



REVIEW: Frederick Grinnell, *The everyday practice of science: Where intuition and passion meet objectivity and logic*

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REVIEWS

Frederick Grinnell. *The everyday practice of science: Where intuition and passion meet objectivity and logic*. 248 pp. New York: Oxford University Press, 2009.*

Cory Lewis[†]

Frederick Grinnell's *The Everyday Practice of Science* is an ambitious attempt to survey the methodological issues facing practicing scientists. His examples and anecdotes are mainly drawn from his own field of biochemistry, which he argues is representative of the scientific method in general because, quoting Nobel Laureate Sir Peter Medawar, "Biologists work very close to the frontier between bewilderment and understanding" (p. 4). Grinnell's goal is to explore the ambiguity and messiness of actual scientific practice, but not with an eye to undermine its credibility. Rather, he tries to show how the day-to-day practice of science functions to generate reliable hypotheses from the complexity of reality.

His project is divided into two main parts. Part I, simply titled "Science," is an overview of the scientific method, told from the perspective of a working scientist. Part II, "Science and Society," looks at some of the issues that arise in the interaction between the scientific community and society at large. I will look at these two sections in turn.

In Part I, Grinnell provides both a rationale for his project and an overview of his approach throughout the book. He believes that there is a pervasive and mistaken view of how science works, which he hopes to combat. He contrasts the cleaned up, linearized picture of scientific method found in textbooks and papers with the exploratory, opportunistic realities of day-to-day scientific practice. He describes the process of discovery in its full emotional richness, from the excitement of finding something unexpected to the crushing disappointment of a failed experiment. Critically drawing on some of the classic authors in the philosophy of science (Merton, Kuhn, Popper, and even Plato), Grinnell works to show how the human face of daily scientific practice informs, and is informed by, formalized text-book knowledge. The vagaries of generating hypotheses, knowing which ones to explore, and convincing others that your exploration is valid are all treated as part of a continuous and reciprocal process. He describes this mutual constitution as a relation between the individual scientist

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(or scientific working group) and the broader scientific community. A promising result excitedly written into a lab notebook is turned into a piece of credible knowledge through peer review, citation and replication. Grinnell describes this process as well as its problems and, along the way, suggests how it self-corrects.

Along the way, we get a series of stories from Grinnell's own scientific practice, and from the practice of others. In order to illustrate the problem of distinguishing data from noise, he uses a particular set of experimental problems he faced while studying the adhesion of cells to a culture dish. While discussing scientific credibility, we get anecdotes about the rejection of papers by *Nature* which would eventually earn their authors a Nobel Prize (p. 78). While Grinnell is undoubtedly aware that the plural of *anecdote* is not *data*, and that individual stories do not constitute arguments for his conclusions, they do serve an invaluable illustrative role. His focus throughout the book is on the practical realities of science and his anecdotes, in all their rough particularities, help to keep his overall narrative grounded.

Part II broadens the picture further, encompassing not just the relation between individual scientists and their community but also the relation between the scientific community and society at large. Questions such as how the decision to fund one study over another and who funds them are explored. His perspective as a biomedical researcher comes through clearly here. Grinnell also works through the ethical questions that arise from the practical necessities of scientific practice. For example, how informed do the participants in a study need to be? Or if a study is done on the genetics of a group of people, do their families who share their genes need to consent as well? After all, to study my genes is also to study the genes of my family. Those ethical issues that scientists must wrestle with are highlighted, always with an eye to how they arise from practical issues. He concludes the book with a section on the relationship between science and religion. He argues for their mutual autonomy, but also for a worldview which encompasses both.

Clearly, Grinnell's project is ambitious, especially for a book that is so short and accessible. His success in communicating some of the core issues in the philosophy of science and their source in inescapable practical issues is striking. While philosophers of science may not find much that is new to them in this work, they will surely appreciate the delicate balance Grinnell manages to achieve between serious engagement with canonical abstract problems and clear-headed pragmatism. For example, he flatly rejects the more fanciful critiques that scientific credibility has endured: "The postmodernists are wrong" (p. 13). But at the same time, his analysis draws on nuanced notions of "truth" and "authority" that capture the best of the twentieth century critique on scientific absolutism and bring the foundational intersubjectivity of scientific credibility to light. We get musings about the "hermeneutic spiral of science" (p. 54) mixed with reflections on how different thought styles make different

aspects of the world visible.

It is interesting to note the delicate balance Grinnell strikes between sociological and philosophical perspectives. Contemporary philosophy of science concerns itself mainly with textbook knowledge, whereas historical and sociological investigations are primarily concerned with the social networks and practices which lead up to that finished product. Grinnell situates himself precisely between these two perspectives, arguing that the appropriate vantage point to view the actual situation is at the interface between textbook knowledge and the practices which produce it. While this places the book outside normal disciplinary boundaries, it is tempting to view this as its primary virtue, rather than any kind of vice.

The vexing question about this book is how best to use it. Having read its less than 200 pages, a person will clearly not have mastered its varied topics. Despite Grinnell's to-the-point style, there is only so much that can be done in one book. And on the other hand, professional philosophers will not experience this text as a revelation. Sophisticated as his perspective is, Grinnell is expressing what is essentially the consensus view in science studies today (except, perhaps, in his final section on religion, where it is doubtful that consensus even exists). One can imagine educated lay-people having a rewarding time reading it, especially those who are either too enthusiastic about scientific objectivity or the opposite, too critical. Grinnell's middle-way would certainly do no harm.

The ideal circumstance for this book, I would imagine, would be as the central text for an undergraduate seminar. Exploring even a few of the issues it raises would easily fill a semester, and someone who has done so would have at least an overview of the kind of issues that science studies deals with. Grinnell's clear style and liberal use of illuminating anecdotes make it accessible enough for students at nearly any level.

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