It appeals to values and policies that empiricists share, but that need not be shared by other rational agents. Only if it could be demonstrated that the metaphysical stance is incoherent by its own lights would the empiricist have a critique that escapes this conundrum, but this is asking too much. In several places, van Fraassen characterizes what it is to be rational in terms that I think, despite his deep commitment to empiricism, leave ample room for the metaphysical stance:

> [N]othing more than staying within the bounds of reason is needed for [the] status of rationality. Not good reasons, not a rationale, not support of any special sort . . . nothing is needed above and beyond coherence. Thus any truly coherent position is rational. (2000: 277)

And again:

> Coherence means: no self-sabotage. The constraints of coherence are really empty, because they don't limit the factual content of belief at all. (2001: 168)

On van Fraassen's conception of epistemology the threshold for rationality is low, and as a consequence the threshold of irrationality is very high indeed. When the sceptic challenges the empiricist to prove that it is not irrational to believe the observable content of our best theories, I do not think the latter has much to answer for. She chooses a form of inquiry that fits with her values, epistemic and otherwise, and some of these tell her the sceptic's life is not worth living. The same applies to metaphysics. One may decide, in accordance with one's values, what forms of inquiry to pursue. That is our prerogative,

after all. But few if any prerogatives transcend all possible stances, and there can be no radical critique of metaphysics by empiricism.

4. Rampant Speculation

The preceding may suggest that I aim to bring bad news to the empiricist, but that is not quite so. Here is a case, I believe, in which apparently bad news is really good news after all. The news is good not merely for those drawn to thinking about metaphysical questions—the targets of the empiricist critique—but for most empiricists as well. For as it turns out, most epistemic stances rely on some degree of metaphysical speculation, and most varieties of empiricism fall into this category. The policies I summarized in the form of M1 and M2 are fairly ubiquitous, and anyone hoping to banish them completely should thus be careful what they wish for. With this foreshadowing suggestion in mind, let us consider a few examples of approaches to the question of what our putative knowledge of the world amounts to. This will, I hope, provide a sense of the range and importance of metaphysical speculation to almost all such inquiry.

Recall that in this discussion, metaphysics is a project that is interested in and that actively pursues explanations of aspects of the world in terms of things inaccessible to the unaided senses. Leaving aside its more specific variations, scientific realism is the view that our best scientific theories describe, either truly or to some significant degree of approximate truth, both observable and unobservable aspects of the world. Given the positive attitude this position takes towards claims regarding the unobservable, realist approaches are clearly viewed as metaphysical by logical positivists. For them, unobservable terms ('theoretical terms', in the jargon) are strictly speaking meaningless if taken literally or at face value. They acquire meaning only via reduction to observable terms by way of meaning postulates (bridge principles, correspondence rules). The apparent fixation of the sciences with unobservable things is thus explained away here by the adoption of a non-realist semantics for terms concerning them. Realism, with its realist semantics, is a metaphysical position if ever there was one.

Or is it? Interestingly, van Fraassen (2005: 171) does not himself view realism as metaphysical.

> [S]cientific realism is not a metaphysical theory. The answer it gives to 'What is science?' is a claim which does not invoke any item in the metaphysicians' cornucopia. The realist claim that science aims to produce literally true theories has as relevant contrary the constructive empiricist claim that the aim is empirical adequacy. Neither is a metaphysical theory.

There are two ways of accounting for this disagreement between van Fraassen and his empiricist predecessors. The first is simple and easily explained. The second is more complicated, and raises issues that will require more careful scrutiny. Let us consider these matters in turn.

The simple reason van Fraassen does not regard realism as metaphysical stems from his definitions of realism and its empiricist rival, constructive empiricism. As he hints in the quotation above, these definitions turn on the idea of aspiration. Thus according to his characterization of realism (1980: 8): 'Science aims to give us, in its theories, a literally true story of what the world is like; and acceptance of a scientific theory involves the belief that it is true.' This is contrasted with the constructive empiricist view of the aim of science, according to which acceptance of a theory involves only the belief that it is empirically adequate. Understood this way, realism is not by itself metaphysical. One might adopt it without actually accepting *any* theory, and thus without endorsing the truth or approximate truth of any claims about unobservables. The claim here is about what sciences aim to do, not what they achieve.

It seems to me that this is too weak. It would be a strange sort of realism that is consistent with such a relaxed view of epistemic achievement. Realists generally do not merely believe that the sciences aspire to knowledge of the unobservable (and observables), but also that they often succeed in this aspiration to some degree and generally increasingly, over time. By maintaining that we do in fact have substantive knowledge of the unobservable, realists engage in the very sort of metaphysical speculation empiricists reject. They apply the epistemic policies characteristic of metaphysics, M1 and M2, in the context of the sciences. They believe that empirical tests offer genuinely confirmatory evidence for claims about unobservable entities and processes. Ampliative inferences from observable data to claims about unobservables are viewed differently by realists and constructive empiricists: the former adopt them as good bets for yielding truths, and the latter as pragmatic devices yielding empirical adequacy. And as van Fraassen himself notes, realists often situate scientific knowledge and describe it in terms of various metaphysical concepts which are not easily extricated, such as causal processes and laws of nature. Realism in practice, it seems, is very much a metaphysical theory.

A second possible reason for disassociating realism from metaphysical speculation is more subtle, and has to do with what I will describe as the perceived distance of metaphysical inquiry from the context of empirical investigation. The term 'distance' furnishes a suggestive metaphor here, but the implied notion of a metric is not especially straightforward. Empiricists have traditionally admired the early modern and modern sciences because of their putative commitment to observation and empirical constraints in the formation of belief. Contrast this with the imagined situation of the analytic metaphysician, who speculates in an a priori way from the comfort of her armchair about the nature of universals and possible worlds. With perhaps some exceptions, scientific inquiry is conducted at a significant distance from the armchair. And so, it might well seem to many empiricists that the metaphysical speculations characteristic of scientific realism are less distasteful than many others. The proximity to experience in the scientific case seems to mark an important difference in degree.

But now let us consider the notions of distance and proximity at work here. Do metaphysical speculations outside the scientific context take place in a vacuum of all but pure reason, divorced from the empirical world? Surely not. Whatever its subject matter, metaphysical inquiry is at the very least intended to be consistent with and to explain observable phenomena. The theory of the Forms is not intended, at any rate, as speculation about merely imaginary entities. It is a theory that seeks to explain how objects such as those of our experience are similar and dissimilar to one another. And theories of possible worlds are intended at least in part to give an account of the perceived modal features of *our* world, and the events, both observable and unobservable, that exemplify them. So if the difference between the metaphysics of realists and the metaphysics of others is not to be understood in terms of the relevance of the observable world to the former and its irrelevance to the latter, it must be understood in some other way. I will suggest two such ways, both of which may give some substance to the notions of distance from and proximity to empirical investigation.

Perhaps the most obvious way of understanding the concept of distance is in terms of what I will call the 'experiential distance' of an object of inquiry. This concerns the manner of detection of such an object, if indeed it is detectable at all. There is a spectrum of detection here incorporating two distinctions. One is between observables and unobservables, or things that under favourable circumstances can be perceived with the unaided senses,

and things that cannot be perceived this way. This distinction underwrites the contrast between M1 and M2 on the one hand, and E1 and E2 on the other. A second distinction is especially relevant to the ostensible difference between metaphysics in the scientific context and elsewhere: the distinction between unobservables that are detectable and those that are not. Let me reserve the word 'detectable' henceforth for unobservables that, according to the realist, can be detected using instruments but not otherwise, and let me use the term 'undetectable' for unobservables that are not amenable to detection at all. For example, though it is unobservable, the realist claims that we can detect the filament lattice of muscle tissue using microscopy, but undetectable entities and processes are hypothesized to exist for purely theoretical or explanatory reasons. When Pauli posited and Fermi theorized about the neutrino in the 1930s, to allow for conservation of mass-energy and angular momentum in atomic decay processes, they were speculating about the undetectable.

In 1956, Reines and Cowan performed an experiment in which neutrinos were apparently detected. The neutrino is thus an example of an entity that was undetectable in practice, but that became detectable in time, according to realists. Some undetectables, however, such as universals and possible worlds, are abstract and causally inefficacious, and thus undetectable in principle. The idea of experiential distance concerns the location of an object of inquiry along the spectrum inhabited by observables, through borderline cases to detectables, and ultimately through to undetectables, both in practice and in principle. The further along this spectrum one goes, the further the distance of the objects of inquiry from perception by the unaided senses. The credibility or degree of belief associated with claims about entities and processes, for empiricists and realists alike, is often a function of their experiential distance.

This, however, does not exhaust the senses in which metaphysical speculation may take place at a distance from empirical investigation. Another important factor is what I will refer to as an 'epistemic distance', which concerns the perceived risk one takes in formulating theories pertaining to the things with which one is ostensibly concerned. Risk here is understood in terms of the relations of these theories to the empirical evidence. Theories from which precise, detailed predictions can be derived about specific observable phenomena take a greater risk than those that do not. Speculations leading to theories about putative objects that are in some way amenable to empirical testing are close to the empirical context; speculations leading to theories about putative objects that are relatively insulated from such testing

are relatively further away. The implications of this sort of distance have been the subject a great deal of debate in the philosophy of science concerning possible norms of epistemic validity. Popper's injunction to consider as scientific (and thus worthwhile) only theories whose claims are falsifiable looms large here, and has an analogue in debates surrounding the epistemic import of accommodation versus novel prediction.

Consider the latter: do theories that make novel predictions (that are subsequently borne out) have greater epistemic warrant than those that merely accommodate the data known at the time of the theory's formulation? Though a matter of some controversy, it is generally held that theories that merely accommodate should be understood as receiving less support. They take a lesser risk in the face of experience, and thus have a greater epistemic distance from empirical investigation. In scientific contexts, metaphysical speculations are often close to experience, in the sense that they are vulnerable in the face of further empirical investigations that may tend to support or refute them. In more distant metaphysical contexts, however, while theories such as those concerning universals and possible worlds are intended to be consistent with the world of our experience, they do not offer predictions to be tested, per se. This apparent, relative invulnerability in the face of future observation is certainly one factor that tends to render these theories bankrupt in the eyes of empiricists.

Placing theories along the spectrum of epistemic distance is no simple matter, though. Some have argued that the evidential relations of theories to things such as auxiliary hypotheses, background beliefs, and empirical data are quite independent of whether they merely accommodate or make novel predictions.[2] For this reason, they suggest, epistemic warrant cannot differ simply in virtue of belonging to one camp or the other. Nevertheless, most share Lipton's (2004) view that while some accommodations may receive greater support than some theories making novel predictions, generally the latter are epistemically more impressive than the former. The grounds of this view, however, are shaky. If a theory accommodates the empirical data then it is consistent with it, so far as we can tell. If a theory makes a novel prediction that is subsequently borne out by observation then it is consistent

[2] For example, see Horwich (1982: chapter 5), and Schlesinger (1987), who stresses the confirmatory relevance of predictive power over novelty. Dissenting views are numerous; see Leplin (1997) for a detailed study of novelty.

with the empirical data, so far as we can tell. What is the difference, here, regarding the likelihood that such theories are true or empirically adequate? It would seem that there is none. In cases of accommodation, theories are presumed consistent with the observable evidence when they are proposed, and in cases of novel prediction, theories are presumed consistent with the observable evidence over more extended periods of time. But this temporal asymmetry has nothing to do with truth or empirical adequacy. Theories are either true or false, empirically adequate or inadequate, and these facts are not determined by the time frames over which we judge them to be so.

Lipton suggests nonetheless that novel prediction lends a theory more support, since unlike in cases of mere accommodation where all the relevant data are known in advance, there is no motive for ad hoc theorizing, or 'fudging': 'an unnatural choice or modification of the theory and auxiliaries that results in a relatively poor explanation and so weak support, a choice [one] might not have made if [one] did not already know the answer [one] ought to get' (2004: 170). Two points should make us somewhat suspicious of this, however. First, whether a choice or modification is unnatural is something that can be assessed; these judgments are made according to the standards of a scientific community in the process of accepting or rejecting a theory. And even if one is dubious of such judgments, a second point is perhaps more telling. There may be instances of mere accommodation, but there is no such thing as *mere* novel prediction. Theories making novel predictions do so in the context of very specific accommodations of the previously known data. When Mendeleev proposed his periodic table, it may well be that what most impressed the scientific community were the gaps he left for elements that were later discovered, not his accommodation of elements previously known into his organizational scheme. But perhaps this is slightly misleading. Mendeleev left gaps in his table *because* of his principles of accommodation of the previously known data.[3] Novel predictions do not arise in isolation. They are artefacts of accommodations.

It is not my intention here to resolve the debate between those who are especially impressed by theories making novel predictions and those who are not. There are considerations on both sides, but it is sufficient for present purposes merely to note that the concept of epistemic distance is part of what leads some empiricists to favour metaphysics in a scientific context over

[3] See Baigrie (manuscript).

metaphysics elsewhere. For the sake of argument let us grant that experiential distance is epistemically significant, and that the notion of epistemic distance has merit, and return to the issue of the ubiquity of metaphysics. Earlier in this section I argued that scientific realism is metaphysical; I would now like to consider whether empiricism itself is metaphysical. The surprising answer, I believe, is that it is. Of course, some forms of empiricism need not bother with M1 and M2 at all. Imagine, for example, a strict phenomenalism of the present moment, according to which knowledge claims are restricted to those describing one's current sensations. It may well be possible to formulate a coherent epistemological theory of such knowledge in the absence of speculations about the unobservable. Few would be satisfied, however, with an account of knowledge according to which we know so little. In extending the remit of what is knowable in various ways, most empiricists embrace some metaphysical speculation in order to preserve the coherence of their positions, or so I will contend.

Consider van Fraassen's empiricism, which endorses claims not merely about sensations, but about what is observed and indeed, that which is observable. Most empiricisms today, I suspect, follow suit. They are not idealisms that dispose of the external world, nor are they quietist with respect to the world beyond impressions and ideas. They generally hold that we can know things about observables that exist quite independently of ideas, on the basis of empirical investigations. They aspire to some knowledge of a world that is external to but nonetheless the subject of experience. Today, many and perhaps most empiricisms are sympathetic to a knowledge of observable entities and processes in the realist sense. Indeed, it is arguable that they must or at least should be interested in more than mere sensations or ideas, for otherwise they risk violating P1, which recall is the general epistemological principle that no inquiry should be immune to the possibility of error or failure. Most contemporary empiricists thus agree with realists about the observable. They differ from them in withholding the extension of knowledge claims to the realm of the unobservable.

As soon as the empiricist claims knowledge of more than sensations and ideas and includes observables, her epistemological landscape changes very significantly. For unlike the case of our imagined phenomenalist, she now requires an error theory. She does not ultimately believe, for example, in the existence of 'objects' experienced in optical illusions and hallucinations, even though there is no doubt that she has sensations in connection with such

events. Her experiences are not always veridical in what they convey about things in the world. Not all observations are created equal; some yield facts, others are misleading, and yet others lead us into wholesale mistakes. On a damp, overcast day through the fog I see a large shape with unusual, prehistoric features slide gracefully through Loch Ness and submerge. Is it a play of the light, or a monster? In order to know something about observables, not merely her sensations, the empiricist must have some understanding of what it means for some observations to be better than others, and how to differentiate them. Furthermore, it is a necessary feature of such judgements, whether in a scientific or everyday context, that she know how to describe her observations in terms of various categories of objects and events and their salient properties, in ways that she and her scientific and everyday communities will understand.

None of this will come as news. Both the necessity of some sort of error theory and an appreciation of the sorts of judgements this engenders have been appreciated by empiricists. Sellars and others, for example, were keen to note the 'myth of the given'. Facts about the world, they argue, cannot simply be read off of experience. Likewise, the overlapping messages of Hanson, Kuhn, and Feyerabend regarding the theory-ladenness of observation have been absorbed into the philosophy of science. They argue convincingly in different ways for the thesis that what we see is importantly shaped by the cognitive and theoretical background we bring to observation. This background generally includes the paradigmatic frameworks in which observation occurs, comprising exemplars for problem solving and metaphysical commitments regarding the various standards empirical investigation should meet. Van Fraassen himself argues against any naive view of empiricism according to which experience serves as a simple foundation for knowledge.

Somehow the significance of these insights with respect to metaphysics has not been appreciated or properly understood, however.[4] Let us briefly consider van Fraassen's rejection of foundationalist empiricism as an example of how moving beyond sensation and taking observation seriously introduces the empiricist to speculations concerning things underlying the observable. Treating experience as the foundation on which knowledge is based, he argues, will not do, for any such position faces three difficulties (2002: 117–33). The first is what he calls the problem of identification, concerning how we determine what counts as genuine experience, or that which is 'indicative of what it was

[4] An exception is Nagel (2000).

that was actually seen, touched, or heard' (p. 123). A second problem is that of interpretation, concerning the meaning of experience, or how it is to be interpreted. A third is the problem of extrapolation, concerning judgements about what accords with experience and what implications can be drawn from it, regarding such things as the confirmation of hypotheses or theories. These problems highlight the need for an error theory and associated judgements. Van Fraassen maintains that these problems are fatal to any view to the effect that experience is the foundation of knowledge, for if one regards experience as the foundation, responses to these challenges are inevitably circular or dogmatic. That is, they answer by appealing to experience, in which case the problems simply arise once more, or they appeal to nothing at all.

The only way out, he believes, is to reject foundationalism, and to appeal to another source of knowledge that explains how epistemic agents diffuse these problems in practice. The relevant source is an understanding or tradition exemplified by a community, which furnishes standard or customary answers to such questions. Crucially, here, the three challenges to foundationalism do not likewise ensnare traditions, for a tradition appropriately conceived is not 'formulable as a text' (p. 130). That is, it is not something that can be described or recorded as a set of rules or a catalogue of information. It is a generally tacit understanding that those who are members of an epistemic community share, and that unifies their practices of empirical investigation. Note how suggestively this echoes the epistemology of Kuhn and many others. For Kuhn, the disciplinary matrix and exemplars that unify normal science under the rubric of a paradigm contain much that is tacit. This knowledge can only be absorbed by means of immersion in a tradition and the training one receives there, not by reading a formulary. One must know *how* to experience things before one can derive knowledge from experience. And importantly, this extra-linguistic thing, the tradition, is something that admits of alternatives. Traditions change, and thus they are no better suited to the role of an ultimate foundation for knowledge than raw experience, whatever that might be.

There are several fascinating aspects of this non-foundationalist picture that call for attention, but I will restrict myself here to the point at issue. What sorts of things are tacit understandings, or traditions, or paradigms? They are unobservable, cognitive, cultural, heuristic entities, underlying the phenomenon of observation on which empiricism is partially grounded. Like many complex social entities they are posited for important explanatory reasons, to account for the phenomena we do experience. The recourse to

speculation here is by no means gratuitous. Indeed, if non-foundationalist conceptions of empiricism (and science) are to be compelling at all, it would appear that this sort of speculation must be central to the very coherence of empiricist (and scientific) knowledge. It furnishes empiricism with an error theory. In scientific contexts it explains how, to recall Bacon's inspired phrase cited approvingly by van Fraassen, we become literate so as to read the book of nature. But now recall M1, the epistemic policy according to which metaphysicians accept demands for explanation in terms of things underlying the observable, and M2, the policy according to which they attempt to answer such demands by speculating about such things. Even a very determined empiricist, it seems, must do some metaphysics after all.

5. Conclusion: Six Degrees

Precisely how much and what sort of metaphysical speculation is required of empiricists are tantalizing questions, and I have only just scratched the surface. Those who believe that epistemology can be naturalized may ultimately hope to answer these questions by reducing talk of tacit understandings and culturally ambient epistemic practices to facts within cognitive science and neuroscience. Some who put little store in this project may continue to speak of traditions and paradigms, perhaps analysing them in terms of systems of relations between brains and ideas and people and institutions. Others will find little of interest in such analysis, preferring instead to focus on the products of epistemic practices, scientific and otherwise. But all will make recourse to the unobservable in fashioning a coherent picture of empirical inquiry.

I began this discussion with the observation that metaphysics exemplifies characteristics that make empiricists uncomfortable. I have arrived at the conclusion that this discomfort has nuances that must be delineated if we are fully to understand what is at stake in the conflict between them. I have argued that stance empiricists cannot reasonably expect to demonstrate to anyone other than themselves that metaphysics is incoherent. For the basis of this judgement comprises values that metaphysicians need not share, and to the extent that their epistemic practices are internally coherent, they have no reason to relinquish them. Furthermore and perhaps more importantly, the sorts of epistemic policies characteristic of metaphysics, of which empiricists disapprove, are policies that most empiricists must adopt in establishing the

coherence of their own forms of inquiry. And so, rather than focus on the coarse distinction between M1 and M2 on the one hand, and E1 and E2 on the other, it will serve us better to pay greater attention to finer distinctions between different kinds of metaphysical speculation. This latter consideration may illuminate how different forms of metaphysical speculation inform different kinds of inquiry into the nature of the world.

I have described these finer-grained distinctions in terms of six degrees of speculation, each applicable to various forms of investigation in empirical contexts. Along one axis there are three degrees of experiential distance, featuring objects and processes that are observable, detectable, and undetectable. Along a second axis there are two degrees of epistemic distance, featuring claims and theories that accommodate the observable data, and those that in addition to accommodating also make novel predictions that are borne out in experience. The resulting six combinations describe speculations of different sorts. It is commonly said, for example, that theories of evolution concern both observables and detectables but make no novel predictions. Theories of gene transcription, however, concern detectables and do make novel predictions, and so on. The theory of the Forms and the theory of epistemic traditions concern undetectables, and neither make specific, testable predictions. Nevertheless, both accommodate the world of everyday and scientific experience.

The lesson here, I believe, is that it is not metaphysics that empiricists should oppose, but degrees of metaphysical speculation that fall outside the bounds of what they judge to be appropriate to the forms of empirical inquiry that most interest them, in accordance with their epistemic and other values. Indeed, were they to oppose metaphysics *simpliciter*, it appears that they would be guilty of pragmatic incoherence, since they themselves generally rely on some such speculations in one form or another. But judgements concerning the degrees of metaphysical speculation one should accept in specific contexts inevitably vary across epistemic agents, in light of the relativism I described earlier regarding the rationality of adopting the epistemic strategies characteristic of things like metaphysics and empiricism. There is no one, correct answer to the question of which degrees of speculation a rational agent should accept. Different investigators engrossed in different contexts of investigation may make different, conflicting, but nonetheless rational judgements about these matters.

With very few exceptions, inquirers go well beyond the observed data in formulating claims and theories about the world. Van Fraassen's empiricist may go so far as claims about observable things, and the empirical adequacy of certain theories more generally. Scientific realists go further. Both take ampliative steps—leaps, perhaps—from the evidence in ways determined by their own subjective values and probabilities of success. Exercising these different epistemic principles is part of what it is to belong to different communities of inquiry. And though they differ with respect to their proximity to empirical investigation, inferences concerning unobservables in scientific contexts often provide suggestive analogies to more deeply metaphysical inferences in the context of scientific realism and beyond.

Consider, for example, the fact that many of the unobservables whose existence realists routinely infer are grasped metaphorically at best. Descriptions of electrons, for instance, not in terms of putatively detectable measures of their quantifiable properties, but rather in terms of the qualitative pictures we employ to conceptualize them, are generally given in terms of jointly inconsistent models: particles, waves, clouds. The metaphors metaphysicians use to paint conceptual pictures of things such as causal necessity, for example, are also crude: powers, chains, giving rise, bringing about. The ontological implications of these curious epistemic practices, if indeed there are any, can be assessed only relative to a stance. An electron is no ordinary particle, wave, or cloud, and neither is an epistemic tradition any simple list of policies, according to which our knowledge of the world is revealed. This, I hope, is no despairing indictment of the possibility of such knowledge, but rather an invitation to explore the varieties of metaphysical speculation that inevitably inform it.

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