The Meta-Explanatory Question[1]

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Philosophical theories of explanation characterize the difference between correct and incorrect explanations. While remaining neutral as to which of these 'first-order' theories is right, this paper asks the 'meta-explanatory' question: is the difference between correct and incorrect explanation *real*, i.e., objective or mind-independent? After offering a framework for distinguishing realist from anti-realist views, I sketch three distinct paths to explanatory anti-realism.

1. Introduction

Between 65 and 50 million years ago, India and Eurasia, then distinct continents, rushed toward one another at the astonishing speed of 14 cm per year, twice the rate at which continents are observed to move together today. Geologists have sought to understand this anomaly ever since its discovery in the 1970s. Might it be explained by a pushing force from the Reunion Plume, a column of rising lava that thrust against India (Cande and Stegman 2011)? Or was the unusual presence of two subduction zones—and thus two loci of motion—between the continents actually responsible (Jagoutz et al. 2015)? The answer remains unclear, and perhaps neither explanation is correct. Still, the very existence of such controversy bears witness to the commonsense assumption that some scientific explanations must be correct, others incorrect.

But what makes an explanation correct or incorrect? Various 'first-order' theories of explanation attempt to say. Most of these theories insist that an explanation's descriptive content must be true, or nearly so. If there were no Reunion Plume, it naturally could not feature in a correct explanation of continental motion. More controversy exists about the right *explanatory relation*: the connection between the facts cited by the explanans and those cited by the explanandum in virtue of which the former correctly explain the latter. For instance, if the explanatory relation is *causal difference-making* (Woodward 2003; Strevens 2008), then an explanation involving the plume would fall short had the plume not been a difference-maker for the rapid continental motion—even if the plume had *some* causal influence on the swift convergence. Alternatively, if the explanatory relation is one of *unification* (Friedman 1974; Kitcher 1981), then the

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plume-based account might fail were this instance of plume-driven motion truly singular—i.e., never before and never after realized. In that case, a plume-involving explanation may not appropriately unify our universe's happenings.

So, which explanatory theory—a variant of the causal or unificationist approaches, or something else entirely—captures the true difference between correct and incorrect explanation? The answer is controversial, and may not even be univocal; different explanatory relations may be appropriate to different scientific domains. Or, perhaps a single phenomenon can be correctly explained by multiple accounts—each drawing on a different explanatory relation—that "complement rather than conflict" (Salmon 1993: 16).

Yet whatever the complexity of the right first-order theory, the common assumption shared by all but the rare explanatory nihilist is that some putative explanations are correct whereas others are not. This basic phenomenon of explanatory correctness is my focus in the present essay. In particular, my aim is to articulate, and urge the interest of, the 'meta-explanatory question': is explanation 'real'? In other words, are standards on explanatory correctness, of the kind articulated by first-order explanatory theories, fully objective or mind-independent?

The meta-explanatory question has been largely neglected in the philosophy of explanation. Though casual comments about explanatory objectivity are not uncommon in debates of the merits of anti-reductionism,[2] and in discussions of whether explanation is, at its core, 'pragmatic,' rarely are the requirements of explanatory objectivity stated with any precision. This is in stark contrast, for instance, to the situation in ethics, where a very familiar distinction is made between first-order questions about what we ought to do, and meta-ethical questions about whether these first-order claims state real or objective moral facts. Yet just as two moral theorists might agree that *we ought not to lie* but disagree as to whether this claim states an objective fact, so too might two explanatory theorists agree that *the germ theory offers the correct explanation of the spread of disease* while disagreeing as to whether this claim states an objective fact.

To facilitate engagement with the meta-explanatory question, this essay begins by providing a framework for thinking about explanatory realism and anti-realism. I then sketch three different paths to explanatory anti-realism: relativism, functionalism, and epistemological anti-realism. The two latter paths serve to show why even to those who are committed to the traditional project in the

[2] Thus Kitcher (1984) suggests that high-level explanations are often "objectively preferred" to reductive ones, while Rosenberg (1994) claims that only a subjective notion of explanation could deliver a high-level preference.

philosophy of explanation—that is, the project of articulating principles that are objective in the substance of the requirements that they place on correct explanation—might nevertheless subscribe to an anti-realist view.

2. Basic Approaches to Explanation

In advance of characterizing explanatory realism and anti-realism, it pays to distinguish a few very general ways of understanding the phenomenon—explanation—that is under analysis. Though all philosophical theories of explanation offer what I call *conditions* on correct explanation,[3] there is a fundamental divide between the handful of philosophers who offer analyses of the particular communicative acts that we call *explanations* (Achinstein 1983; Bromberger 1966) and the rest who take a more impersonal approach by abstracting from particular communicative acts in one of the following two ways.

For those who adopt an 'epistemic' view, explanations are, properly speaking, representations or texts (Bechtel 2008), often understood as *ideal* standards against which real-life explanations are to be judged (Hempel 1965; Railton 1981). On this picture, important explanatory conditions—i.e. those governing explanatory *form*—tell just how the explanatory facts are to be represented (e.g., as arguments or as models of a certain description). Additionally, advocates usually articulate conditions on explanatory *content*, which state precisely which facts explanations should present.

The rival 'ontic' view holds that explanations "are facts, not representations" (Craver 2007: 27; see also Craver 2014),[4] and therefore the most important explanatory conditions govern explanatory *content* alone, stating which facts constitute explanations. This is usually done, at least in part, by specifying the explanatory relation or relations. Alongside these content conditions, the advocate of the ontic view can articulate conditions on an explanation's representational form, though such constraints will not be considered to govern explanation in the strict sense.

In what follows, I will at times attend to the difference between impersonal accounts of explanation and those focusing on communicative acts; however, the intramural dispute between epistemic and ontic views will not much matter for my purposes. Though they are couched in somewhat different terms,

[3] If some philosophers theorize about explanatory practice without articulating any correctness conditions (possibly the approach of Machamer, Darden, and Craver 2000), then their project does not concern us here.

[4] This sketch of the ontic approach relies on recent discussions in the new mechanist literature (see Illari 2013), which deviates somewhat from Salmon's (1984) original conception.

both views are compatible with the existence of conditions on explanatory content and form.[5] And unlike accounts of communicative acts, both of the impersonal approaches to explanation can straightforwardly be understood in a realist or anti-realist light.

3. Explanatory Realism and Anti-Realism Defined

Though usage varies and complexities abound, realists are often understood to maintain the existence of mind-independent (or objective) truths respecting a particular subject matter. So, the moral realist countenances the existence of mind-independent moral truths, and the causal realist, mind-independent causal truths. The motivation for thinking about realism in this way is straightforward: there is a substantial difference between truths that hold independently of our concepts or attitudes and those that depend on our concepts or attitudes. Arguably, part of what it is to understand a domain of discourse is to know on which side of this divide its claims fall.

If we are to follow this pattern in characterizing explanatory realism, the realist will, to a first approximation, endorse the full mind-independence of explanatory truths. But just which explanatory truths? And what would it take for them to be, in the relevant sense, mind-independent? I address these questions in order.

Though we call explanations *good* or *bad*, *correct* or *incorrect*, *complete* or *incomplete*, philosophical attention has focused on the idea of a *correct* explanation, and I follow suit here. Truths about explanatory correctness can themselves be divided into two kinds: the *individual* and the *general*. Individual explanatory truths involve the correctness or incorrectness of individual explanations (whether of an event or a regularity). They are often expressed by statements of the form *X is (correctly) explained by Y*—e.g., *the Challenger Disaster is correctly explained by O-ring fragility* or *cellular respiration is explained via a mechanistic-computational model*. General explanatory truths are *correctness conditions* for whole classes of explanation. These are most often expressed by statements of the form *(correct) explanations of type A have feature P*—e.g., *correct event explanations cite an event's difference-makers* or *regularity explanations take the form of deductive arguments*.

As these examples illustrate, both individual and general truths may pertain to explanatory content (i.e., the identity of the explanatory facts) or form (i.e., how the explanatory facts are correctly represented). And though labeled 'general,' general truths, as I will understand them, can be limited in scope: they

[5] Conditions on content and form are not always clearly separated by theories of explanation.

may apply exclusively to explanations in a particular domain (e.g., cell biology, fundamental physics).[6] Furthermore, to make room for a certain kind of pluralism, explanatory conditions can recognize an explanation as correct in virtue of having any of a menu of features.

Should individual or general truths be the focus of the realist's position? Though the realist will judge both to be in some sense mind-independent, it is simplest to focus on general truths when formulating the realist's view. Thus, I propose to understand explanatory realism as follows: it is the view that *there exists at least one explanatory condition—in the simplest case, one of the form 'explanations are P'—that is fully objective.*[7] Full objectivity, in turn, requires that the explanatory condition (e.g., 'an event is explained by its principal cause') be both *substance-independent* and *status-independent.*[8] These constraints reflect two dimensions along which an explanation's correctness might depend on something about our aims or ways of thinking.

For an explanatory condition to be *substance-independent*, the property P that correct explanations are to have must not be a function of our concepts, capacities, knowledge, or interests. For instance, the suggestion that 'events are explained by some or all their difference-making causes' satisfies the substance independence condition (presuming that causal difference-making is itself mind-independent). By contrast, it is not satisfied by the proposal that correct explanations are those that induce "explanatory phenomenology" (in Alison Gopnik's phrase)—the 'aha!' feeling of edification or insight. Also failing this criterion, in a less glaring way, would be an account on which 'an event is explained by the broadest regularity under which it falls expressible by predicates of a human language.' This proposal falls short of substance independence in virtue of the role that human languages play in it.

An explanatory condition is *status-independent* when its status as right or genuine does not depend in any way on our concepts, knowledge, capacities, or interests. To bring out this more subtle requirement, imagine asking of an

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[6] Admittedly, this focus overlooks the possibility of a particularist realism that recognizes no general explanatory truths but embraces the objectivity of particular truths. However, as this view has uncertain motivations and no known advocates, its exclusion is not troubling.

[7] This characterization of realism is permissive because it is satisfied if *just one condition* is fully objective. Thus, the realist might hold that only the explanatory relation is objective and that principles governing explanatory form do depend on us. For instance, Craver (2014) writes that "the fundamental dispute" in explanation "concerns the kinds of ontic structure that ought to populate our explanatory texts, whatever their representational format"(28).

[8] My [2015] uses a parallel two-part condition for defining realism about natural kinds.

explanatory condition that you accept—for instance, 'biological regularities are explained by their underlying mechanisms'—*in virtue of what* is this condition right or genuine? In answering this question, a certain kind of anti-realist might say: 'this condition is right just because it reflects *what we mean* by *explanation*.' Alternatively, another kind of anti-realist might suggest that 'this condition is right because, by thinking of explanation in this way, we will be able to serve aims we endorse (e.g., control or prediction).' The important thing to note is that, in both of these replies, the anti-realist has held that at least part of what makes a particular explanatory condition right is our concepts, knowledge, capacities or interests.

Of course, the realist, too, may judge our concepts to align with the right explanatory conditions. The realist may also find that our goals—prediction and control—are well-served by our conceiving of explanation as we do. The realist disagrees with the anti-realist just by denying that a condition's rightness actually depends on these things. Quite the reverse, she will suggest instead that our concepts are apt or serve our ends *because* they reflect the real explanatory principles. In this vein, it is not uncommon for explanatory realist-leaning philosophers of explanation to comment that the correct explanatory approach is "a distinctive kind of achievement that cultures and individuals have to learn to make"(Craver 2014: 29).

The approach to realism I've just described—though demanding—does seem to capture what is required for explanation to be, from an intuitive point of view, "fully objective" (Salmon 1989: 133). After all, for those who deny either the substance independence or the status independence requirement, it will be the case that, had our concepts, knowledge, capacities or interests been different, just which explanations are correct and incorrect would have been different as well.[9] To see this in the case of the status independence requirement in particular, consider the consequences of modifying whatever human feature grounds the rightness of the right explanatory conditions. So, if the fact that 'explanations cite causes' is true because, in thinking this, our ends will be served, imagine changing our ends. Or, if it is true because it is 'how we conceive of explanation,' imagine

[9] Another way of thinking about this issue is worth noting. On a 'constitutive' approach, certain conditions that we actually employ and that do depend on us are held to *define* explanation. If we had been very different and those conditions did not suit us, then on this view we wouldn't be engaged in explanatory activity at all but in 'shmexplanatory' activity. But observe that we can still distinguish a realist version of this view from an anti-realist one, for on the former we would be going wrong in some way in giving shmexplanations rather than explanations, while on the latter we would not.

changing our explanatory concept. In virtue of such changes, both the right explanatory conditions and the correct explanations will vary.

If explanatory realism is the view that there is an explanatory condition that is both substance- and status-independent, then explanatory anti-realism is the view that there is no such condition. It comes in two prominent forms. First, having rejected realism, the explanatory nihilist denies that we can speak meaningfully of explanatory correctness. Given how fundamental explanation appears to be to the scientific enterprise—particularly in the high-level sciences—nihilism has few contemporary advocates.[10] Second, the 'constructive' anti-realist accepts that there are correct explanations and that some explanatory conditions are the right ones, but holds that all such conditions are subjective in virtue of being status- or substance-dependent.

Now, having framed the meta-explanatory question, should we be realists or anti-realists? I cannot provide a definitive answer in so short an essay, but I will highlight three different paths—some more appreciated than others—that lead to explanatory anti-realism. Delineating these paths, I hope, will help to reveal some of the most important contours of the problem. I begin with the best-known route to explanatory anti-realism—explanatory relativism.

4. The Relativist's Path to Explanatory Anti-Realism

According to explanatory relativists, the traditional project in the philosophy of explanation "went wrong at the very beginning" (van Fraassen 1980: 156). In particular, the fundamental misstep of 'traditionalists' from Hempel (1965) and Kitcher (1989) to Craver (2007) and Strevens (2008) has been to posit conditions on explanatory correctness that abstract from the contexts in which explanations are given and received.

In the place of timeless constraints, explanatory pragmatists—the most prominent kind of relativist—suggest that an explanation's correctness is invariably relative to a particular conversational setting. For instance, according to van Fraassen (1980), the correct reply to an explanatory request depends on a conversationally specified 'relevance relation.' This ultimately sets which kind of facts are explanatory.[11] Explanatory contextualists—another type of relativist—understand explanatory conditions as correct or otherwise only relative to a

[10] In earlier eras, this position had more currency. Duhem, for instance, was a nihilist with respect to physical explanations, though he reserved a role for explanatory facts in metaphysics.

[11] Van Fraassen also requires explanatory answers to satisfy a statistical relevance constraint that may not be contextually determined.

broader disciplinary setting (rather than to a particular conversational one). Advancing such a view, Godfrey-Smith writes that "[t]he word 'explanation' is used in science for something that is sought, and sometimes achieved, by the development of theories, but what exactly is being sought is not constant in all of science"(2003: 197).[12]

In completely rejecting the impersonal conception of explanation and conceiving of it instead in terms of particular communicative acts between individuals, some pragmatists embrace a radical form of substance dependence, where the properties that make an explanation correct wholly depend on the concepts, knowledge, capacities, and interests of the framers or recipients of the explanation. Although contextualists defend a *more* impersonal approach to explanation, it is a matter of degree, and so it seems that they are also committed to a form of substance dependence.[13] Clearly, then, neither sort of relativist is an explanatory realist.

What is the appeal of relativism? Some have thought it a fitting response to the many counterexamples that famously plague traditional first-order theories (Achinstein 2010). The view can also be motivated by observed variation in the character of explanations offered or judged acceptable in different scientific fields and over time—as illustrated, for instance, by Kuhn (1977) and Dear (2008). Relativists can account for such differences in a very tolerant way (De Regt and Dieks 2005).

Traditionalists, of course, have their replies. Some will point to difficulties facing relativism in any of its particular instantiations (Kitcher and Salmon 1987). And with respect to variations in explanatory practice, traditionalists either will be less tolerant of explanatory diversity or will distinguish between explanatory norms and mere conversational pragmatics, suggesting that the latter can make sense of a good deal of diversity in the explanations actually offered while still maintaining that explanation is non-pragmatic "at it core."

So, how do realism's prospects stand if the traditionalists are right and relativism is rejected? Since to reject explanatory relativism is typically to endorse the *substance* independence of at least some explanatory principles, this question turns on the promise of the *status* independence requirement on explanatory

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[12] Though I cannot pursue the matter, contextualism presumably differs from pluralism in lacking an overarching norm assigning different conditions to different domains.

[13] Alternatively, some contextualists can be understood as defending explanatory theories that are substance-independent but status-dependent. This shows that views reaching similar verdicts on the correctness of particular explanations can sometimes be formulated in more than one way.

conditions. It is this that explanatory functionalists—the view I will now consider—explicitly deny.

5. The Functionalist's Path to Anti-Realism

Explanatory 'functionalists' typically disagree with relativists in endorsing the substance independence of at least some explanatory principles, yet they still reach anti-realist conclusions by another route. Functionalists see the rightness of the right explanatory principles as flowing ultimately from the fact that in following those principles we are best able to serve our ends. This is an anti-realist view because the status of the right explanatory principles is set, in part, by our aims and capacities.

I should say that *functionalism* in this context is my term, and while I think the idea is not uncommonly held in an implicit way, neither the substance nor the merits of the position has enjoyed the same focused attention as relativism. Consequently, it is somewhat more difficult to attribute functionalism to particular writers with confidence. Still, it seems safe to put Peter Lipton and James Woodward in this camp.

Lipton's views may serve as a nice illustration. While advocating for a causal approach to explanation, Lipton (2001) considers the interesting question: 'why do causes explain their effects, and not effects their causes?' He rejects a mere 'conceptual' or 'analytic' answer according to which "the reason causes explain and effects do not is simply that 'explanation' is a word we apply to causes and not to effects"(12). Instead, he proposes that our explanatory practice has grown up, at least in part, around the human need to control. When we modify an event's difference-makers, we control its occurrence, and though causes can be difference-makers for their effects, effects are not difference-makers for their causes. Thus, if our explanatory practice is to aid in our project of control, it is better that we conceive of explanation causally, so that we can focus on gathering information about possible levers of control.

Why might one be tempted by explanatory functionalism? In contrast to relativists, functionalists can honor the intuition that explanation is in *some measure* objective, in two ways. First, and most obviously, they do this by denying the substance dependence of explanatory conditions. Second, given our ends (e.g., control or prediction), functionalists can evaluate a particular proposed explanatory condition as either apt or not apt relative to that goal, just as any other means to an end might be so judged. A final point is that functionalism might seem more satisfying for providing, in Lipton's words, an "explanation of

explanation." In this way it differs from the less informative proposal that causes explain effects just because *that's what we mean* by 'explanation.'

Yet functionalism, too, will have its detractors. Naturally, those philosophers of explanation with explanatory realist leanings—such as Salmon (1989: 133) and Craver (2014: 31)—will resist it. Functionalism also stands in opposition to a broader 'intellectualist' conception of explanation, according to which, in contrast to goals like prediction and control, explanation is *not* essentially practical, and this is precisely what makes it distinct. Articulating such a view in the introduction to *Aspects of Scientific Explanation*, Hempel contrasts two motives for scientific inquiry: the first practical and the second—to explain and understand—"independent of such practical concerns"(1965: 333). Likewise, Strevens emphasizes the contrast between the goals of prediction and control, which are useful, and explanation and understanding, science's only dividends of "intrinsic value"(2008: 3).

Should intellectualists—or anyone else who has rejected both explanatory relativism and functionalism—therefore endorse explanatory realism? An epistemological challenge sketched in the next section offers a reason why not.

6. The Epistemological Path to Anti-Realism[14]

Should a correct event explanation cite (1) *all* of the event's causal influences, (2) only its difference-makers, (3) a special subset of its difference-makers, (4) a local pattern under which it falls, or (5) a broad pattern under which it falls? Despite disagreement about the correct answer to this question, philosophers of science broadly agree about the proper *method* for settling it: by examining actual scientific explanatory practice. In particular, most hold that we should infer the explanatory principles—directly or indirectly—from that practice.

Even if we have not yet definitely settled on the best account, for this methodology to lead us in the direction of the truth, we must hope that scientific practice developed so as to conform to the right explanatory principles—i.e., our practice must be (as I shall say) *coordinated* with them. But why think that explanatory practice in our sciences has in fact coordinated with the right principles? This question stands at the heart of the epistemological challenge to explanatory realism.

The anti-realist can account for coordination rather easily. Because she believes that it is ultimately *something about us* that determines (for example) the right explanatory relation, it is natural that we can look to the patterns manifest in

[14] See my [2015] for a parallel argument against natural kind realism, one inspired by a challenge to normative realism in Street (2006).

our explanatory practice as a starting point for working out the right explanatory conditions.

The realist, by contrast, judges the right explanatory conditions to be fully independent of us, and thus cannot offer so straightforward an account. Her difficulties become acute—more than an idle skeptical concern—once we make two observations.

First, from a purely conceptual point of view, the right explanatory conditions might have been any of a large range of possibilities. Lipton (2001), for instance, suggests that it is at least conceivable that effects explain causes, rather than the other way around. More modestly, correct event explanations might have satisfied any of the five proposals noted above, each of which has prominent defenders in the philosophy of science.

Second, scientific practice—that from which we are to extract the right explanatory conditions—stands at the end of a long and circuitous history, one shaped by evolutionary forces and cultural factors that have, *prima facie*, no relationship to the mind-independent explanatory facts themselves. Had some of these factors been different, it seems that explanatory practice itself would have been different. For instance, had our capacities—both to gather and process information—been more limited, we might have deemed *correct* those explanations that simply subsume an event under a local regularity, without saying anything about its causal run-up. Or, had it been easier for us to gather information about the mechanisms of our universe, our notion of explanation might have been more demanding and 'correct explanations' would invariably rehearse the full causal run-up to the event explained. Alternatively, had our intellects evolved to be, in the mean, much closer in character to that of a systematizing Hegel than of a cataloging Pliny, we might have insisted that correct explanations invariably unify an event with a range of other events and principles, near and far.

Given these two facts, it appears that—if the realist is indeed right that the explanatory principles are fully mind-independent—our success in discovering them via an appeal to our actual explanatory practice was an instance of very good luck. In particular, we were lucky that our practice developed so as to coordinate with the right explanatory conditions. And though I will not venture a guess as to how strongly, this certainly speaks against the realist position.

As with the two previous anti-realist paths, there are replies. Most obviously, the realist might formulate a 'tracking account,' a mechanism by which scientific explanatory practice developed to reflect the mind-independent

explanatory conditions. For instance, the realist could suggest that, just as we can learn through experience what the true facts are, we can also learn what the right explanatory conditions are.[15]

Still, those pressing the epistemological critique will wonder how this could be made to work. Consider again the debate between those who think that event explanations should cite every causal influence and those who think that explanations should only cite the causal difference-makers. Explanations offered in line with both explanatory theories may succeed in citing only true facts, and would also satisfy inquirers partial to their own explanatory principles. How could experience lead us to either of them?

Needless to say, this is not the end of the story. A variety of further moves are available on either side. The realist may, for instance, suggest that the success of inference to the best explanation provides indirect evidence that we have in fact settled on the right explanatory conditions. And in response, the anti-realist may try to show either that inference to the best explanation has less of a role in successful science than is sometimes thought, or that its success does not ultimately depend on just which explanatory principles inquirers deploy.

Were the epistemological argument ultimately to succeed, what kind of anti-realism would it recommend? It is compatible with almost any form of anti-realism. But it is *intellectualist anti-realism* that relies on the epistemological argument as its main support. Intellectualist anti-realists go about their explanatory philosophizing in what is, from the perspective of post-war philosophy of science, a very traditional way. They examine actual explanatory practice. They formulate substance-independent principles to which that practice conforms. They may even look only for principles that are trans-disciplinary, governing explanation in all recognizably scientific inquiry, from physics and biology to economics and sociology. They are anti-realists exclusively because they hold that the correctness of these principles is ultimately relative—not to the practical purposes that explanation is supposed to serve—but to what constitutes understanding for the human mind.

7. Conclusion

This essay has posed the meta-explanatory question and sketched three paths to explanatory anti-realism. Though I myself favor the last of these, my presentation has aimed only to characterize the contours of a neglected question; it has not aspired to lead the reader to any particular answer. But would it matter, after all, if

[15] Though offered in favor of a version of contextualism, there is a suggestion to this effect in Godfrey-Smith (2003).

explanatory anti-realism—or realism, for that matter—were true? Though space does not permit me to detail the consequences of either answer, either one has the potential to inflect the many philosophical debates in which explanatory reasoning plays a part—from the proper place of inference to the best explanation, to the implications of explanatory reductionism. Yet, arguably, the intrinsic interest of the meta-explanatory question is enough to warrant philosophical attention. I submit that we cannot hope to 'explain scientific explanation' until we know, not just what the right explanatory conditions, are but also in virtue of what those conditions are right.

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