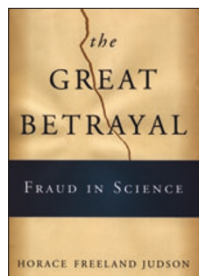


When science falls from grace



The Great Betrayal: Fraud in Science

Horace Freeland Judson

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Reviewed by Sheldon Krimsky

Anyone who has read Horace Freeland Judson's magnum opus on the history of molecular biology, *The Eighth Day of Creation*, which gives homage to the creative power and intellect of the new breed of molecular geneticists, might be surprised to learn that his latest book is a no-nonsense exposé of science's deep, dark secrets. *The Great Betrayal* displaces science from its pedestal and situates it squarely in the world as one of many subcultures that possesses its share of human vice, deceit and corruption. Building on personal interviews conducted over a decade ago, the author takes on three deeply entrenched myths about science that most scientists begin to internalize in their early training.

Myth #1: Post-Enlightenment science has given rise to a universal method of inquiry for which one can find continuity across three centuries. Judson casts the spotlight on some of our most notable scientific forebears, including Isaac Newton, Robert Millikan and Sigmund Freud, and disputes the idea of a consistently applied rational scientific method of inquiry. He argues that these scientists followed procedures that would be classified as improper today, or that they committed outright scientific misconduct according to current standards. These historical accounts raise questions about how the norms of scientific inquiry and the standards of accepted scholarship have changed during the development of modern science.

Myth #2: There is very little outright fraud committed by scientists because science has its own ethical compass and incentives for ensuring integrity. Cases of confirmed scientific fraud represent the aberrant behavior of errant scientists differing from other forms of social deviance rooted in social and economical factors. In a chapter titled "Hard to Measure, Hard to Define," Judson takes the reader on a tour of the most infamous cases of scientific misconduct (fabrication, falsification and plagiarism) of the twentieth century. He reviews studies that estimate the frequency of the incidence of fraud in science. Allegations and investigations into fraud and misconduct have become a major activity of the US Office of Scientific Integrity. Within the decade ending in 2002, two government agencies investigated over 200 allegations of scientific misconduct. Judson juxtaposes notable cases of fraud and surveys estimating the occurrence of scientific misconduct with the authoritative declaration of Philip Handler, former President of the National Academy of Sciences: "The matter of falsification of data need not be a matter of general societal concern. It

is rather a relatively small matter which is generated in and is normally effectively managed by that smaller segment of the larger society which is the scientific community" (p. 112). Judson is justifiably skeptical of Handler's assessment.

Yet, there is insufficient data to verify or debunk the myth about fraud in science or to confirm whether it has risen in recent years. One of the problems of measuring the frequency of scientific fraud is in knowing how to define it. Judson explores how our scientific agencies arrived at a consensus view that "the misconduct be committed intentionally, or knowingly, or in reckless disregard of accepted practices" (p. 188). Just being sloppy and making mistakes is not currently sufficient for a finding of misconduct.

Myth #3: The peer review system is the best thing science has going for it in its pursuit of certifiable knowledge. There is undoubtedly a two-class system in the world of journals: those that are refereed and those that are not. Peer review has been likened to Winston Churchill's view of democracy. It is a flawed system that is better than any of its alternatives. Judson discusses the role of peer review both in granting awards and in publishing papers. For the former, the alternative suggested is; fund the scientist rather than the project. It is not clear why that system would be less whimsical or subject to political bias if we were to fund promising or veteran scientists rather than peer review their proposals. And in the publication of papers, what is the alternative to peer review? Richard Smith, editor of the *British Medical Journal*, is quoted as saying: "Refereeing is expensive, time-consuming, inaccurate, subject to bias or worse, doesn't catch errors let alone fraud—and there is no objective evidence that it works better than the independent judgment of a qualified editor" (p. 271). Judson explores the alternative idea of giving to a few editors the daunting task of determining the quality of scientific papers, but this is reminiscent of the Supreme Court's Daubert decision, which gives federal judges the task of evaluating reliable science in court testimony before it is heard by the jury. Under Daubert, judges are inclined to use their own discretion to exclude responsible expert testimony based on their understanding or misunderstanding of scientific methods. Critics argue that it has raised the cost of plaintiff suits while reducing the importance of the jury's role in weighing expert opinion. There are many useful suggestions to improve peer review, such as the use of a double-blind system and disclosure of conflicts of interest—some journals have adopted them. But Judson seems to see no redeeming qualities in the current system. "Half a century on, though, peer review and refereeing are moribund. They have become dispirited, often ineffectual, and in some respects corrupt, infested with politics, rife with temptations to plagiarize" (p. 7).

The book also addresses another solution for reformation of the peer review system—open publication. Under this system, an article would be published electronically without peer review. After electronic publication, reviews could be posted online by anyone, and the authors would be free to decide whether to revise their paper. Science turns from 'accepted canon of knowledge' to 'pure process.' Judson predicts that "we will see an evolution towards a form of publication that will be a continuing open dialogue and collaboration among contributing scientists, editors, expert commentators, and readers" (p. 368).

The Great Betrayal deserves our attention. It is a challenging, sometimes even prickly, book that explores the future direction of science from its flawed tectonic shift and whether such a shift is desirable.

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ERRATUM: When science falls from grace

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The last sentence of the book review should be replaced with the following: "It is a challenging, sometimes even prickly, book that explores the future direction of science from its flawed past. Judson asks us to consider whether scientific norms are undergoing a tectonic shift and whether such a shift is desirable."