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Should the Empiricist Be a Constructive Empiricist?*

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Van Fraassen does not argue that everyone should be a constructive empiricist. He claims only that constructive empiricism (CE) is a coherent post-positivist alternative to realism, notwithstanding the realist's charge that CE is arbitrary and irrational. He does argue, however, that the empiricist is obliged to limit belief as CE prescribes. Criticism of CE has been largely directed at van Fraassen's claim that CE is a coherent option. Far less attention has been directed at his claim that empiricists should be constructive empiricists. I consider his various attempts to support this claim, conclude that they are unsuccessful, and suggest that the empiricist who repudiates CE does not thereby abandon contemporary empiricism itself.

1. Introduction. Before Bas van Fraassen presented his account of Constructive Empiricism (CE hereafter), the only significant empiricist contender to scientific realism seemed to be logical positivism.¹ Since positivism had, as van Fraassen puts it, a "rather spectacular crash," the realist seemed to be in the enviable position of having as a contender a philosophical orientation whose shortcomings as an account of science were obvious. Unfortunately for the realist, van Fraassen cheerfully endorses the standard objections to positivism and proceeds to describe a form of empiricist anti-realism that appears to be untouched by those objections.²

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1. But see section 10 below.

2. "Logical Positivism, especially, even if one is quite charitable about what counts as a development rather than a change of position, had a rather spectacular crash. So let

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Van Fraassen's arguments are, as a result, not so much directed at showing that realism is not a tenable philosophy of science as at demonstrating that CE is. As he says in his introduction to *The Scientific Image*, his intent is to counter the "arguments brought forward by scientific realists against the empiricist point of view" (van Fraassen 1980, 5), and to develop a "constructive alternative to scientific realism" (van Fraassen 1980, 5). He explicitly denies that his goal is to demonstrate that the realist's commitment to unobservables is irrational. He claims only that the empiricist is not required, in light of the failure of positivism, to follow the realist in that commitment. "I do not," he says, "consider leaps of faith or belief in things unseen, arrived at for whatever reason, necessarily irrational—only the pretense that we are rationally compelled (e.g. through arguments concerning explanatory value) to embrace more than strict empiricism prescribes" (van Fraassen 1985, 286).

The result, as Gideon Rosen notes, is that the "naïve realist who approaches van Fraassen's work looking for reasons to change his mind will find surprisingly little to go on" (Rosen 1994, 157). If one's reason for being a realist is the unavailability of a coherent antirealist alternative that "makes sense" of science, then "van Fraassen's display of a coherent anti-realist alternative should undermine that commitment" (Rosen 1994, 158). But "the trouble is that for many of us our realism does not seem to depend on argument *against* the various more skeptical stances," and so the "mere availability of van Fraassen's view does not give me reason to go over to it" (Rosen 1994, 159; see also Creath 1985, 336–337).

As the passage from *The Scientific Image* above indicates, however, van Fraassen does think that CE is the position you should adopt if you are an empiricist. If you share the empiricist's conviction that "experience is the sole legitimate source of information about the world" (van Fraassen 1985, 286), and so long as CE is the only viable expression of that conviction, then it behooves you to limit your acceptance of scientific theories to their empirical adequacy. This is how Rosen understands van Fraassen's position: "The thought is that van Fraassen is not just concerned to show that the constructive empiricist's stance is permissible; he is also concerned to show that *if one is a committed empiricist in the broad sense,*

us forget these labels which never do more than impose a momentary order on the shifting sands of philosophical fortune, and let us see what problems are faced by an *aspirant* empiricist today. What sort of philosophical account is possible of the aim and structure of science?" (van Fraassen 1980, 2)

The traditional reading of positivism that van Fraassen presupposes, and that is presupposed by these objections, has come under considerable attack in recent years. I am very sympathetic to these criticisms, but this is not the place to discuss them. See Alspector-Kelly 2001a and 2001b.

one has positive reason to reject a realist stance in favor of constructive empiricism." (Rosen 1994, 159)

So understood, van Fraassen has two aims: to demonstrate to the realist that a viable empiricist alternative to realism is available; and to demonstrate to the empiricist that her commitment to empiricism requires that she embrace CE. Since the critics of CE have by and large been realists, the first claim has been subject to extensive scrutiny (see, for example, Churchland 1985, Wilson 1985, Gutting 1983, Hacking 1981, Boyd 1985, Glymour 1984, Musgrave 1985, and Hooker 1985). But the second claim (to which I will refer as his "empiricist thesis") has received comparatively little attention, despite the crucial role that it plays in van Fraassen's overall argumentative scheme.

It is this second thesis—that the empiricist should be a constructive empiricist—that I will consider here. I will argue that van Fraassen's defense of this thesis fails: he has not given the empiricist reason to think that her commitment to empiricism is in tension with belief in the existence of unobservable entities. I point out in closing that another contemporary empiricist—W. V. Quine—rejected the pragmatic/epistemic distinction that CE presupposes. CE is not, then, the only available post-positivist formulation of empiricism, and so the empiricist who renounces CE need not take herself to have renounced empiricism itself.

2. From Empiricism to Constructive Empiricism. In "Empiricism and the Philosophy of Science" (1985, 252 and 286) and *Laws and Symmetry* (1989, 8), van Fraassen characterizes the empiricist as one who maintains that experience is the sole legitimate source of information about the world (I will refer to this claim as "SI"). This does not mean that the only propositions that can be legitimately endorsed are the deliverances of our senses. As van Fraassen recognizes, to accept a theory as empirically adequate is to believe more than this, since it involves commitment to observables that will in fact never be delivered to anyone's senses (van Fraassen 1980, 69).

He also recognizes that the claim that a theory is true and that it is empirically adequate are both vulnerable to test against the information that experience provides; either can be undermined by future observations that do not accord with the theory's predictions. The claim that a theory is true (call this "TU"), however, admits of no *additional* test against that information than does the claim that the theory is empirically adequate ("TEA"). So TU could never enjoy *more* empirical support than TEA. And since experience is the only source of information, no other epistemically relevant consideration can be appealed to as a reason for taking on the additional commitments that come with believing TU; those commitments are "supererogatory" (van Fraassen 1985, 255).

This does not in itself require that we—or the empiricist—endorse CE. But it does mean that there can never be reasons *in favor* of, let alone that mandate, belief in TU over TEA. The realist option cannot therefore be forced on the empiricist who opts instead for CE.

There is, on the other hand, an objection to realism that the empiricist should find compelling. TU is logically stronger than TEA and therefore a priori less likely to be true (van Fraassen 1980, 69 and 1985, 246). And we have just noted that information from experience will never tell in favor of TU over TEA, and so can never improve the likelihood of TU with respect to TEA. But SI implies that there is no other information to appeal to. So the empiricist would have to view preference for TU as the choice of a less likely hypothesis over a more likely one without any epistemically relevant reason for so choosing.

So the empiricist should be a constructive empiricist. Indeed realism looks unattractive in general: it involves either indulgence in superfluous belief without hope of warrant or commitment to a non-empirical source of information about the world.

3. Problems. Logical compatibility (or incompatibility) with the deliverances of experience is the only evidential relation between theory and empirical information that van Fraassen recognizes. He construes all other relations—being explanatory of that empirical information, for example—as pragmatic (at best).

In light of this, one of the realist's standard responses to van Fraassen is that there are a variety of logically weaker positions than TEA that are also compatible with all the empirical evidence that we will ever have. We could, for example, believe in the empirical adequacy of the theory only from the moment humans began to make observations to the moment they cease doing so. *Ex hypothesi*, no observation made by humans will ever prove that hypothesis wrong if the theory is empirically adequate. Or we might slide all the way down the slippery slope and advocate the weakest assertion consistent with the observed evidence, namely, the observed evidence itself, and refuse to endorse anything beyond what has been or will be in front of our eyes. (Peter Railton (1990) calls this position “manifestationalism.”) If we will affirm only the logically weakest belief consistent with the evidence, this will leave us with very little to believe.³

3. On van Fraassen's behalf, Rosen suggests that CE is the only position that does maximal justice to *both* SI and the commitment that science is a valuable, fully rational activity (Rosen 1994, 161–163). Manifestationalism does not do justice to the latter commitment since the manifestationalist has no reason to gather more empirical information, an activity that is clearly part of scientific practice. But this suggestion does not rule out limiting belief to the theory's empirical adequacy while humans exist. If I am concerned to discover whether my theory “that covers all the evidence so far col-

Van Fraassen acknowledges the existence of weaker alternatives in his recognition that even belief in the theory's empirical adequacy is underdetermined by the available evidence. But he points out that "if we choose an epistemic policy to govern under what conditions, and how far, we will go beyond the evidence in our beliefs, we will be setting down certain boundaries" between "extreme scepticism and untrammelled, wholesale leaps of faith" (van Fraassen 1985, 254). Both the realist and the constructive empiricist set such boundaries. If the realist is permitted to set her boundaries so far out as to include unobservables, then the constructive empiricist can hardly be maligned for setting them more closely and in accord with "our opinions about the range of possible additional evidence" (van Fraassen 1985, 254).

If van Fraassen's only task were to demonstrate that CE is a coherent alternative to realism and that realism is not itself rationally mandated by the evidence, then this response might be adequate. But he also claims that the empiricist *should* be a constructive empiricist, that she is obliged to renounce commitment to unobservables as in tension with her commitment to SI.

In this context, the realist's response returns in full force. So long as there are other beliefs weaker than CE and logically compatible with the empirical evidence, then if SI obliges the empiricist to prefer CE over realism it also obliges preference for these weaker alternatives over CE. If it does not oblige the empiricist to prefer these weaker alternatives—if CE is characterized as an option available to the empiricist but one with a variety of equally legitimate stronger and weaker alternatives—then the empiricist is not obliged by her commitment to SI to renounce belief in unobservables.

Van Fraassen thinks that the middle ground CE represents is stable, and congenial to the empiricist, in virtue of its appeal to our "opinions about the range of possible additional evidence." But as critics (Churchland 1985, for example) have emphasized, the observable/unobservable distinction—at least as van Fraassen draws it—is simply not the same as the distinction between what is within and without the range of possible additional evidence. Even the past is beyond the range of possible additional evidence, at least in the sense that judgments concerning it are forever immune to refutation by direct observation. But of course van Fraassen does not advocate scepticism with respect to the past.

The past is not of course beyond the range of possible additional evi-

lected about Etruscan urns" is correct about everything observable from the moment humans began to make observations to the moment they cease doing so, then I will "dig in the last uninspected patch of ground" where contrary evidence might lie (Rosen 1994, 162).

dence in an indirect sense. We can discern evidence for *Australopithecus* in present observations of fossils. But the same seems for all the world to be the case for van Fraassen's unobservables: unbemused by the constructive empiricist, we would see evidence for subvisible particles in their Brownian aggressions against smoke particles. Appeal to susceptibility to empirical confirmation or falsification does not distinguish our epistemic relation to unobservables from our relation to our ancestors. So it does not delimit the range of possible evidence, and therefore does not determine CE as the natural stopping-place—or the only such place—for the empiricist searching for middle ground between scepticism and untrammelled, wholesale leaps of faith.⁴

4. Reconsidering the Slogan. Van Fraassen has recently lost faith in his earlier characterization of the empiricist as advocate of the doctrine that experience is the sole legitimate source of information about the world. Some concerns he has lately expressed do not undermine appeal to this slogan entirely. In van Fraassen 1997 he rejects a classical foundationalist interpretation of the slogan which would require that experience be construed as providing uninterpreted (or self-interpreting), unassailable, pre-theoretical material that nonetheless constitutes adequate foundations for the theoretical edifice the classical empiricist hoped to erect on it. But it was already clear in *The Scientific Image* that he did not conceive of the deliverances of experience, or of epistemology in general, this way. And he is surely right to think that appeal to experience as the only means by which the world communicates with its epistemic agents survives the downfall of classical foundationalist empiricism.

More troubling for the advocate of SI as constitutive of empiricism are the pair of essays "Against Transcendental Empiricism" (van Fraassen 1994a) and "Against Naturalized Epistemology" (van Fraassen 1993).⁵ One might well think that the empiricist would have to be either transcendental or naturalized; and so it would seem at first glance as though these essays together leave no room for empiricism at all. But his message is that this dichotomy is a false one, resting on an assumption concerning the character of philosophical positions that he hopes to undermine.

These papers present a generalized version of an old complaint against empiricism: that empiricism itself, at least when expressed as a doctrine concerning the (epistemic, semantic, or ontological) relation between ourselves and the world, becomes an instance of the very sort of metaphysical

4. See Psillos 1999 for arguments along much the same lines as those presented in this section.

5. See also van Fraassen 1994b.

(or first-philosophical, or trans-empirical, or superscientific) standpoint that it is designed to repudiate.

He presents two lines of argument; the first is as follows.⁶ Empiricists have always had a high regard for empirical science as the ideal of rational inquiry, and have hoped to wield the empiricist doctrine as the means to demarcate respectable science from noxious metaphysics. Suppose that it is the principle SI, or some elaboration thereof, that the empiricist hopes to employ in this way. Does that principle itself constitute science or metaphysics? Obviously, the empiricist will not opt for the latter. So the doctrine must itself be a scientific doctrine.

Since the negation of scientific doctrine is also scientific doctrine—since disagreement in science does not make one unscientific—the denial of SI is also scientific. But then the empiricist cannot disparage the metaphysician for transgressing the bounds of scientific rationality in her denial of SI. And that means that SI cannot be relied on to ground a critique of metaphysics as unscientific.

The attempt to distinguish rational science from irrational metaphysics is now unpopular. The contemporary empiricist may well then not want to hitch her wagon to such a project, and that provides a response to the above argument. Empiricism is indeed a scientific doctrine competing, in the way that scientific doctrines do, with its contradictory endorsed by the metaphysician, who the empiricist now admits into the scientific fold. The metaphysician who denies SI is not, therefore, irrational, or unscientific; he is, this “naturalized” empiricist thinks the evidence will show, just wrong.

Van Fraassen’s second line of argument is directed against this naturalist response. He claims that the supposedly empirical hypothesis that experience is the sole source of information cannot be either disconfirmed or confirmed. Any supposed disconfirmation—that a soothsayer seems remarkably adept at delivering correct judgments concerning times and places she has not experienced, for example—would not really disconfirm SI because it is not really her *judgments* that are taken as evidence, but our identification of the correlation between her judgments and the facts. Without that correlation, we would place no confidence in her judgments; and we place only so much confidence in them as the correlation we have discovered warrants. But that correlation is itself an empirical result. So this supposed disconfirmation only exemplifies the principle that scientific data has experience alone as its source.

Now suppose we try to confirm the doctrine—that experience, for all people and every subject-matter, is the sole source of information—by

6. These arguments are each present in both of van Fraassen’s essays, though in greater or lesser degrees; this presentation is gleaned from both essays.

scientific means. We might conduct experiments whose results indicate that their subjects' information improves with experience of the subject-matter. But this assumes that the experimenters themselves deliver reliable information regarding their subject-matter, namely, the reliability of their subjects' judgments. So what is really established is the conditional: if the experimenter's empirical judgments are reliable, then so are their subjects'. But what we want is the consequent; for that is the proposition on which the scientist will generalize in order to arrive at SI. So we need to determine whether the antecedent is true. We might conduct another experiment, now with those experimenters as subjects; but the same question will apply to our own empirical judgments. If, instead, we stop with the experimenters, that amounts to assuming the reliability of (their) experience as a source of information. And confirmation of a principle under circumstances wherein that principle is assumed is a sham.

The upshot is that any attempt to evaluate SI by conducting a scientific inquiry is illegitimate because, in essence, SI is too fundamental a characteristic of scientific inquiry itself to be capable of being "bracketed" for scientific investigation. So we can neither confirm nor disconfirm SI by empirical means. Therefore, SI—in the form in which it might be wielded against the metaphysician—cannot constitute an empirically testable claim, and is therefore metaphysical. So SI cannot provide the basis for the critique of metaphysics without being self-undermining.

In the interest of not straying too far afield from the main concern of this paper—whether the empiricist should be a constructive empiricist—I will not evaluate these arguments here, but instead will assume that van Fraassen has raised intractable difficulties for the empiricist who advocates SI. Van Fraassen remains committed to empiricism nonetheless; how does he now understand that commitment, and what impact does that commitment have on his contention that the empiricist should be a constructive empiricist?

5. Empiricism without Doctrine. The empiricist's problem arises, van Fraassen says, because empiricism was characterized doctrinally at the outset as a claim about the world—specifically, about the epistemic relation between the world and its epistemic agents (van Fraassen 1994a, 317 and 1993, 82). His solution is to deny that empiricism must constitute a doctrine that the empiricist believes. Common to members of the empiricist tradition that he respects is a form of critique that emphasizes the virtues of science's appeal to experience and "calls us back to experience from the enmeshing webs of theoretical reason" (van Fraassen 1994a, 311). The specific targets of that critique are those metaphysical doctrines that give primacy to the role of explanation and are satisfied by expla-

nations that appeal to entities or aspects of the world that are not evident in experience (van Fraassen 1994a, 311).

But this standpoint is a constellation of attitudes, not of beliefs, and it is a mistake to assume that attitudes are reducible to, presuppose, or must be justified by beliefs. The doctrinal empiricist hoped for a doctrine the endorsement of which would justify this constellation of attitudes. But that was a mistake. Van Fraassen's arguments demonstrate that this is not possible; and it is a philosophical mistake to assume that it is needed.

So the empiricist can escape the dilemma van Fraassen has described by repudiating the background assumption that empiricism must consist in a doctrine such that to be an empiricist is to believe that doctrine. Empiricism is appropriately characterized by the attitudes of respect for science, suspicion of the comfort that explanation-by-postulate brings, and a call to experience as a safeguard against theoretical flights of fancy, without the requirement that these attitudes be based on, or reduced to, a belief about the world and our epistemic relation to it.

Van Fraassen's comments in these papers concerning his own (re)conceptualization of empiricism are suggestive but, I believe, underdeveloped, and leave the impression that he is still working through the issues involved. So I will therefore not contest those comments in any detail, except to raise one concern that I hope will be allayed by his discussion to come.

The concern is that the dilemma he has raised for the doctrinal empiricist seems to be quickly translatable into the language of attitudes. The doctrinal empiricist's problem is a result of: (a) her respect for science as paradigmatic of rational inquiry and her suspicion of any approach to inquiry that does not share its characteristics (in particular, its appeal to experience), (b) her desire not to have that respect appear frivolous and unfounded, (c) the fact that a scientific justification of her respect for science would be either trivial or beg the question, and (d) the fact that a superscientific justification of her respect for science as the paradigm of rationality would be self-undermining. None of this requires that her attitude of respect be expressed as a belief; it only requires that she would like to have something coherent and significant to say in favor that attitude and against those who do not share it. So the problem van Fraassen raises seems to apply whether or not empiricism is characterized doctrinally or attitudinally. (Indeed, the dilemma's target need not even be an empiricist. The fact that those aspects of the scientific endeavor the doctrinal empiricist wishes to emphasize and commend are those that happen to be congenial to her empiricist heart plays no essential role in the dilemma.)

Whatever the outcome, we can ask after the impact that this reorientation of empiricism has on van Fraassen's claim that the empiricist should be a constructive empiricist. The specific attitudes he identifies—suspicion

of explanation in general and of explanation by appeal to unobservable postulates in particular—is dangerously close to a characterization of empiricism that requires the empiricist to be a constructive empiricist by definitional fiat. That is a mistake; there have been many empiricists—including, for example, one to whom van Fraassen refers, Hans Reichenbach⁷—who thought that empiricism is compatible with belief in unobservables (see also Salmon 1985).

But suppose that we agree that scepticism regarding appeals to explanation of the sort in which his realist opponent indulges—in particular, inference to the truth of the best explanation—is constitutive of the empiricist standpoint. We can still ask whether that sceptical attitude will lead the empiricist naturally to endorse acceptance of scientific theory as the belief in nothing more than empirical adequacy but also nothing less, and therefore to CE.

6. Inference to the Best Explanation. Van Fraassen has raised a number of arguments against inference to the best explanation (for example, van Fraassen 1980, 19–40 and Chapter 5, and van Fraassen 1989, 142–150). I will not take up those arguments here. Instead, I note that van Fraassen appears to object to inference to the *truth*, but not inference to the *empirical adequacy*, of the best explanation.⁸

To the realist who argues that we follow inference to best explanation (IBE) in ‘ordinary’ cases, and that following it consistently will lead to realism, van Fraassen responds: “Here is a rival hypothesis: we are always willing to believe that the theory which best explains the evidence, is empirically adequate (that all the observable phenomena are as the theory says they are)” (van Fraassen 1980, 20). He recognizes that explanatory power is a criterion for theory-acceptance; but since acceptance is only belief in the empirical adequacy of the theory, that endorsement does not imply belief in the truth of the most explanatory theory (van Fraassen 1980, 71–72).

Van Fraassen does not bemoan the fact that explanatory power plays a role in theory choice. Far from being a regrettable preoccupation of the working scientist which distracts her from her fundamental task, the search for explanation is integral to the development of empirically adequate theories (van Fraassen 1980, 157). This is not because explanatory power is a *sui generis* property which, “mysteriously, makes those other qualities [including empirical adequacy] more likely,” but because “having a good explanation *consists* for the most part in having a theory with those other qualities” (van Fraassen 1980, 94). So the search for explanation

7. Van Fraassen 1994a, 334 n. 2.

8. In section 7, I explain why the “appears” qualifier is needed.

“consists *for the most part* in the search for theories which are simpler, more unified, and more likely to be empirically adequate” (van Fraassen 1980, 93–94). The constructive empiricist thus agrees with the realist that theories are, *ceteris paribus*, “better off if they are more explanatory” (van Fraassen 1985, 280), although he disagrees with the realist as to the reason why they are better off.

Van Fraassen’s response to the realist conforms to his general argumentative line that we discerned earlier: CE presents us with an alternative to realism—in this case, to the realist’s conception of the role of IBE—and so we have the option of limiting belief as CE prescribes. But the present issue is not whether such an option is available, but instead whether the empiricist is obliged to take it up, and whether a sceptical attitude toward inference to the best explanation will lead the empiricist to CE.

To infer to the empirical adequacy of the best explanation is to infer to the truth to some extent, since belief that a theory is empirically adequate is belief that it is true *vis-à-vis* the observable. The question is then whether the empiricist should countenance inference to the truth of the conclusion only if the conclusion concerns observables.

But if *that* is the question, then van Fraassen’s objection to IBE to unobservables does not concern the status of IBE *per se*, but rather the status of inference to unobservables generally. For otherwise endorsing IBE to observables but not to unobservables would be as arbitrary as endorsing IBE on every day of the week but Wednesday. So if the empiricist attitude is not so defined as to rule out commitment to unobservables by fiat, then van Fraassen’s apparently selective attitude toward IBE begs the question against the empiricist who does not share his reservations concerning unobservables.

7. The “New Epistemology.” Stathis Psillos (1996 and 1999) raises similar objections to van Fraassen’s discrimination between IBE to empirical adequacy and to truth. (Psillos calls the former “horizontal” IBE and the latter “vertical” IBE.) Van Fraassen co-authored a response to Psillos; I will refer to the co-authors collectively as “RESP.” RESP argues that van Fraassen never affirmed IBE in either its horizontal or vertical forms. Van Fraassen’s intent is to counter the realist’s argument that “the use of IBE in scientific practice, and acceptance of the rationality of that practice, forces us into realism. Van Fraassen attempts to show that . . . it can always be recast as a decision to believe in the empirical adequacy of a hypothesis and that this can be given a pragmatic justification” (Ladyman et al. 1997, 314). But “Psillos is wrong to think that this amounts to an endorsement of horizontal IBE. Therefore, his main claim, that van Fraassen offers no reason to discriminate between vertical and horizontal IBE, is no criticism of van Fraassen’s position” (Ladyman et al. 1997, 314).

In response to the question how, in the face of a general rejection of IBE, belief in empirical adequacy can be justified by the evidence, RESP denies that van Fraassen ever intended to argue that belief in empirical adequacy *is* justified by the evidence. The constructive empiricist rejects the realist's claim that it is irrational not to accept the best explanation. But "neither does it follow, on that view [CE], that one should believe the theory to be empirically adequate while remaining agnostic about its truth. The epistemic attitude is presented, not as a doctrine that must be adopted on pain of irrationality, but as a position that may be adopted while accounting for all that we need to about science" (Ladyman et al. 1997, 315).

Both realism and CE, it turns out, extend belief beyond evidential warrant. But given the "English" (vs. "Prussian") model of rationality that van Fraassen endorses—according to which "rational" is a term of permission rather than obligation—neither are thereby irrational (van Fraassen 1989, 172).

Since realism goes greatly beyond the evidence, the realist cannot charge the constructive empiricist with irrationality when she refuses to extend belief beyond empirical adequacy. But since CE also goes beyond the evidence, the constructive empiricist cannot charge the realist with irrationality either.

We are on familiar ground. Van Fraassen is not arguing that realists should not be realists—that they would be irrational in believing TU—but that it is not irrational for the empiricist to refuse to commit to unobservables and moreover that the empiricist does have reason to restrict belief to TEA. But now the empiricist's obligation does not arise in light of a difference in the epistemic merit of horizontal and vertical IBE. IBE is not an evidential rule at all, and so belief in TEA is not warranted on the basis of the evidence any more than is belief in TU. "[V]an Fraassen's disagreement with the realist does run much deeper than is so often thought; it is not just about the possibility of justifying our beliefs about the unobservable parts of the world. What this means, however, is that the scepticism which is entailed by a rejection of IBE in general is simply accepted by van Fraassen." (Ladyman et al. 1997, 319)

Since informativeness varies inversely with truth and informativeness is a reason for acceptance, van Fraassen has argued that acceptance is not belief and that reasons for acceptance are pragmatic (van Fraassen 1985, 280–281). But in light of the availability of logically weaker alternatives to TEA, the same reasoning implies that acceptance of TEA is also not belief and that TEA must also be understood as accepted on pragmatic grounds. It seems that (the later) van Fraassen is willing to concede this and accept the resulting scepticism. We are however rescued from the destructive impact that doing so would seem to have on the rationality of our beliefs by the permissiveness of the new epistemology: "It is possible

to remain an empiricist without sliding into scepticism, exactly by rejecting the sceptics' pious demands for justification where none is to be had" (van Fraassen 1989, 178).

But to defend his empiricist thesis van Fraassen needs to argue, not that commitment only to observables *is* permissible, but that extending commitment to unobservables is *not* permissible given commitment to empiricism. RESP claims that CE is more congenial to the empiricist standpoint. Van Fraassen is "content to argue that *empiricists* should not be realists but should adopt constructive empiricism, because realism has no more *empirical* goods to offer than his position has. Thus from an empirical point of view the extra strength of the realist position is illusory" (Ladyman et al. 1997, 317). The empiricist's obligation to adopt CE supposedly arises, not because TEA is within the compass of evidential warrant and TU is not, but because realism has no more *empirical* goods to offer than CE.

But CE itself has no more empirical goods to offer than the logically weaker alternatives mentioned earlier. Indeed, it has no more empirical goods to offer than belief only in the deliverances of present and future observation, the past being forever beyond the "immediacy of experience" (van Fraassen 1989, 178) and so safe from the "pinch of misfortune" (van Fraassen 1985, 255). If the later van Fraassen concedes that TEA and TU—as well as a variety of alternatives weaker than TEA—all constitute unwarranted (but not thereby irrational) extensions beyond the evidence, then the constructive empiricist cannot be commended for restricting his epistemic commitment to the "empirical goods" and not indulging in the realist's metaphysical excess without opening CE to the very same criticism.

8. Further Arguments from RESP. At one point RESP suggests that there is an "extra problem with IBE over and above Hume's problem [of induction]":

Even supposing that in everyday life we routinely use IBE to go beyond the observed phenomena, we do not routinely introduce new ontological commitments. In the case of the earlier example, *we already believe that mice exist*, that is, we use IBE to conclude new facts about tokens of types that are already included within our ontological commitments. (Ladyman et al. 1997, 316)

These comments should not be taken to imply that RESP endorses an ampliative rule of inference, whether it be induction or IBE.⁹ The point is that even *if* we were to countenance ampliative rules, the ampliative rule

9. I confess to having so taken them until corrected by an anonymous referee.

that would be required in order to warrant TU is different in kind— and more objectionable—than that which would be required to warrant TEA. So CE would come out the winner even if we admit ampliative rules of inference.

Just what the difference is between the ampliative rule that would be required for TU and for TEA is not, however, clear from this passage. The introductory sentence—which asserts that there is an extra problem with IBE over and above Hume’s problem of induction—suggests that the extra problem is with IBE *per se*, in virtue of its inevitable introduction of new ontological types, but that we would not have to appeal to IBE in order to infer TEA from the evidence (again, on the assumption—which RESP happens to deny—that there are legitimate ampliative rules of inference). For induction, the claim would be, would deliver more than what present observation discloses and so license belief in unobserved observables, but would not license belief in unobservables. The impression that this is RESP’s intent is reinforced when RESP later says that “[e]ven if it is necessary to make inductive inferences, abduction [which is, I take it, IBE] gains us nothing further” (Ladyman et al. 1997, 316).

But the subsequent passage itself suggests instead that it is the introduction of new (types of) ontological commitment that presents the “extra” problem, not IBE *per se*, since in everyday life we “routinely use IBE to go beyond the observed phenomena,” but without introducing new ontological types. That would suggest that RESP believes that inferences to observables never involve new types and inferences to unobservables always do. For otherwise, the claim that we stick to extant ontological categories in our everyday inferential behavior would in itself provide no reason to think that TU is susceptible to an extra problem and that TEA is not.

Suppose that RESP’s claim is that IBE inevitably introduces commitment to new ontological types but TEA would not require appeal to that inferential rule. If so, the first point is false and the second *prima facie* unlikely and unsupported. IBE does not inevitably introduce commitment to new ontological types, as van Fraassen’s own mouse-in-wainscoting example¹⁰ illustrates. And it is hard to see how all of our beliefs concerning observables—concerning extinct dinosaurs, distant stars, past murders, and mice in wainscoting that never reveal their whiskered faces to constructive empiricist homeowners—could be arrived at without favoring the most explanatory hypotheses. Neither RESP nor van Fraassen anywhere demonstrate that IBE is *not* needed in order to arrive at *any* belief in

10. “I hear scratching in the wall, the patter of little feet at midnight, my cheese disappears—and I infer that a mouse has come to live with me” (van Fraassen 1980, 19–21).

observables but that it *is* needed to arrive at *every* belief in unobservables. *Prima facie*, this seems most unlikely to be the case.

Suppose instead that RESP's claim is that vertical IBE introduces new ontological types whereas horizontal IBE—the inferential pattern we apply in our everyday lives—does not. This claim is also false. As Psillos later points out, positing a hitherto unknown extinct animal on the basis of archeological evidence is the positing of a new type, and the discovery of a new virus—HIV, for example—introduces an instance of a known type. The line between inferences to new and old ontological types and that between horizontal and vertical IBE are orthogonal. (And if not, so what? As Psillos points out (1997, 371), RESP provides no reason to think that the introduction of a new ontological type should make any epistemic difference anyway.)

9. RESP's Last Stand. There is one last argument presented by RESP. RESP points out that CE is “not an epistemology but a view of what science is,” one which could “accompany many different attitudes towards it, its value, its worthiness of acceptance, its chance of success” (Ladyman et al. 1997, 318). It appears “on first glance” that “van Fraassen thinks empirical adequacy to be a reachable aim for science. But of course that is not implied at all. In fact, he nowhere says that empirical adequacy is within the reach of science—nor that it is not. It is simply an issue van Fraassen does not address and *need not* address in order to make his point against the realist [that a theory is more likely to be empirically adequate than true]” (Ladyman et al. 1997, 317).

A thesis strictly about the aim of science does not indeed imply any epistemological position. For example, even if the realists are right that science is aimed at the truth, the empiricist can value science only for its delivery of empirically adequate theories. But van Fraassen needs to conjoin this thesis to an epistemology. Who cares whether the aim of science is empirical adequacy, after all, if it turns out that this is as utopian an aim as is truth? Empiricism *is* an epistemological standpoint (even if it is an epistemological attitude rather than a belief); if CE is not itself an epistemological standpoint, then it is empiricist in little more than name, and loses much of its interest. And van Fraassen will need an epistemology in order to make his point against the empiricist who believes in unobservables. He advocates his thesis concerning the aim of science, after all, because he thinks that the characterization of science as aiming at empirical adequacy rather than truth is the one most congenial to the empiricist's epistemological standpoint, and that the realist's characterization is not congenial to that standpoint.

Van Fraassen does, of course, conjoin the thesis about the aim of science to an epistemology. Indeed, it seems as though he conjoins it to two

epistemologies, one early and one late. According to the early epistemology, we should believe only what lies within the scope of the empirical evidence (which supposedly limits us to TEA). According to the new epistemology, both realism and CE involve beliefs beyond the scope of empirical evidence—although realism lies further out than CE—but both are acceptable in light of the permissive nature of rationality.

I suspect that many readers of *The Scientific Image* would be surprised to learn that when van Fraassen chastised the realist for believing more than the empirical evidence supports he actually thought that the constructive empiricist did so as well. (Did he really not, for example, believe that his inference that a mouse has come to live with him was not only not irrational but indicated by the evidence?) I will nonetheless put aside the question whether the later van Fraassen's views are really compatible with those of the earlier (see Psillos 1996, 1997, 1999, Ladyman et al. 1997, Richmond 1999, and Kukla 1995). In any case, neither formulation of CE (or CE-plus-epistemology) delivers what van Fraassen needs, namely, an argument to show that the empiricist is obliged to restrict her beliefs to those that concern observable entities.

10. Conclusion: Options for the Empiricist. I conclude that van Fraassen's argument for his empiricist thesis fails. He has not shown that commitment to experience as the sole source of information is incompatible with belief in unobservables. He has not, in particular, shown that belief in TU presupposes the postulation of sources of information other than experience whereas belief in TEA is innocent of that presupposition. Nor does scepticism regarding inference to the best explanation leave CE as the natural standpoint for the empiricist to adopt. He has presented the empiricist with an epistemic option lying between scepticism and untrammelled leaps of faith. But he has not shown that belief in TU is not also a legitimate standpoint between those two extremes. He has, therefore, provided no reason to believe that the empiricist should be a constructive empiricist.

Van Fraassen might retrench. Perhaps the empiricist is not *obliged* to renounce belief in unobservables for fear of violating her commitment to SI. But CE is still, for all I have said, an available option.¹¹ Surely epistemic modesty in the face of empirically indistinguishable alternatives is in general an attitude that empiricism encourages. Since TEA fares favorably in

11. I have in fact been granting that CE is an option to this point for the sake of argument. I do not actually believe that it is, in part because I do not believe that van Fraassen's observable/unobservable distinction is coherent and because I do not believe that evidence reports inevitably refer only to observables. But these are objections typical of the realist; my aim to this point has been to explore van Fraassen's empiricist thesis given the assumption that CE is a coherent option.

light of that attitude when compared with TU, doesn't the empiricist still have reason to prefer it?

Since considerably weaker options *are* available, however, the same attitude gives the empiricist reason to prefer them over TEA. We should then continue to assign the additional portions of scientific doctrine to the pragmatic realm and arrange our epistemic wagons in ever smaller circles.

I have not argued for it here, but I suspect that if we continue in this way, we will find nothing left within the circle to defend. After all, many philosophers have argued—against the very positivism from which van Fraassen has distanced himself—that even present opinion concerning the view in front of our eyes involves more commitment to the way the world is than to what actually *is* in front of our eyes. That theoretical commitments are involved in the most mundane perception is as much a lesson of the theory-ladenness of observation as is van Fraassen's concession that we import the conceptual resources of science in describing our observations. The pragmatic/epistemic distinction would then seem to be a distinction in name only, one that cannot be defensibly drawn through the corpus of scientific doctrine at all.

But rather than concluding that our beliefs—all of them—can be given only a pragmatic, but not an epistemic, justification, and that we shouldn't endorse any of them in our reflective moments, we might conclude instead that the distinction that van Fraassen draws should not be drawn at all. After all, it delivers no "empirical goods." Unlike reference to unobservables, which is, van Fraassen concedes, required for the development of empirically successful theories, the distinction between pragmatic acceptance and epistemic belief—delivered from an autonomous philosophical standpoint detached from the context of the immersed scientist (van Fraassen 1980, 81–82)—does not contribute to empirical success at all.

Empiricism does encourage an attitude of epistemic modesty. But perhaps it is the distinction between autonomous philosophy and immersed science—rather than commitment to unobservables—that constitutes the 'metaphysical baggage'¹² that modesty requires us to forego. CE, in its commitment to that distinction, may then be a very unnatural standpoint for the contemporary empiricist—who wishes to avoid the errors of her predecessors while preserving what is essential to empiricism—to adopt.

W. V. Quine came to the conclusion that a sophisticated post-positivist empiricism requires renunciation of the distinction between autonomous

12. "Empirical minimality is emphatically *not* to be advocated as a virtue, it seems to me. The reasons for this point are pragmatic. Theories with some degree of sophistication always carry some 'metaphysical baggage'. Sophistication lies in the introduction of detours via theoretical variables to arrive at useful, adequate, manageable descriptions of the phenomena" (van Fraassen 1980, 68).

philosophy and immersed science long before CE appeared on the scene. Quine's position deserves comparison with van Fraassen's, at least because it is also a form of post-positivist empiricism but one that does not involve the repudiation of unobservable entities.¹³ There is not the space here to compare their views (see Alspector-Kelly 2001d). But because Quinean empiricism is an option, although one that has been neglected in contemporary philosophy of science, the problems attending CE do not undermine the empiricist standpoint per se, but only CE as an expression of it. Perhaps the empiricist should not be a constructive empiricist; but that does not mean that she cannot be an empiricist at all.

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13. "Having noted that man has no evidence for the existence of bodies beyond the fact that their assumption helps him organize experience, we should have done well, instead of disclaiming evidence for the existence of bodies, to conclude: such, then, at bottom, is what evidence is, both for ordinary bodies and for molecules. . . . We can continue to recognize . . . that molecules and even the gross bodies of common sense are simply posited in the course of organizing our responses to stimulation; but a moral to draw from our reconsideration of the terms 'reality' and 'evidence' is that posits are not ipso facto unreal. The benefits of the molecular doctrine which so impressed us . . . and the manifest benefits of the aboriginal posit of ordinary bodies, are the best evidence of reality we can ask (pending, of course, evidence of the same sort for some alternative ontology)" (Quine 1966b, 251–252).

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