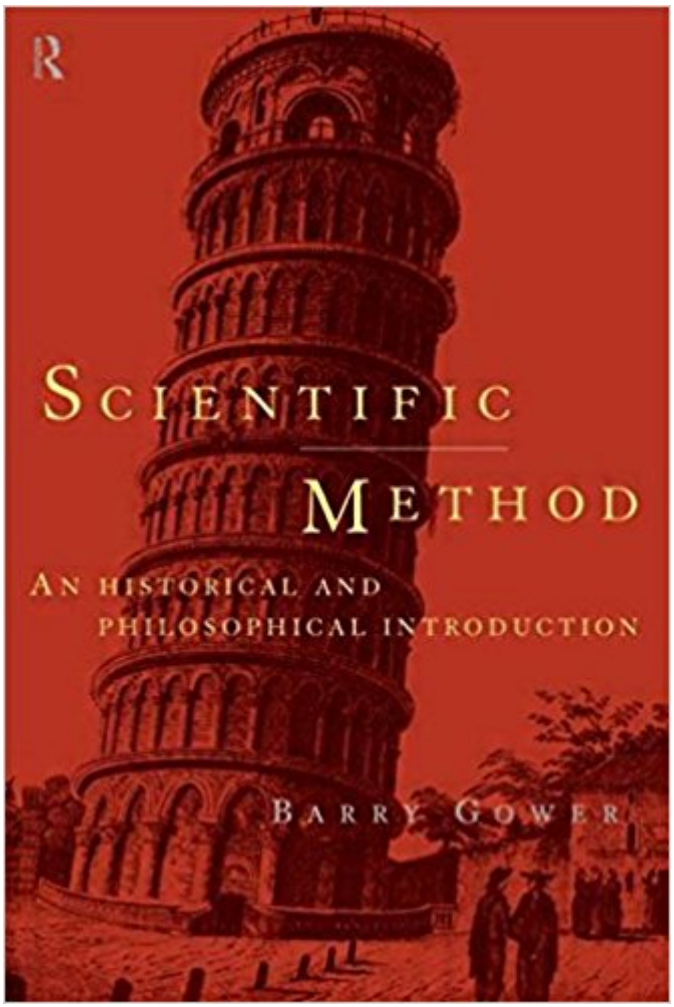
Scientific Method: A Historical And Philosophical Introduction (Routledge Advances In Management And)



Synopsis

The central theme running throughout this outstanding new survey is the nature of the philosophical debate created by modern science's foundation in experimental and mathematical method. More recently, recognition that reasoning in science is probabilistic generated intense debate about whether and how it should be constrained so as to ensure the practical certainty of the conclusions drawn. These debates brought to light issues of a philosophical nature which form the core of many scientific controversies today. Scientific Method: A Historical and Philosophical Introduction presents these debates through clear and comparative discussion of key figures in the history of science. Key chapters critically discuss* Galileo's demonstrative method, Bacon's inductive method, and Newton's rules of reasoning* the rise of probabilistic `Bayesian' methods in the eighteenth century* the method of hypotheses through the work of Herschel, Mill and Whewell* the conventionalist views of PoincarÃ© and Duhem* the inductivism of Peirce, Russell and Keynes* Popper's falsification compared with Reichenbach's enumerative induction* Carnap's scientific method as Bayesian reasoningThe debates are brought up to date in the final chapters by considering the ways in which ideas about method in the physical and biological sciences have affected thinking about method in the social sciences. This debate is analyzed through the ideas of key theorists such as Kuhn, Lakatos, and Feyerabend.

Book Information

Series: Routledge Advances in Management and
Paperback: 288 pages
Publisher: Routledge; 1 edition (December 12, 1996)
Language: English
ISBN-10: 0415122821
ISBN-13: 978-0415122825
Product Dimensions: 6.1 x 0.6 x 9.2 inches
Shipping Weight: 1.2 pounds (View shipping rates and policies)
Average Customer Review: 4.1 out of 5 stars 3 customer reviews
Best Sellers Rank: #687,592 in Books (See Top 100 in Books) #39 inÂ Books > Science & Math > Experiments, Instruments & Measurement > Microscopes & Microsocopy #642 inÂ Books > Science & Math > Experiments, Instruments & Measurement > Methodology & Statistics #3711 inÂ Books > Science & Math > History & Philosophy

Customer Reviews

""Scientific Method is a stimulating introduction to the philosophy of science. In Gower's hands this is a wonderful way to come straight to the fundamental issues."-Michael Ruse, University of Guelph

The results, conclusions and claims of natural science are often taken to reliable because they arise from the use of a distinctive method. Yet today, there is widespread scepticism as to whether we can validly talk of method in modern science. This outstanding new survey explains how this controversy has developed since the seventeenth century and explores its philosophical basis.

Gower's survey begins with Galileo and ends with Carnap. In between, he covers a number of prominent scientists - the ones you expect, like Bacon and Newton; and a few you don't, like John Maynard Keynes. He has grouped his subjects according to the nature of their contribution, which means that this reads as the series of essays that it is. Each essay is separately referenced.There are a few odd omissions, like Descartes (who is nonethless mentioned in passing). But the net result is that, instead of being presented with the historical panorama, one is confronted with a series of ideas - and how they fit into the overall understanding of contemporaries.

Many people do not realize that there has been an ongoing debate concerning:1) What science is (does it require proof of causality)2) What science can claim (is inductive reasoning valid)3) How science should be framed (are hypotheses the best framework for science, or should they be abandoned in favor of inductive models that come from experimental evidence)This book clearly explains how methodology has evolved, and what sort of science was done based on the varying methods in use. It's both a great history and a clear demonstration that science is not "set" but is an evolving practice, based on utility, but also sometimes side-tracked by philosophical concerns, such as the desire for "absolute truth", which has created somewhat of a problem over the years for those who champion probability.Highly recommended.

The question that has to be asked about recent books on the philosophy of science is: Does this book explain the four "turns" that Karl Popper introduced? These are (1) the conjectural turn, to explain that even our best scientific theories may be false, (2) the objective turn to focus on scientific knowledge in its public or objective form, rather than subjective beliefs, (3) the social turn to be aware that the scientist works in a community and there is a need for conventions or "rules of the game" to maintain standards of criticism and best practice and (4) the rehabilitation of metaphysics, in defiance of the positivists and logical empiricists, in the form of "metaphysical research

programs".This book does not score very well on that test however on the positive side the historical approach is very good, introducing concepts in relation to scientific episodes: Galileo on new methods for a new science, Francis Bacon on experiments, Newton on rules for reasoning, Herschel (the astronomer), Mill and Whewell on the use of hypotheses, Venn and Peirce on probabilities as frequencies, Keynes on probability logic, Reichenbach and Popper on induction.Contrary to the conjectural view of science (small s) this book was written very much in the justificationist or authoritarian mode (the authority of Science with a big S). And so "to explain the success of the work of scientists we will have to refer to the methods they use; we will refer to the reasoning they use to justify their new knowledge." With reference to our confidence in science "we trust scientific theories simply because they are scientific and therefore authoritative or we count claims as scientific and reliable because they are established by scientific methods.' That orientation begs all the questions.An interesting novelty in the book is the introduction of John Maynard Keynes who was a serious student of probability theory (the probability of theories or beliefs, or expectations) before he made his name as an economist.In view of the central importance of the problem of induction in modern times this review concentrates on the final chapters about Reichenbach, Popper and Carnap. Gower was even-handed regarding Reichenbach and Popper, pointing out that the former encountered a number of insoluble problems with his project to save inductive logic with a method to assign objective probability values to theories.He then argued that Popper had similarly run into trouble with his campaign to dispense with induction altogether. First he suggested that the claim of asymmetry between verification and falsification was not as clear as Popper declared. That objection fails because Popper drew a very clear distinction between the logic of testing and the practical problem of establishing a negative result. He described this as the difference between falsifiability (the capacity for a generalization to be refuted by a single true observation statement) and falsification, the practical matter of testing with all the complications of theory-dependence of evidence, the Duhem problem and so on.The logic of the situation is quite clear (it was endorsed by W V O Quine) and also by Richard Feynman, as cited by Gower on page 15 of this book. "If it [the computed consequences of a law] disagrees with experiment it is wrong. In that simple statement is the key to science ."The problem of handing the practical side of testing prompted Popper to develop the idea of conventions or rules of the game, not set in concrete but subject to criticism and improvement like scientific theories themselves. For an extended treatment of this aspect of Popperism, see Ian Jarvie's book "The Republic of Science". http://www..com/review/R37DB4M4BDDI0P/ref=cm_cr_pr_perm?ie=UTF8&ASIN=9042015152&linkCode=&nodeID=&tag=The second line of attack is to suggest that "induction in a broad sense" is

involved in justifying Popper's preference for well tested (corroborated) hypotheses over those that fail. However this involves a very different use of induction from the inductive logic that is supposed to assign a numerical degree of confidence to a theory. It is induction in the sense of the metaphysical theory that there are regularities or laws of nature which provide a degree of structure and predictability in the world. Given Popper's conjectural theory of knowledge, preferences are not set in concrete and are liable to revision in the event of new evidence, new arguments and new theories in the contest.The final chapter on Carnap describes now his lifelong project to develop a system of inductive logic failed and morphed into the very different program to quantify subjective feelings of probability which we now know as Bayesian subjectivism. This can be seen as the last bastion of subjectivism and inductivism. It remains to be seen how long it will last before people find that there is a better way with Popperian critical rationalism and objective knowledge.