

A Metaphysics for Scientific Realism

By A. CHAKRAVARTTY

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Conducted almost exclusively at the epistemological level the scientific realism debate often ignores metaphysical niceties. In the face of the scientific realist's systematic appeal to metaphysical notions like causation and natural kinds the neglect seems dissonant. Chakravartty aspires to overturn it with a bespoke metaphysics for scientific realism. In pursuing this aim, he undrapes a more comprehensive vision of the scientific realist viewpoint, including a distinctive epistemology.

I will focus my critical remarks on three families of issues. The first concerns semi-realism, the author's own brand of epistemological realism that he develops over the first three chapters and incorporates lessons from two heavyweights in the debate. Semi-realism, roughly speaking, is the view that entities can be known via their properties' causal interactions with detectors – following entity realism (ER) – and this knowledge primarily concerns the relations these properties stand in – following epistemic structural realism (SR). Chakravartty's hybrid view deserves more attention than it has heretofore received. To present it in the most attractive light, however, he regrettably caricatures certain aspects of ER and of SR. Take ER. Despite their general aversion towards theory, ER supporters sanction some low-level theoretical claims that feature in localised causal interactions. Chakravartty downplays such qualifications to amplify the dissimilarities between ER and SR and to thereby place semi-realism as the auspicious redeemer.

The reader also gets a less than subtle portrayal of SR. The author incorrectly attributes the view that SR restricts knowledge to second or higher-order properties to Bertrand Russell (59). Only Grover Maxwell cast SR in those terms. Since by all accounts SR limits scientific knowledge to isomorphic specification, it follows, contra Maxwell, that even entities and their first-order properties can be known up to isomorphism. Or consider the Ramsey sentence approach that some SR supporters, including Maxwell, favour. The process of Ramsification existentially quantifies over all theoretical predicates and turns them into variables regardless of whether they represent first or higher-order properties. Of course for Chakravartty this is a moot point since in his eyes no less than the complete identification of the entities, their first-order properties and their relations will suffice for realist purposes. How is this complete identification to be achieved? The author gestures in various directions but falls short of supplying an unequivocal example of such knowledge or at least a positive argument for its attainability.

The second family of issues concerns the author's metaphysical vision. To motivate the legitimacy of metaphysical inquiry, Chakravartty draws an analogy between speculation about unobservables in science and speculation about metaphysics in philosophy. Although the former runs a greater risk of failure since scientific theories are expected to generate novel predictions, he stresses that this difference is a matter of degree since not all sciences generate such predictions. More crucially, in the author's view the legitimacy of a form of inquiry cannot be settled on rational grounds but depends on the values one endorses (25). The first part of Chakravartty's reasoning is erroneous. Many realists, purge sciences or theories as immature and epistemically unworthy when they are incapable of generating novel predictions, i.e.

when they merely accommodate the data. To thus suggest that the existence of immature sciences somehow lends credence to metaphysical speculation is self-defeating. Indeed even the author's conviction that metaphysical beliefs are fallible since they 'can lose out' (23) is tricky to maintain in the absence of an argument that real progress can be made in metaphysics - essentialism and nominalism are just two of many metaphysical theories that keep getting disinterred.

What about the author's specific metaphysical proposals, developed chiefly over chapters four to six? Chakravartty's self-professed 'relatively modest' and non-exclusive approach to metaphysics ring sensible at first. However, the generally unrevealing attitude towards the appropriate level of metaphysical engagement is ultimately precarious as the reader naturally wonders whether many of the details of the author's own proposals pass muster. These misgivings are not helped by the fact that some of Chakravartty's objections have a boomerang quality. Take, for example, his dismissal of certain types of explanations about the mechanism of causation. Chakravartty carps, '[m]etaphors abound: links; chains; ties; glue; cement; bringing things about; and perhaps most highly scorned of all, the "powers" of ancient metaphysics' (101). In their stead, he puts forth the view that '[c]ausal phenomena are produced by the ways in which property-conferred dispositions are linked to one another' (112). How is the author's explanation more edifying than the one citing chains, glue or cement? In what way have dispositions superceded 'the powers of ancient metaphysics', if, by the author's own admission (113), the explanatory benefit of dispositions can only be gleaned metaphorically?

The third family of issues concerns Chakravartty's analysis of the notion of approximate truth, sketched over chapters seven and eight. The analysis is prompted by the apparent inadequacy of the existing literature to explore in-depth the notion's qualitative, as opposed to quantitative, details. From the author's standpoint theories deviate from the truth either by idealisation - when the postulated relations between causal properties 'do not exist as described' - or by abstraction - when the descriptions of postulated relations are correct but 'applied to different circumstances' - indeed most often by both (147-148). Chakravartty's call for a qualitative analysis of the notion of approximate truth would benefit from a firmer footing. At least some of his account's presumably unique features, e.g. that more abstract theories are less approximately true than less abstract ones, drop out of the very quantitative treatments he criticises (222-223). What is more, the distinction between abstraction and idealisation cannot easily be upheld. Abstracting parameters and idealising them seem inseparable. Take the pendulum example. Removing 'air-resistance' is considered by Chakravartty to be an abstraction but it is also an idealisation since by abstracting we simplify the nature of the pendulum's interactions with its surroundings. Similarly, representing the bob as a point mass is taken by the author to be an idealisation of its nature yet it is also an abstraction of a number of its features, e.g. that it has an extension, that its mass is not uniformly distributed, etc.

It is, of course, all too easy to find flaws in a book. I will therefore end this review with some notes of praise, occasions of which there are plenty. First, a testament to a selection of thoughts I found rousing. One thought, of which we admittedly get only a glimpse, fashions causation as the continuous alteration of interacting properties (§ 4.4). A potential upshot of this idea is a more faithful way to model dynamical systems in nature. Perhaps a more enticing thought concerns the author's articulation

of a weak notion of necessity, according to which things are compelled in the actual world without implication for other possible worlds (§ 5.2). This construal of necessity unshackles the realists from excessive metaphysics while still permitting them to maintain a discrepancy between laws of nature and accidental regularities. A final thought worth bringing up concerns the author's view that natural kinds should not be tied only to essence kinds. Since the most desirable characteristic of natural kinds is their ability to support successful inductive practices, it is reasonable to suppose that kinds possessing this characteristic but whose members do not share essences should also be admitted into the natural kind club (§ 6.2). Over and above these ideas, Chakravartty deserves credit for his perceptiveness in pre-empting a great many potential objections. I recommend this book, particularly, but not only, to those who want to study in earnest the interface between the metaphysics and the epistemology of scientific realism.

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