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Review

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Popperean philosophy of science is seen. For Watkins, the best theory to act on is chosen by a ramified procedure that legitimates the estimation of long-run (i.e., future) frequencies on the basis of current data. Many inductivists will fail to see the difference between that and induction. Watkins's account of pure science *is* handled purely deductively but therefore leaves an arbitrary and implausible gulf between the theory choices of a pure scientist and those of an applied scientist. Is there one specific heat of aluminum for theoreticians and another for engineers?

JOHN M. NICHOLAS

### ■ Scientific Method

**Husain Sarkar.** *A Theory of Method.* xvii + 229 pp., bibl., indexes. Berkeley/Los Angeles/London: University of California Press, 1983. \$29.95.

The subject of Husain Sarkar's book is perhaps best stated in the author's words: "A theory is about the world; a method is about theories; and, a theory of method is about methods" (p. 1). A theory of method is an attempt to provide a general framework within which to choose among alternative methods.

Through critical examination of the positions of Karl Popper, Imré Lakatos, and Larry Laudan, Sarkar develops his own framework for evaluating methods, which includes two bold proposals: that the history of science cannot be used as an arbitrator among methods, and that methods should be chosen by testing the heuristic advice they give about which lines of scientific research to pursue further. Interestingly, he does not limit the role of history for the usual (bad) reason that the history of science is "merely factual," whereas what is needed is a normative judgment about what has and will constitute good science. Sarkar emphasizes that good history requires interpretation and contends, along with Laudan, that there is no philosophically neutral or methodologically innocent history of science. However, he thinks that the best history will pay close attention to past conceptions of method, which need not be relevant for evaluating current scientific theories. He espouses an experimental approach to the selection of methods: they should be proposed and

tested, as are scientific theories themselves. Perhaps to mitigate the dangers involved in putting all the money on the wrong horse, Sarkar also develops an account of group rationality, the thrust of which is that a rationally ordered scientific community will comprise a number of subgroups pursuing distinct methods.

The reader who already has an interest in the work of Popper, Lakatos, and Laudan will find this book of interest. That reader is likely to be disappointed by the abstractness of the argument in the book: there is a lot of talk about "theories of method *M*" and the desiderata that they propose, such as "Criterion *X*," without much explication of these desiderata beyond naming them and invoking them in the categorization (as rational or irrational, scientific or unscientific) of various scientific episodes that are themselves for the most part (though with exceptions) merely mentioned or named. Other readers will want a fuller discussion of such key notions as "absolute truth," "verisimilitude," and "the much-needed metaphysical theory of realism." Although the book proposes a theory of method and thus is about methods and not about theories, one would like to have had a fuller discussion of the application of methods to theories, the better to see what one is choosing and how the choice relates to scientific practice.

GARY HATFIELD

### ■ Theory Construction

**Arthur I. Miller.** *Imagery in Scientific Thought: Creating Twentieth-Century Physics.* xiv + 355 pp., illus., bibl., index. Boston/Basel/Stuttgart: Birkhäuser, 1984. \$24.95.

The questions raised in this book are of the following kind: What are the origins of scientific concepts? How are scientific ideas transformed? How do scientists invent or discover theories? These queries form the stock-in-trade of philosophers of science, but Arthur Miller claims that he raises them in a novel way inasmuch as he proposes to use the history of twentieth-century physics as a laboratory. His goal is less the logic of justification than the psychology of discovery, and he borrows his tools from cognitive science, which he defines as the integration of philosophy, lin-