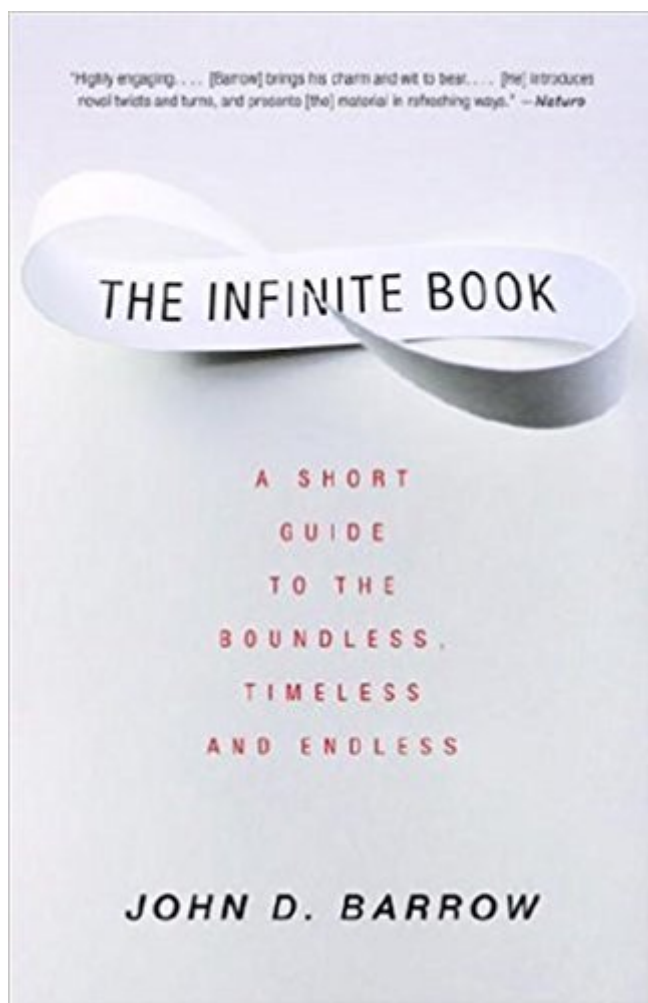


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# The Infinite Book: A Short Guide To The Boundless, Timeless And Endless



## Synopsis

For a thousand years, infinity has proven to be a difficult and illuminating challenge for mathematicians and theologians. It certainly is the strangest idea that humans have ever thought. Where did it come from and what is it telling us about our Universe? Can there actually be infinities? Is matter infinitely divisible into ever-smaller pieces? But infinity is also the place where things happen that don't. All manner of strange paradoxes and fantasies characterize an infinite universe. If our Universe is infinite then an infinite number of exact copies of you are, at this very moment, reading an identical sentence on an identical planet somewhere else in the Universe. Now Infinity is the darling of cutting edge research, the measuring stick used by physicists, cosmologists, and mathematicians to determine the accuracy of their theories. From the paradox of Zeno's arrow to string theory, Cambridge professor John Barrow takes us on a grand tour of this most elusive of ideas and describes with clarifying subtlety how this subject has shaped, and continues to shape, our very sense of the world in which we live. The Infinite Book is a thoroughly entertaining and completely accessible account of the biggest subject of them all—infinity.

## Book Information

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## Customer Reviews

As prolific science writer and physicist Barrow regularly remarks, infinity is not merely the smallest or biggest thing, or the longest time imaginable: it's a quality that is unimaginable. It's thus a paradox that mathematicians, physicists, and philosophers have discovered quite a bit about infinity, albeit with different degrees of certitude. As also related in David Foster Wallace's *Everything and More: A Compact History of Infinity* (2003), Barrow recounts the career of German mathematician

Georg Cantor, whose explorations of set theory resulted in fundamental proofs about infinities (some are bigger than others, for example). However joyous such discoveries are to the numbers masters, physicists' encounters with infinities are less rapturous because they hint at deficiencies in general relativity; hence their joy over string theory, which eliminates infinities that arise in calculations about the big bang and black holes. Performing with his customary fluency and accessibility, Barrow imparts for general readers a feeling for the nub of thought about the mathematical, cosmic, ethical, and theological implications of infinity. Gilbert Taylor Copyright © American Library Association. All rights reserved --This text refers to an out of print or unavailable edition of this title.

“Highly engaging. . . . [Barrow] brings his charm and wit to bear. . . . [He] introduces novel twists and turns, and presents [the] material in refreshing ways. Nature” Eloquent. . . . Succinct. . . . Barrow [has the] remarkable ability to provide clear, concise, engaging and distinctly finite explanations—even when describing some fairly advanced concepts. . . . [An] engaging read.” San Francisco Chronicle “Clever and insightful. . . . [A] lively history of infinity through the ages.” Entertainment Weekly “Entertaining. . . . Remarkably lucid and not the least mind-boggling. . . . His clear, engaging style manages to illuminate abstruse matters.... This is a useful guide to an endlessly fascinating subject.” American Scientist

This book discusses infinity. This concept has a precise definition in mathematics and since the times of Cantor we know that there are various degrees of infinity, one of the most interesting problems being whether there is an infinity between the cardinal of the natural numbers and that of the real numbers, the so called continuum hypothesis, which was proven to be undecidable in the usual Zermelo-Frankel-Choice axioms of set theory. In recent times, cosmologists, whether those adopting the inflationary scenario or those favouring the cyclic universe, are pondering whether the universe is infinite in space and possibly eternal in time (although some believe it had a beginning about 14 billion years ago, but may never end). So the topic of the book is pertinent to our age. Naturally, the idea of infinite is also related to the idea of God, although this is not a scientific subject, but possibly a philosophical one. The first part of the book is a historical review of the concept of infinity, from Zeno and Aristotle to Kant and Cantor, via St. Augustine. A very entertaining chapter is the one about the Hotel Infinity and all the challenges that the manager meets, quite successfully and that would be impossible in a hotel with only a finite number of rooms. The second

part of the book deals more with physics and cosmology, things like the singularities at the center of black holes. It is interesting to learn that an English astronomer of the 16th century already proposed that the universe is infinite. The question of the possible topologies of the universe is discussed, although we do not know yet the answer. The important distinction between the observable universe and the universe as such is made in page 139 where the radius of the visible universe is stated to be 42 billion light years (which seems to be the correct figure if we take into account the expansion of the universe since the light emitted 14 billion years ago has reached us). Unhappily, the drawing in the next page will confound the lay reader because the radius is pictured at 14 billion light years. (There are also some other minor mistakes in the book, which would have been avoided by a careful reviewer before publishing. Another example is the graph in page 190 which suggests that expansion of the universe is decelerating, contrary to recent data of supernovas). Naturally, the limit on how fast information can spread will probably preclude us from knowing whether the universe is infinite unless we can get some degree of confidence on some basic theory that predicts this infinity. The book also discusses interesting problems regarding the impact on ethics of immortality and the possibility of clones in an infinite universe (Vilenkin has explored also this idea in one of his books). Physicists have changed their views on the universe in the last 30 years when it was hoped that The Theory of Everything would be mathematically unique and would determine one universe. Instead, superstring theory has landed with a whole landscape of possible universes. So the question remains, how we happen to live in such universe that has made it possible for life to appear (at least in the Earth, possibly in many other planets) and to develop a self-conscious and inquisitive species by means of which the universe interrogates itself? The diverse answers are tabulated in page 186. It also has another chapter on virtual reality "À la Matrix" (simulated universes) and it also discusses the possibility that advanced civilizations are capable of cultivating universes, the way we grow cornfields or build cities. Another of the subjects discussed by the author is that of machines capable of supertasks. I found very interesting the 4-body configuration discovered by Xia in 1971 that, according to Newton's theory, sends the 4 bodies at infinite distance in finite time. Einstein's general relativity doesn't allow this, so that infinities did appear not only in quantum mechanics, but also in newtonian mechanics. One of the important conclusions of the book is that the human race is not necessarily equipped to know all things that are true about the universe. "We have no special right to expect that all truths about the Universe can be tested by observations that are within our reach: that really would be an anti-Copernican outlook" (page 198). The book is an eye opener for those readers not familiar with the role of infinity in the mathematical and physical sciences, but if you look for definite answers

about these difficult problems you will not find them here (not in other books, of course).

I enjoyed this book. Mr. Barrow is adept at translating complex concepts into simpler terms, and maintains a sense of humor in the face of his taunting task. But He dwells upon many hypothetical scenarios that I found less interesting than the actual definitions and history of the concept of infinity. Though a non mathematician I would have preferred more explanation of the mathematical, philosophical, and religious implications of the infinite. The brief history of Cantor's life was interesting, but lacked an in depth treatment of the two school of thoughts which clashed. Instead we received a biography of Mr. Cantor with but a smattering of the Ideas behind the conflict. All in all, I would recommend this book as it was interesting, witty, and thought provoking--perhaps, just not what I expected.

I have not been disappointed by any of John Barrow's book so far. He has a unique gift of writing with exceptional clarity about difficult topics. This is not a typical cosmology book, but large portion is devoted to beginning, shape and future of The Universe. Like in his previous "Book of Nothing", author mixes philosophical and scientific musings about infinities (big and small) affecting theology, mathematics, cosmology, physics (TOE) and our existence. I found Georg Cantor's life and his quest for understanding "absolute infinity" (God?) quite interesting and emotional. And check how Blaise Pascal argued about believing (or not) in God, because of infinite gain (or loss!!). One truth emanates from "The Infinite Book": we are far, infinitely far from knowing the truth about everything (Immanuel Kant's rings the bell!). The more we learn the bigger infinite number of questions surface in front of us. Are we nearing the limits of knowledge? Professor John Barrow does not suggest it has come to this, but read about them and enjoy stretching your mind.

This is a great book mostly on concepts of the mathematical and physical infinite.

This is one of my all time favorite books. It helped shape the way I think as a boy and I have given away numerous copies to friends. If you like non-fiction and the philosophy of mathematics/science and relating to religion this book is for you. John Barrow's narrative is very compelling and easy to follow.

A mesmerizing book on the story of infinity and the history behind it. The author travels from math to physics and swings into philosophy and theology.

The Book starts off pretty well, very interesting, brings up unique stories, concept and theories on infinity. Half way through the Book, everything is already said, and begins to repeat itself (like infinity!). The book speaks too often about the universe and its implication in regards to infinity. In conclusion starts good and then drops some, but very thought provoking, and enjoyable.

Interesting book

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