

A Metaphysics for Scientific Realism: Knowing the Unobservable. BY ANJAN CHAKRAVARTTY.
(Cambridge UP, 2007. Pp. xvii + 251. Price £45.00.)

In this exceptionally clearly written book, Chakravartty argues that the debate between scientific realists and scientific anti-realists calls for attention to the metaphysics of science. This is argued for in two ways. Chakravartty first points out that scientific realists make metaphysical assumptions about causation, laws and

individuals for which they rarely argue. Secondly, he argues that the nature of the debate between realists and anti-realists calls for scientific realists to be acutely aware of the metaphysical implications of their position. This argument is developed by tracing the development of current realist positions partly in response to arguments developed by Bas van Fraassen. Van Fraassen has suggested that an empirical stance is superior to a metaphysical stance, where a 'stance' is defined as a set of attitudes, commitments and policies regarding the formation of beliefs. An empiricist, for example, should shun beliefs about unobservables, whereas a realist can adopt them. Whether we accept a given stance is in part a function of our values and interests. If so, it seems a bit difficult to argue rationally for or against stances; but van Fraassen suggests that we can do this by considering issues of consistency. According to him, the metaphysical stance is inconsistent, whereas the empirical stance is not; therefore the empirical stance is superior to the metaphysical stance. However, Chakravartty points out that so long as a stance is rational (i.e., not self-undermining), it cannot be rejected in any non-question-begging sort of way, and he sets out to show that a consistent metaphysics for scientific realism can be developed. Developing a consistent metaphysics for scientific realism will at least show that an empirical stance is not superior to a metaphysical stance.

The book falls into three parts. In the first part Chakravartty presents the above considerations, but also sets out his preferred version of realism, his so-called 'semi-realist' position, characterized by its commitment to mind-independent (unobservable) properties which are epistemically accessible by detection via scientific instruments. Chakravartty argues that semi-realism is the result of combining aspects of traditional entity realism (roughly, the view that we can know of the existence of unobservable entities even if we are sceptical about the truth of theories) with structural realism (the view that we have knowledge only of the structure of the world, abstracted from theories about unobservables). Chakravartty recommends that we should be realists about concrete causal structures, where concrete structures consist of relations between first-order causal properties. These causal properties confer dispositions for relations, and thus dispositions for behaviour, on the particulars that have them. Towards the end of part I Chakravartty defends his choice of realism against so-called ontic structural realism (the view that only structures exist). He has been prominent in shaping the structural realist debate and has delivered arguments against the position on different occasions. In this latter part of the section he reiterates these arguments in a very clear way, and suggests how his preferred version of realism escapes the problems which ontic structuralists have suggested for both entity realism and epistemic structural realism.

In the second part Chakravartty undertakes the task of presenting a metaphysics for scientific realism (as promised in the book's title). The view presented is not intended to be exclusive, nor supposed to be the only coherent account available to a realist. Rather, it is intended to provide an example which shows that at least one coherent and internally consistent account is available. Given the need for this established in part I, this is an important task. This second part of the book is rather dense: in only 90 pages Chakravartty argues for his favoured process account of causation, presents an account of property-identity, shows how causal properties

and laws of nature are related, and finally gives an account of how his view relates to debates about natural kinds. What makes a causal property the property it is, on his view of properties, is the dispositions for behaviour it confers on the particulars which have it. The level of ambition is high, and in my opinion Chakravartty achieves what he aims at. This is not to say that many issues could not and should not be explored further. The central tenet of Chakravartty's view is that realism should be defined as realism with regard to detection properties. This raises the issue of when and how groups of properties taken together constitute entities. This central question can be seen as underlying much of what goes on in the second part of the book.

Generally, realists have used a notion of natural kinds when arguing for the mind-independent existence of entities: only kinds spelt out with some reference to essences have been considered truly objective. Chakravartty argues for a version of pluralism regarding natural kinds, embracing both an essentialist conception of kinds for the purpose of thinking about fundamental kinds (like kinds of basic particles) and a bundle view of kinds for the sake of thinking about more complex kinds (like animal species). He embraces a degree of pragmatism about how groups of properties are grouped together so as to form kinds: 'There are presumably uncountable numbers of incompatible ways of grouping properties that are sociably distributed across the natural world' (p. 176).

In saying this, he parts company with a great number of scientific realists. The claim is not made without a great deal of qualification, however, and Chakravartty labours to show that embracing such a view does not imply sacrificing objectivity. This is nevertheless going to be a central issue for commentators in evaluating the coherence of his view. One might wonder whether semi-realism will lead to realism about properties in a way more reminiscent of epistemic structural realism than entity realism, and whether entities as thought of within standard entity-realist accounts will really be brought back into the picture. When Chakravartty argues that observation of groups of manifestations of dispositions underwritten by causal properties in some cases constitutes detection of an unobservable *entity*, his central argument is inductive. He points out that the manifestations which make up the groups have occurred together time and time again, and this is best explained, if at all, by postulating the existence of an entity responsible for it. But different kinds of sceptical replies are lurking in the background here. One could, for example, object that this kind of argument for the view still leaves questions unanswered. A bundle view of entities still needs an account of what makes those particular properties bundle together. A substance conception of entities still leaves open what it is about a substance that brings together these particular properties. In Chakravartty's favour, it should be borne in mind that what he takes himself to be doing at this stage of the book is not settling debates between different competing metaphysical accounts, but only displaying how there is at least one internally consistent developed version of a metaphysics for scientific realism. On the other hand, suggesting that there is a range of kinds which are best treated as 'sociable' may not be enough to inspire confidence that we are dealing with entities proper (whatever that may mean).

The third part of the book concerns ‘related issues’. In the discussion of the metaphysics of realism, different epistemic questions arise, and here Chakravartty engages with two different issues: the topic of theories and models, and the topic of approximate truth. These are perhaps best seen as elaborations upon some of the basic suggestions in the first part of the book about how to formulate scientific realism.

This also makes the third part stand out somewhat, and though there is a direct link between the first and the second part, the relation between the second and the third is perhaps more tangential. However, the topics covered are central to the realist/anti-realist debate, and the contributions made are worthwhile. Chakravartty first discusses the distinction between theories and models, and argues that it has been a mistake to worry about whether theories should be identified with models (an ontological issue): the epistemic significance of theories is a function of how they can be used to describe the world regardless of how else they are considered, so there is no refuge for a realist in the semantic conception of theories. Chakravartty next discusses the problematic notion of approximate truth. He goes through three different accounts, Popper’s (and the neo-Popperian) account of verisimilitude, the possible-worlds approach, and the type-hierarchy approach. Just as Chakravartty advocates pluralism with regard to natural kinds, he also advocates pluralism with regard to approximate truth: he recommends thinking about approximate truth as something which can be realized by multiple representational relationships. Again this may be too lightweight for some scientific realists, but Chakravartty is not trying to relativize realism. Rather, he is advocating a degree of modesty which he takes to be required for a working formulation of realism.

The book recycles material published by Chakravartty between 1998 and 2005, but in each case where there is some repetition he has elaborated upon his previously published material; more significantly, he has shown how all of his work integrates into an overall consistent argument for a version of scientific realism. Regardless of whether one is ultimately persuaded by the arguments presented in this book, it is a must-buy for anyone who is serious about the realist/anti-realist debate, as well as for anyone interested in the issue of the metaphysics of science.

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