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# Set Theory And Its Philosophy A Critical Introduc

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Philosophy of Mathematics  
The Philosophy of Set Theory  
Essays on Set Theory  
Set Theory and Its Logic, Revised Edition  
Lectures on the Philosophy of Mathematics  
Badiou's Being and Event and the Mathematics of Set Theory  
Quine, New Foundations, and the Philosophy of Set Theory  
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Axiomatic Set Theory  
Set Theory: An Introduction

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## PIERRE BRYCE

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Philosophy of Mathematics Cambridge  
University Press

This book is designed to explain the technical ideas that are taken for granted in much contemporary philosophical writing. Notions like denumerability, modal scope distinction, Bayesian conditionalization, and logical completeness are usually only elucidated deep within difficult specialist texts. By offering simple explanations that by-pass much irrelevant and boring detail, *Philosophical Devices* is able to cover a wealth of material that is normally only available to specialists. The book contains four sections, each of three chapters. The first section is about sets and numbers, starting with the membership relation and ending with the generalized continuum hypothesis. The second is about analyticity, a priority, and necessity. The third is about probability, outlining the difference between objective and subjective probability and exploring aspects of conditionalization and correlation. The fourth deals with metalogic, focusing on the contrast between syntax and semantics, and finishing with a sketch of Gödel's theorem. *Philosophical Devices* will be useful for university students who have got past the foothills of philosophy and are starting to read more widely, but it does not assume any prior expertise. All the issues discussed are intrinsically interesting, and often downright fascinating. It can be read with pleasure and profit by anybody who is curious about the technical infrastructure of contemporary philosophy.

The Philosophy of Set Theory Cambridge  
University Press

By its nature, set theory does not depend on any previous mathematical knowledge. Hence, an individual wanting to read this book can best find out if he is ready to do so by trying to read the first ten or twenty pages of Chapter 1. As a textbook, the book can serve for a course at the junior or senior level. If a course covers only some of the chapters, the author hopes that the student will read the rest himself in the next year or two. Set theory has always been a subject which people find pleasant to study at least partly by themselves. Chapters 1-7, or perhaps 1-8, present the core of the subject. (Chapter 8 is a short, easy discussion of the axiom of regularity). Even a hurried course should try to cover most of this core (of which more is said below). Chapter 9 presents the logic needed for a fully axiomatic set theory and especially for independence or consistency results. Chapter 10 gives von Neumann's proof of the relative consistency of the regularity axiom and three similar related results. Von Neumann's 'inner model' proof is easy to grasp and yet it prepares one for the famous and more difficult work of Gödel and Cohen, which are the main topics of any book or course in set theory at the next level.

*Essays on Set Theory* Courier Dover  
Publications

This is an introduction to set theory and logic that starts completely from scratch. The text is accompanied by many methodological remarks and explanations. A rigorous axiomatic presentation of Zermelo-Fraenkel set theory is given, demonstrating how the basic concepts of mathematics have apparently been reduced to set theory.

This is followed by a presentation of propositional and first-order logic. Concepts and results of recursion theory are explained in intuitive terms, and the author proves and explains the limitative results of Skolem, Tarski, Church and Gödel (the celebrated incompleteness theorems). For students of mathematics or philosophy this book provides an excellent introduction to logic and set theory.

**Set Theory and Its Logic, Revised**

**Edition** Cambridge University Press  
 "This accessible approach to set theory for upper-level undergraduates poses rigorous but simple arguments. Each definition is accompanied by commentary that motivates and explains new concepts. A historical introduction is followed by discussions of classes and sets, functions, natural and cardinal numbers, the arithmetic of ordinal numbers, and related topics. 1971 edition with new material by the author"-

*Lectures on the Philosophy of Mathematics* Cambridge University Press  
 Set theory, initially built on the Cantorian extension of number into the infinite and the Zermelian axiomatization affirming a foundation for mathematics, is today a rich and sophisticated field of mathematics which, having been invested with model-building techniques of Goedel and Cohen, incorporates into its ongoing investigation of infinite sets a full range of strong hypotheses involving large cardinalities. This volume serves as a companion to set theory, in that it gathers together essays that illuminate the historical development, philosophical resonances, and current mathematical activity. Part I, History, has essays on the development and involvements of set theory in the early 20th Century, essays that bring out the interplay with

then ongoing mathematics. Part II, Philosophy, has essays that take up related issues and considerations in the philosophy of mathematics and its practice. Part III, Mathematics, has a few mathematical papers of modern set theory that with their thematic reach qualify them as ``essays''. Finally, Part IV, Lives in Set Theory, has essays on the life work of prominent set theorists to the present day, essays that exhibit mathematical research.

Badiou's Being and Event and the Mathematics of Set Theory Cambridge University Press

Cantor's ideas formed the basis for set theory and also for the mathematical treatment of the concept of infinity. The philosophical and heuristic framework he developed had a lasting effect on modern mathematics, and is the recurrent theme of this volume. Hallett explores Cantor's ideas and, in particular, their ramifications for Zermelo-Frankel set theory.

**Quine, New Foundations, and the Philosophy of Set Theory** Oxford University Press

One of the greatest revolutions in mathematics occurred when Georg Cantor (1845-1918) promulgated his theory of transfinite sets. This revolution is the subject of Joseph Dauben's important studythe most thorough yet writtenof the philosopher and mathematician who was once called a "corrupter of youth" for an innovation that is now a vital component of elementary school curricula. Set theory has been widely adopted in mathematics and philosophy, but the controversy surrounding it at the turn of the century remains of great interest. Cantor's own faith in his theory was partly theological. His religious beliefs led him to expect paradoxes in any concept of the infinite,

and he always retained his belief in the utter veracity of transfinite set theory. Later in his life, he was troubled by recurring attacks of severe depression. Dauben shows that these played an integral part in his understanding and defense of set theory.

Notes on Set Theory Cambridge University Press

Halmos begins, "Every mathematician agrees that every mathematician must know some set theory; the disagreement begins in trying to decide how much is some. This book contains my answer ... with the minimum of philosophical discourse and logical formalism". The mathematician, scientist, or engineer who needs to know the facts of set theory will find this crisp, clear, concise book, by a master expositor, ideal. This book "Naive Set Theory" uses the language and notation of ordinary informal mathematics to state the basic set-theoretic facts which a beginning student of advanced mathematics needs to know... Because of the informal method of presentation, the book is eminently suited for use as a textbook or for self-study. The reader should derive from this volume a maximum of understanding of the theorems of set theory and of their basic importance in the study of mathematics.

**Principia Mathematica** Cambridge University Press

Set theory is a branch of mathematics with a special subject matter, the infinite, but also a general framework for all modern mathematics, whose notions figure in every branch, pure and applied. This Element will offer a concise introduction, treating the origins of the subject, the basic notion of set, the axioms of set theory and immediate consequences, the set-theoretic reconstruction of mathematics, and the

theory of the infinite, touching also on selected topics from higher set theory, controversial axioms and undecided questions, and philosophical issues raised by technical developments.

*Georg Cantor* Princeton University Press

A wonderful new book ... Potter has written the best philosophical introduction to set theory on the market - Timothy Bays, Notre Dame Philosophical Reviews.

Quine, New Foundations, and the Philosophy of Set Theory Clarendon Press

Mathematics depends on proofs, and proofs must begin somewhere, from some fundamental assumptions. The axioms of set theory have long played this role, so the question of how they are properly judged is of central importance. Maddy discusses the appropriate methods for such evaluations and the philosophical backdrop that makes them appropriate.

**Philosophical and Mathematical Logic** Courier Corporation

Set theory can be considered a unifying theory for mathematics. This book covers the fundamentals of the subject.

**Defending the Axioms** Broadview Press

Presents a detailed and critical examination of the available conceptions of set and proposes a novel version.

Model Theory and the Philosophy of Mathematical Practice Springer Science & Business Media

What this book is about. The theory of sets is a vibrant, exciting mathematical theory, with its own basic notions, fundamental results and deep open problems, and with significant applications to other mathematical theories. At the same time, axiomatic set theory is often viewed as a foundation of mathematics: it is alleged that all

mathematical objects are sets, and their properties can be derived from the relatively few and elegant axioms about sets. Nothing so simple-minded can be quite true, but there is little doubt that in standard, current mathematical practice, "making a notion precise" is essentially synonymous with "defining it in set theory." Set theory is the official language of mathematics, just as mathematics is the official language of science. Like most authors of elementary, introductory books about sets, I have tried to do justice to both aspects of the subject. From straight set theory, these Notes cover the basic facts about "abstract sets," including the Axiom of Choice, transfinite recursion, and cardinal and ordinal numbers. Somewhat less common is the inclusion of a chapter on "pointsets" which focuses on results of interest to analysts and introduces the reader to the Continuum Problem, central to set theory from the very beginning.

*More Precisely: The Math You Need to Do Philosophy - Second Edition* Walter de Gruyter GmbH & Co KG

Philosophy of Mathematics is clear and engaging, and student friendly. The book discusses the great philosophers and the importance of mathematics to their thought. Among topics discussed in the book are the mathematical image, platonism, picture-proofs, applied mathematics, Hilbert and Gödel, knots and notation definitions, picture-proofs and Wittgenstein, computation, proof and conjecture.

*Philosophical Introduction to Set Theory* Academic Press

The book discusses the fate of universality and a universal set in several set theories. The book aims at a philosophical study of ontological and conceptual questions around set theory.

Set theories are ontologies. They posit sets and claim that these exhibit the essential properties laid down in the set theoretical axioms. Collecting these postulated entities quantified over poses the problem of universality. Is the collection of the set theoretical entities itself a set theoretical entity? What does it mean if it is, and what does it mean if it is not? To answer these questions involves developing a theory of the universal set. We have to ask: Are there different aspects to universality in set theory, which stand in conflict to each other? May inconsistency be the price to pay to circumvent ineffability? And most importantly: How far can axiomatic ontology take us out of the problems around universality?

*Set Theory, Logic and Their Limitations*

Springer Science & Business Media

This unique approach maintains that set theory is the primary mechanism for ideological and theoretical unification in modern mathematics, and its technically informed discussion covers a variety of philosophical issues. 1990 edition.

*Set Theory and Its Philosophy* Courier Corporation

This is modern set theory from the ground up—from partial orderings and well-ordered sets to models, infinite combinatorics and large cardinals. The approach is unique, providing rigorous treatment of basic set-theoretic methods, while integrating advanced material such as independence results, throughout. The presentation incorporates much interesting historical material and no background in mathematical logic is assumed.

Treatment is self-contained, featuring theorem proofs supported by diagrams, examples and exercises. Includes applications of set theory to other branches of mathematics.

**Introduction to Modern Set Theory**

Oxford University Press

Geared toward upper-level undergraduates and graduate students, this treatment examines the basic paradoxes and history of set theory and advanced topics such as relations and functions, equipollence, more. 1960 edition.

The Foundations of Mathematics in the Theory of Sets Cambridge University Press

This is an extensively revised edition of Mr. Quine's introduction to abstract set theory and to various axiomatic

systematizations of the subject. The treatment of ordinal numbers has been strengthened and much simplified, especially in the theory of transfinite recursions, by adding an axiom and reworking the proofs. Infinite cardinals are treated anew in clearer and fuller terms than before. Improvements have been made all through the book; in various instances a proof has been shortened, a theorem strengthened, a space-saving lemma inserted, an obscurity clarified, an error corrected, a historical omission supplied, or a new event noted.