Gerhard Schurz

Philosophy of Science a Unified Approach. Abingdon: Routledge, 2014; paperback ISBN: 9780415829366, £32.99; hardback ISBN: 9780415829342, £93.00; e-book ISBN: 9780203366271, from £32.99.

Gerhard Schurz's remarkable *Philosophy of Science a Unified Approach* is at once an introductory textbook, an exposition and defence of a modern version of logical empiricism, and an encyclopaedic resource for professional researchers and teachers of philosophy of science. I should say at once that I think it succeeds admirably in fulfilling these disparate aims.

Schurz is able to ensure that his book can be used as an introductory textbook by differentiating in each chapter the introductory material from 'complementary and advanced topics'. The latter parts are more useful for advanced students and professionals and can be skipped by those who are beginners in the philosophy of science. (This also means that the same book can be used for a more advanced course in the philosophy of science.) It should be noted that while this book can be used for teaching introductory philosophy of science, it would not be appropriate, in my view, for students very early in their philosophical careers, since it does demand a level of philosophical sophistication that philosophical neophytes will not have. For students taking philosophy of science for the first time in their second or third year of studies this will be a demanding but rewarding work.

The following will give you some idea of how Schurz has divided his topics. Chapter 1: On the role of the philosophy of science, with an excellent historical overview of how we have got to where we are in the philosophy of science. Chapter 2: Develops from Chapter 1. The main theme is the unity of science. The chapter discusses the contrast between normative and descriptive approaches to philosophy of science and the method of rational reconstruction. It addresses the question of values and value-neutrality in science, and the demarcation problem. The advanced topics of this chapter include the metaphysical assumptions of science, theory-dependence of observation, and the justification of induction. Chapter 3 is rather different. Here we are given the 'conceptual toolkit' we will need as philosophers of science. Much of this is logic and philosophical logic. While the logic ought to be familiar to those students who are ready for Schurz's book, it is useful to have that material presented in a broader context, including a basic introduction to probability and its interpretations. The advanced material takes this further, including more on the interpretation of probability, plus the analytic-synthetic distinction, dispositional concepts, and relevance in logical inference. Chapter 4 returns to the familiar territory of laws, and empirical tests of laws, including

the use of classical statistical tests, while the advanced material addresses ceteris paribus laws (one of several areas covered by this book where Schurz is a leading expert) and Bayesian statistics. In a sense, we can think of a law proposition being the 'easy' case of a scientific claim that can be tested. Then theories (whose claims go 'beyond experience') are the next most difficult cases. And explanatory theories and causal claims in particular being an especially important and difficult subset of the theories. So these are dealt with in chapters 4, 5, and 6 in succession. A wealth of material is covered therein. In Chapter 5, on theories and their evaluation, the advanced topics include instrumentalism and realism, Ramsey sentences and the (non-)eliminability of theoretical terms, theories of confirmation, and truthlikeness. In Chapter 6, on causes and explanation, the advanced topics cover lawlikeness and causation. (N.B. this brief survey hardly does justice to the richness and range of the coverage of Schurz's book.)

One feature of Schurz's mode of organizing topics is that it treats metaphysics and epistemology side by side, e.g. the discussion of what theories are is immediately followed by discussion of how we confirm theories. As I mentioned, Schurz's own views are very much in the logical empiricist tradition, though developed in his own particular way, backed up by a wealth of his own published research. This comes through clearly in this book, but that does not detract from the generality of the coverage. (Schurz makes quite clear when it is his own views that are being presented.)

I must admit that I do look forward to an anti-empiricist introduction to the philosophy of science being available one day. Schurz presents a 'minimal epistemological model', one component of which is 'minimal empiricism'. The latter holds that: 'the objects examined by any science [formal sciences excepted] must, in principle, be accessible to experience and observation. After all, reliable information about reality can only be gained through perceptual observation; for perception is our only form of direct informational contact with reality. Empirical observations, then, are a decisive referee in the scientific search for truth …' This minimal empiricism is one that will indeed be shared by the majority of philosophers of science; it seems almost uncontroversial. But should it be uncontroversial? For a start, Schurz makes an all-too-easy transition between the concepts of 'perception' and 'observation' which, in my view, covers a multitude of difficult questions about the precise relationship between the two. (To be fair, some of these are discussed by Schurz in his detailed discussion of the theory-dependence of observation.) Furthermore, this empiricism in the philosophy of science is justified by the quite general claim that perception is an individual's only informational contact with reality. Even if the latter is correct (which in part depends on the definition

of 'perception'), it does not follow that observation in science is in any way perceptual. Consider the outcomes of the observations made by scientists engaged in CERN's ATLAS experiment using the Large Hadron Collider. Those outcomes are stored as data on CERN's (very capacious) servers, having been subjected to considerable automatic statistical processing. So where does the perception come in? When a scientist looks at her computer screen? The latter seems hardly relevant to the philosophy of science. I am sceptical about even minimal empiricism, insofar as it involves sense-perception.

Individual readers may disagree with Schurz, as I have just done, on particular points, but they will also think that he has done an excellent job of presenting a detailed, balanced, and tightly argued overview of the philosophy of science. I will use this book a great deal myself and I am looking forward to challenging my students with it too.

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