The Disunity of Philosophy of Science as a Worrying Hypothesis

Review of 'Physical Theory: Method and Interpretation'
edited by Lawrence Sklar

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This collection brings together nine essays by ten leading philosophers of science, divided into two groups. The first tranche consists of six essays under the rather broad theme of 'scientific method'. Here we find contributions on topics such as explanation, laws of nature, structuralism and the scientific realism debate. The second part then consists of three essays devoted to philosophical issues in the foundations each of the three pillars of modern physical theory: relativity theory, quantum theory (with a focus on the infinite dimensional case) and statistical mechanics.

In and of themselves, the essays are, without exception, of first rate quality. And, in this regard, as a collection, this book represents a worthwhile contribution that will be of particular value to graduate students looking for an overview of the key issues in the contemporary philosophy of physical science. Here my focus will not be upon the individual merits of the essays. Rather, in this short review I would like to propose a hypothesis regarding the disunity of philosophy of science, that I take this collection to well illustrate. My hypothesis, in brief, is that the core debates in contemporary philosophy of science are worryingly unintegrated, and that this lack of integration is damaging to the field as a whole. I will illustrate my hypothesis by drawing upon three of the nine essays, and in particular by using Kyle Stanford's discussion of the realism debate (Chapter 4) as a filter through which to view Michael Strevens' essay on statistical explanation (Chapter 2) and John Norton's essay on the ontology of spacetime (Chapter 7).

The main focus of Stanford's essay is the realism/instrumentalism dialectic, and a group of broadly 'quietist' responses due to Howard Stein, Arthur Fine and Simon Blackburn. Take scientific realism as an inflationary thesis, put forward in favour of an interpretation of (at least aspects of) our scientific theories as *real, in some sense*. Instrumentalism is then usefully characterised as a deflationary thesis, put forward in favour of an interpretation of our scientific theories as *mere instruments, in some sense*. To different degrees and in subtly different ways, Stein, Fine and Blackburn all insist there does not really exist a substantive distinction between the two views. Rather, we would do better to follow a third, quieter course, where we simply abstain from entering into debate regarding meta-theoretical questions as to the interpretation of physical theories. Stein, who to my mind articulates such a position most persuasively, focuses upon the classic version of scientific realism, where the sense of 'real'

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is cashed out in terms of claims regarding the successful reference of terms within the scientific theory. He suggest that an instrumentalist would do well to simply help themselves to such a representational function of scientific language, only with an instrumentalist spin. In such circumstances, the distinction between instrumentalism and realism becomes a largely verbal one: 'reference to reference has failed to stake out any claim to which a sophisticated instrumentalist should feel a need to object' (Stein 1989, p.51).

The thrust of Stein's point drives in much the same direction as Fine's idea of a 'Natural Ontological Attitude' (NOA). As Stanford notes, 'NOA insists that...the various things that the truth of various claims might amount to, in science as in everyday living, are multiple and many-splendored: we are guided in what to make of our acceptance (or the "truth") of a particular scientific claim in a particular context by circumstances specific to it, and that is all there is to say' (Stanford 2015, p.113). A sceptical attitude towards the coherence of the realist/instrumentalist dialectic is also taken by Blackburn. In particular, in the 2002 article discussed by Stanford, he gives short shrift to the claim that the realist has unique access to an explanation for the predictive success of science. Rather, he takes the the explanations provided by science itself as an explanation for the predictive success of science. In his view, it does not even make sense to ask for a further second-order explanation of scientific phenomena: 'there is no getting *behind* the explanation' (Blackburn 2002, p.113). The exploration and evaluation of these intriguing lines of thought seems to me an important task, and Stanford's essay is a worthy effort in this direction. I will not further pursue such thoughts here.

Rather, I would like to articulate the following hypothesis: The prima facie plausibility of the quietist line vis-á-vis the realism debate should be rather worrying for those working on other topics in the philosophy of science. If it is simply wrongheaded to try and look for substantive interpretative questions 'behind' the models and explanations provided by scientific theories themselves, then why is much (if not most) of contemporary philosophy of science predicated upon the coherence of such an activity? Surely, if we were to accept the quietist perspective, then much of the contemporary discussions of explanation, laws of nature and the interpretation of physical theories would be rendered otiose. Once we adopt the quietest viewpoint, we cannot consistently confine our vision to the realism debate in isolation. Alternatively; putting things the other way round: if there are good arguments that such interpretive work *is* a worthwhile activity, then these arguments surely should be successfully brought to bear against quietism in the broader realism/instrumentalism context. By philosophising about science in such an unintegrated manner we are at best missing a trick, and at worst wasting our time! Let me illustrate this point by reference to two of the other essays in the volume.

First consider the philosophical debate regarding probabilistic explanation as admirably explored in the essay by Michael Stevens. Philosophical accounts of probabilistic explanation have as their goal attempts to make sense of successful probabilistic explanations in quantum mechanics, medical science and statistical physics. In his essay, Strevens provides a dexterous and concise critical examination of the various philosophical accounts. What is not discussed, however, is the reason why we should want a philosophical theory of probabilistic explanation in the first place. If

we take our cues from the quietists, in particular Blackburn, then all attempts towards such a theory are futile. From their perspective, trying to ground the probabilistic explanations found in science in terms of deeper underlying structure, such as causes, propensities or robustness of processes, amounts to trying to peak behind a curtain that simply isn't there. My suggestion here is not that this is necessarily what we should think, but rather that such 'meta-philosophical' questions need to be considered in much greater detail, and in this regard the lack of integration in this volume of essays is a missed opportunity.

A similar point can be made about John Norton's elegant essay 'What can we learn about the ontology of space and time from the theory of relativity?'. Here again we have a broad-ranging yet concise exposition of a central topic in contemporary philosophy of physical science written by a noted expert. In a manner that will be largely accessible to those without technical expertise, Norton reviews key issues such as the conventionality of simultaneity, the hole argument, and the equivalence principle. But once again, this discussion is pursued independently of the 'meta-philosophical' question of how we come to be able to talk of the ontology of space and time in the first place. As Norton himself notes in his introduction: 'We are not compelled to adopt realism. But without it, there is no rhyme or reason in answers to the question of the title' (Norton 2015, p.187). Furthermore, on the crucial question of interpreting the (putatively) distinct roles of the manifold and metric structures within general relativity, he notes that it is only realism that 'enjoins us to take the division seriously' (Norton 2015, p.200). Without realism, the content of much contemporary debate in the foundations of relativity theory is rendered questionable. And, once again, if we take quietism seriously, we would seem best behoved to take interpretational debate lightly.

My hypothesis was that a lack of integration between the key debates in the philosophy of science is damaging to the field. In particular, it seems to me that debates regarding explanation and ontology in physical theory cannot sensibly be carried out without settling broader meta-philosophical questions regarding realism and truth in the context of science. While the essays of this volume represent some of the best that contemporary philosophy of physical science has to offer, taken together, they are emblematic of a disunity and disconnectedness in the field that is, to my mind, rather worrying.

References

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