

## Introduction To Logic Scientific Method

This classic undergraduate treatment examines the deductive method in its first part and explores applications of logic and methodology in constructing mathematical theories in its second part. Exercises appear throughout.

Treats politics, economics, technology, and geography as fundamental factors in generating an audience for logic.

Part I of this coherent, well-organized text deals with formal principles of inference and definition. Part II explores elementary intuitive set theory, with separate chapters on sets, relations, and functions. Ideal for undergraduates.

Logic is the backbone of Western civilization, holding together its systems of philosophy, science and law. Yet despite logic's widely acknowledged importance, it remains an unbroken seal for many, due to its heavy use of jargon and mathematical symbolism. This book follows the historical development of logic, explains the symbols and methods involved and explores the philosophical issues surrounding the topic in an easy-to-follow and friendly manner. It will take you through the influence of logic on scientific method and the various sciences from physics to psychology, and will show you why computers and digital technology are just another case of logic in action.

Major figures of twentieth-century philosophy were enthralled by the revolution in formal logic, and many of their arguments are based on novel mathematical discoveries. Hilary Putnam claimed that the Lwenheim-Sklem theorem refutes the existence of an objective, observer-independent world; Bas van Fraassen claimed that arguments against empiricism in philosophy of science are ineffective against a semantic approach to scientific theories; W. V. O. Quine claimed that the distinction between analytic and synthetic truths is trivialized by the fact that any theory can be reduced to one in which all truths are analytic. This book dissects these and other arguments through in-depth investigation of the mathematical facts undergirding them. It presents a systematic, mathematically rigorous account of the key notions arising from such debates, including theory, equivalence, translation, reduction, and model. The result is a far-reaching reconceptualization of the role of formal methods in answering philosophical questions.

The Conduct of Inquiry is a practical introduction to logic and scientific method. It provides a comprehensive and current discussion of the logic of scientific method and scientific reasoning.

The author places consistent stress on the evaluation of actual scientific reasoning and the development of critical thinking skills by employing numerous examples that require the application of the principles discussed in the text. Each chapter lays out basic, underlying principles of logic and scientific method and illustrates them by reference to detailed case studies in the history of science. The method of proceeding from concrete case studies to general principle embodied in the examples provides an understandable progression for those learning the basic ideas of logic and scientific method.

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I have tried to make this book an argument, not a catalogue of dogmas. Its ideal reader will find himself constantly asking questions, for which he will insist on finding his own answers. To avoid wasting his time, I have made the fullest use of authentic illustrations from newspapers, books, and other contemporary sources. One of the wisest things ever said about our subject is that "Logic, like whiskey, loses its beneficial effect when taken in too large doses." While bearing this constantly in mind, I have also aimed at a high level of accuracy and the inclusion of nothing that would have to be unlearned at a more advanced level of study. This book could never have been written without the help of the students to whom I have lectured on logic and scientific method. My chief obligations are to them. Logic ought to be easy, interesting, and enjoyable. This book will have been successful if it helps some readers to find it so.—Prof. Max Black

This is the first of two volumes comprising the papers submitted for publication by the invited participants to the Tenth International Congress of Logic, Methodology and Philosophy of Science, held in Florence, August 1995. The Congress was held under the auspices of the International Union of History and Philosophy of Science, Division of Logic, Methodology and Philosophy of Science. The invited lectures published in the two volumes demonstrate much of what goes on in the fields of the Congress and give the state of the art of current research. The two volumes cover the traditional subdisciplines of mathematical logic and philosophical logic, as well as their interfaces with computer science, linguistics and philosophy. Philosophy of science is broadly represented, too, including general issues of natural sciences, social sciences and humanities. The papers in Volume One are concerned with logic, mathematical logic, the philosophy of logic and mathematics, and computer science.

The work of Galileo has long been important not only as a foundation of modern physics but also as a model - and perhaps the paradigmatic model - of scientific method, and therefore as a leading example of scientific rationality. However, as we know, the matter is not so simple. The range of Galileo readings is so varied that one may be led to the conclusion that it is a case of chacun a son Galileo; that here, as with the Bible, or Plato or Kant or Freud or Finnegans Wake, the texts themselves underdetermine just what moral is to be pointed. But if there is no canonical reading, how can the texts be taken as evidence or example of a canonical view of scientific rationality, as in Galileo? Or is it the case, instead, that we decide a priori what the norms of rationality are and then pick through texts to find those which satisfy these norms? Specifically, how and on what grounds are we to accept or reject scientific theories, or scientific reasoning? If we are to do this on the basis of historical analysis of how, in fact, theories came to be accepted or rejected, how shall we distinguish 'is' from 'ought'? What follows (if anything does) from such analysis or reconstruction about how theories ought to be accepted or rejected? Maurice Finocchiaro's study of Galileo brings an important and original approach to the question of scientific rationality by way of a systematic read

Many of the earliest books, particularly those dating back to the 1900s and before, are now extremely scarce and increasingly expensive. We are republishing these classic works in affordable, high quality, modern editions, using the original text and artwork.

The scientific method is just over a hundred years old. From debates about the evolution of the human mind to the rise of instrumental reasoning, Henry M. Cowles shows how the idea of a

single "scientific method" emerged from a turn inward by psychologists that produced powerful epistemological and historical effects that are still with us today.

Clear, comprehensive, and rigorous treatment develops the subject from elementary concepts to the construction and analysis of relatively complex logical languages. Hundreds of problems, examples, and exercises. 1958 edition.

The vital resource for grading all assignments from the Introduction To Logic course, which includes: Instructional insights enhanced with worksheets and additional practice sheets  
Special chapter reviews at the beginning of each new chapter worksheet created to help students and teachers grasp the scope of each section.  
OVERVIEW: Welcome to the world of logic. This logic course will both challenge and inspire students to be able to defend their faith against atheists and skeptics alike. Because learning logical terms and principles is often like learning a foreign language, the course has been developed to help students of logic learn the practical understanding of logical arguments. To make the course content easier to grasp, the schedule provides worksheets and practice sheets to help students better recognize logical fallacies, as well as review weeks for the quizzes and the final. The practice sheets in the back of the book offer practical study for both the final exam and for actual arguments you might encounter online or in the media.  
FEATURES: The calendar provides daily sessions with clear objectives and worksheets, quizzes, and tests, all based on the readings from the course book.

Written for independent study and suitable for an introductory course in logic, this classic text combines a sound presentation of logic with effective pedagogy and illustrates the role of logic in many areas of humanistic and scientific thought. Cohen and Nagel's elegant integration of the history of philosophy, natural science, and mathematics helps earn this work its distinguished reputation.

The subject of this book is limited to the abstract form or "logic" of science (as applied particularly to scientific sociology). The chief aim is to compress, to simplify, and to organize into an easily understood and reasonably well-documented scheme some principal answers to questions such as: What makes a discipline "scientific" in the first place? What are theories, empirical generalizations, hypotheses, and observations; and how are they related to each other? What is meant by "the scientific method?" What roles do induction and deduction play in science? What are the places of measurement, sampling techniques, descriptive statistics, statistical inference, scale construction, tests of significance, "grand" theories, and "middle-range" theories? What parts are played by our ideas concerning logic, causality, and chance? What is the significance of the rule of parsimony? How do verbal and mathematical languages compare in expressing scientific statements? The intended use of this book goes beyond these abstract questions. The discussion presented here may serve a practical role in the sociology and history of science by providing a framework for reducing the enormous variety of scientific researches--both within a given field and across all fields--to a limited number of interrelated formal elements. Such a framework, it is hoped, may prove useful in assessing empirical relationships between the formal aspects of scientific work and its substantive social, economic, political, and historical aspects. Wallace identifies four ways of generating and testing the truth of empirical statements--"authoritarian," "mystical," "logico-rational," and "scientific," and considers each in depth. As he concludes, "In science (as in everyday life) things must be believed to be seen, as well as seen to be believed; and questions must already be answered a little, if they are to be asked at all." This is a work of synthesis that merits close attention. It provides an area for viewing theory as something more than a review of the history of any single social science discipline. Walter L. Wallace is Professor of Sociology Emeritus at Princeton University. He is also the author of Sociological Theory: An Introduction, and Principles of Scientific Sociology, available from AldineTransaction.

Described by the philosopher A.J. Ayer as a work of 'great originality and power', this book revolutionized contemporary thinking on science and knowledge. Ideas such as the now legendary doctrine of 'falsificationism' electrified the scientific community, influencing even working scientists, as well as post-war philosophy. This astonishing work ranks alongside The Open Society and Its Enemies as one of Popper's most enduring books and contains insights and arguments that demand to be read to this day.

The fundamental principles of the scientific method are essential for enhancing perspective, increasing productivity, and stimulating innovation. These principles include deductive and inductive logic, probability, parsimony and hypothesis testing, as well as science's presuppositions, limitations, ethics and bold claims of rationality and truth. The examples and case studies drawn upon in this book span the physical, biological and social sciences; include applications in agriculture, engineering and medicine; and also explore science's interrelationships with disciplines in the humanities such as philosophy and law. Informed by position papers on science from the American Association for the Advancement of Science, National Academy of Sciences and National Science Foundation, this book aligns with a distinctively mainstream vision of science. It is an ideal resource for anyone undertaking a systematic study of scientific method for the first time, from undergraduates to professionals in both the sciences and the humanities.

The first volume in this new series explores, through extensive co-operation, new ways of achieving the integration of science in all its diversity. The book offers essays from important and influential philosophers in contemporary philosophy, discussing a range of topics from philosophy of science to epistemology, philosophy of logic and game theoretical approaches. It will be of interest to philosophers, computer scientists and all others interested in the scientific rationality.

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