

Cartesian and Kantian epistemologies and Vienna Circle and Popperian philosophies of science and (2) post-Kuhnian and constructivist epistemologies.

The label “post-Kuhnian” ignores the fact that Kuhn himself and some of his critics align him with the Mertonians and dispute the claim that he made any contributions to the sociology of knowledge. Smith goes on to distinguish “constructivism” from “social constructionism.” Her characterization of “social constructionism” as a critical culturally and politically engaged endeavor obscures social constructionism as a fundamental theorem of sociological theory—the claim that knowledge and belief (like all human activities and products) are socially constructed, constituted of social relations, and social institutions. These are about the only vulnerabilities in her framework, and they are benign. Her critique of evolutionary psychology and her defanging of Steven Pinker should be required reading for all scholars and especially for science writers who promote the public misunderstanding of science with their zeal for the findings from this arena. More generally, Smith corrects all sorts of misunderstandings about the nature of relativism and the nature and grounds of science studies. We are reminded again and again about the importance of reading carefully and reading things through to their conclusions. There is no guarantee, however, that such readings will avoid misunderstandings, misconstructions, and misinterpretations. We are, as cultural theorists such as Michael Thompson remind us, bound by our cultural biases, and Smith demonstrates just how difficult it is for people to escape those biases. Her own work, on the other hand, illustrates that certain cultural biases can help us separate the wheat from the chaff better than others. Smith’s book, carefully and thoroughly read, will help some but not all readers avoid the pitfalls laid out like land mines across today’s epistemological geographies. Scandals, as Randall Collins and I have argued, can signal organizational changes and realignments of power, and Smith’s book opens a window on just such changes in the intellectual community.

SAL RESTIVO

P. Kyle Stanford. *Exceeding Our Grasp: Science, History, and the Problem of Unconceived Alternatives.* xi + 234 pp., bibl., index. New York: Oxford University Press, 2006. \$45 (cloth).

What makes Kyle Stanford’s book on scientific realism so valuable to philosophers of science is that it both presents new philosophical ideas and

bases its argument on a detailed study of the history of science. While scientific realism—the idea that our most well-confirmed theories give a literally true description of the world—has usually been debated in the context of physics, Stanford explores the history of biology. He develops a novel argument against realism (yet one that combines an improved version of the two main traditional arguments: the underdetermination of theory by evidence and the pessimistic meta-induction over the history of science). His “problem of unconceived alternatives” claims that while scientists may have sufficient evidence to exclude all but one of several rival theories considered, endorsing the remaining theory is unwarranted as there are unconceived alternatives that are equally well confirmed by the evidence (p. 18). The support for this claim consists in the historical fact that, in the past, scientists have failed to conceive of theories that were eventually adopted, even though those unconceived theories would have been genuine alternatives as well supported by the original evidence as the theories those scientists did endorse. Of course, this inability to conceive of such a relevant alternative persists only temporarily (since the originally unconceived alternative is later proposed and accepted). Stanford’s point is that it is a *recurrent* predicament that at any point in history there are unconceived alternatives that are equally well supported by the available evidence, yielding a “new induction over the history of science” implying that the problem of unconceived alternatives challenges even our current theories (p. 19).

The historical case made for this argument consists in a detailed discussion of views on heredity found in Darwin, Francis Galton, and August Weismann. Stanford’s discussion of how nineteenth-century biologists developed and defended their accounts presents both examples where a relevant alternative was actually conceived *in broad terms* and discussed, though this consideration fell short of a genuine understanding of the alternative and its merit, and cases where relevant alternatives were not conceived at all by the whole scientific community. For instance, when defending his theory of pangenesis, Darwin failed to conceive of any account that assumed that the characters of parent and offspring were equally determined by the hereditary material as a common cause, rather than the parental structures determining the offspring characters via physical particles. Darwin even failed to grasp this alternative when it was suggested to him by Galton. Galton’s own stirp theory assumed that the hereditary elements grow into the

adult trait and that they exert their influence independently of the physical context in which they occur, and Galton could not conceive of any alternative that denied either of these assumptions (classical genetics later rejected both). In defending his theory of the germ plasm, Weismann explicitly argued that one must maintain that the hereditary material is split up qualitatively in cell division during development and that it must be physically consumed when its activity ceases, thereby failing to conceive of a whole class of alternatives of which classical and contemporary genetics are instances. Stanford uses this historical evidence not only to support his novel challenge to realism but also to criticize recent attempts by Philip Kitcher and Stathis Psillos to rebut traditional antirealist arguments.

In the last chapter, Stanford develops as an alternative to realism a variety of *instrumentalism* that maintains that while the theoretical claims of science are significant in that they are used for making predictions and developing means of intervention, one nonetheless should not believe these theoretical claims (unlike non-theoretical claims). Admittedly, Stanford's positive account is seriously underdeveloped. For instance, though he distinguishes between actively using a theoretical idea and believing it, he gives no account of this distinction. And while his critique of (at least some versions of) realism neatly flows out of the history of science, this does not hold for the presentation of his instrumentalism. Nevertheless, Stanford's discussion presents historical material that raises very significant questions for future philosophical and historical studies of scientific change: What intellectual, material, and institutional features both hinder scientists in conceiving of alternatives and yet enable them to develop those alternatives at a later point?

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■ Collections

José Ramón Bertomeu-Sánchez; Agustí Nieto-Galan (Editors). *Chemistry, Medicine, and Crime: Mateu J. B. Orfila (1787–1853) and His Times*. xxv + 306 pp., figs., apps., index. Sagamore Beach, Mass.: Science History Publications/USA, 2006. \$52 (cloth).

José Ramón Bertomeu-Sánchez; Agustí Nieto-Galan: Preface. **José Ramón Bertomeu-Sánchez; Agustí Nieto-Galan**: Introduction. **José Ramón Bertomeu-Sánchez; Agustí Nieto-Galan**: Mateu Orfila and His Biographers. **Antonio García-Belmar**: The Didactic Uses of Experiment: Louis-Jacques Thenard's Lectures at the Collège de France. **María José**

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Adrian C. Brock (Editor). *Internationalizing the History of Psychology*. vii + 260 pp., fig., index. New York: New York University Press, 2006. \$50 (cloth).

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Nina Byers; Gary Williams (Editors). *Out of the Shadows: Contributions of Twentieth-Century Women to Physics*. Foreword by **Freeman J. Dyson**. xxv + 471 pp., figs., indexes. Cambridge: Cambridge University Press, 2006. \$35 (cloth).

Nina Byers: Introduction. **Joan Mason**: Hertha Ayrton (1854–1923): The Electric Arc (Early Plasma Physics) and the Formation of Sand Ripples at the Seashore. **Peggy Aldrich Kidwell**: Margaret Eliza Maltby (1860–1944): Acoustics, Electrolytes, and Physics