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BOOK REVIEW

Stathis Psillos and Martin Curd (eds): *The Routledge Companion to Philosophy of Science*

Routledge, Abingdon and New York, 2008, ISBN13: 978-0-415-35403-5, xvii + 619 pp, $200.00

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1 Introduction

This is a very impressive collection. Editors Stathis Psillos and Martin Curd have assembled a distinguished group of authors; the 55 chapters, though individually relatively brief, cover the field with sophistication and depth. As a whole, the volume provides a highly informative snapshot of the current state of philosophy of science.

2 Overview of Contents

The book is divided into four parts. Part I, 'Historical and philosophical context', includes nine chapters: 'The epistemology of science after Quine' by Paul A. Roth, 'The history of philosophy and the philosophy of science' by Joanne Waugh and Roger Ariew, 'Metaphysics' by Stephen Mumford, 'Philosophy of language' by Rod Bertolet, 'The role of logic in philosophy of science' by Diderik Batens, 'Critical rationalism' by Gürol Irzik, 'The historical turn in the philosophy of science' by Alexander Bird, 'Logical empiricism' by Thomas Uebel, and 'Pragmatism and science' by Robert Almeder. As a group, these chapters do a good job of providing relevant context for the chapters that follow. Some are exceedingly clear and provide the kind of background that would be useful to a newcomer to philosophy of science, as well as offering analyses and views of interest to the specialist (e.g., the chapters by Irzik, Mumford, Bertolet and Bird); others are written more for the specialist and engage contemporary interpretive and substantive debate, and as such offer less help to the beginner (e.g., the chapters by Roth and Uebel). Most of these chapters provide systematic coverage of their topics; all make substantial claims concerning those topics. As such, these chapters will be of interest to both students and specialists.

Part II, 'Debates', contains 19 chapters: 'Bayesianism' by Colin Howson, 'Confirmation' by Alan Hájek and James M. Joyce, 'Empiricism' by Elliott Sober, 'Essentialism and natural kinds' by Brian Ellis, 'Ethics of science' by David B. Resnik, 'Experiment' by

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Theodore Arabatzis, 'Explanation' by James Woodward, 'The feminist approach to the philosophy of science' by Cassandra L. Pinnick, 'Inference to the best explanation' by Peter Lipton, 'Laws of nature' by Marc Lange, 'Naturalism' by Ronald N. Giere, 'Realism/anti-realism' by Michael Devitt, 'Relativism about science' by Maria Baghramian, 'Scientific method' by Howard Sankey, 'Social studies of science' by Robert Nola, 'The structure of theories' by Steven French, 'Theory-change in science' by John Worrall, 'Underdetermination' by Igor Douven, and 'Values in science' by Gerald Doppelt. These wide-ranging chapters are uniformly clear and informative. Most will be of interest both to students and to more knowledgeable, advanced readers.

Part III, 'Concepts', includes 19 chapters: 'Causation' by Christopher Hitchcock, 'Determinism' by Barry Loewer, 'Evidence' by Peter Achinstein, 'Function' by D. M. Walsh, 'Idealization' by James Ladyman, 'Measurement' by Hasok Chang and Nancy Cartwright, 'Mechanisms' by Stuart Glennan, 'Models' by Demetris Portides, 'Observation' by André Kukla, 'Prediction' by Malcolm Forster, 'Probability' by Maria Carla Galavotti, 'Reduction' by Sahotra Sarkar, 'Representation in science' by Paul Teller, 'Scientific discovery' by Thomas Nickles, 'Space and time' by Oliver Pooley, 'Symmetry' by Margaret Morrison, 'Truthlikeness' by Graham Oddie, 'Unification' by Todd Jones, and 'The virtues of a good theory' by Ernan McMullin. These chapters also contain an expansive range of excellent material, both for students and specialists.

Part IV, 'Individual sciences', contains eight chapters: 'Biology' by Alexander Rosenberg, 'Chemistry' by Robin Findlay Hendry, 'Cognitive science' by Paul Thagard, 'Economics' by Uskali Mäki, 'Mathematics' by Peter Clark, 'Physics' by Simon Saunders, 'Psychology' by Richard Samuels, and 'Social sciences' by Harold Kincaid. While inevitably these chapters focus on specialized, individual science-specific content and issues, they do so informatively and helpfully.

In a review of this length, it is impossible to comment on each chapter. Instead, I will try to say something about some themes running through the volume, and about the resulting picture of philosophy of science to be gleaned from these essays. Assuming that these essays collectively provide an accurate snapshot of the current state of the field, what is that state?

Although the trend in recent years has been an ascension of issues in specific sciences and a decline in the urgency of questions concerning 'general philosophy of science', the volume indicates that the latter is alive and well, with the substantial majority of chapters devoted to extra-specific-science issues and concepts. This, I agree with the editors (Introduction, pp. xix–xx), is a good thing.

The editors' Introduction provides a helpful (albeit brief) survey of the central problems and the grand historical sweep of the subject, as science and scientists both shaped and were shaped by developments in its philosophy. More or less all aspects of this historical and substantive tale are taken up in subsequent chapters. Of particular note is the Editors' brief account of the rise and fall of logical positivism (pp. xxii–xxv). For the logical positivists, philosophy of science was characterized by "anti-psychologism, anti-historicism, and anti-naturalism" (p. xxiii). All three of these were subsequently challenged (by Quine, Sellars and Kuhn most famously, though many other figures were of course involved as well). The resulting post-positivism, in which period we remain today, emphasizes the contributions that history, sociology, and (other) specific sciences make to the settling of the normative questions at the heart of philosophy of science. A further important trend today is opposition to the reduction of the specific sciences to physics, and an embrace of the resulting 'disunity' of science (pp. xxiv–xxv).

Of particular note is the *naturalistic* character of contemporary philosophy of science. As the editors suggest, naturalism extends in particular to the normative questions (e.g., concerning the epistemological strengths and weaknesses of particular theories, methods of investigation, patterns of inference, and theory choices) at the heart of philosophy of science: "But the real bite of the naturalist turn was that it made available a totally different view of how scientific methods (and inductive methods in particular) are justified. Naturalists regard methodology as an empirical discipline that is part and parcel of natural science: methodological norms are *hypothetical imperatives* that link methods and aims; their justification is a function of their (empirically certified) effectiveness in bringing about those aims" (p. xxiv). The editors are certainly correct that naturalism is the dominant view these days, and the subsequent chapters bear this out: In addition to Giere's chapter-length defense of naturalism (pp. 213–223), the chapters by Roth, Bird, Sankey, and Doppelt all give it a prominent and positive place; only Worrall (p. 283) and Nola (pp. 264–265) sound dissenting notes, while Sankey, though holding out hope for its ultimate success, acknowledges its controversiality (pp. 256–257). While Bird suggests that naturalism seems not to settle but rather to abandon prescriptive/normative matters in philosophy of science (pp. 76–77), Doppelt insists that the naturalist cannot avoid issues of values (pp. 308–309). So even in these naturalistic days, questions remain concerning both its substance and its justification. This too, I think, is a good thing.

3 Concluding Comments

The essays are on the whole clear, well-written, engaging and authoritative. Some are quite technical, but many are readily accessible even for the relative newcomer; that is, they combine effectively introductory survey with specialized analysis. It is hard to think of a topic in philosophy of science that is not addressed; in this sense the volume is quite comprehensive. Of course the individual authors have particular points of view to advocate and particular axes to grind, and in this sense the essays are not always 'neutral,' un-opinionated surveys. But this is not only to be expected, it is to be desired, since these are uniformly authors whose views of their domains deserve to be taken seriously. Readers will invariably learn—a lot—from the rich discussions collected here. The book should be useful for both students and specialists. It should be very helpful to the many readers of this journal who don't specialize in philosophy of science but for whom aspects of philosophy of science are important to their own research. Each chapter provides a highly useful list of 'further readings' that provides an avenue for readers to pursue the issues further; these further readings are an especially welcome pedagogical feature of the individual chapters.