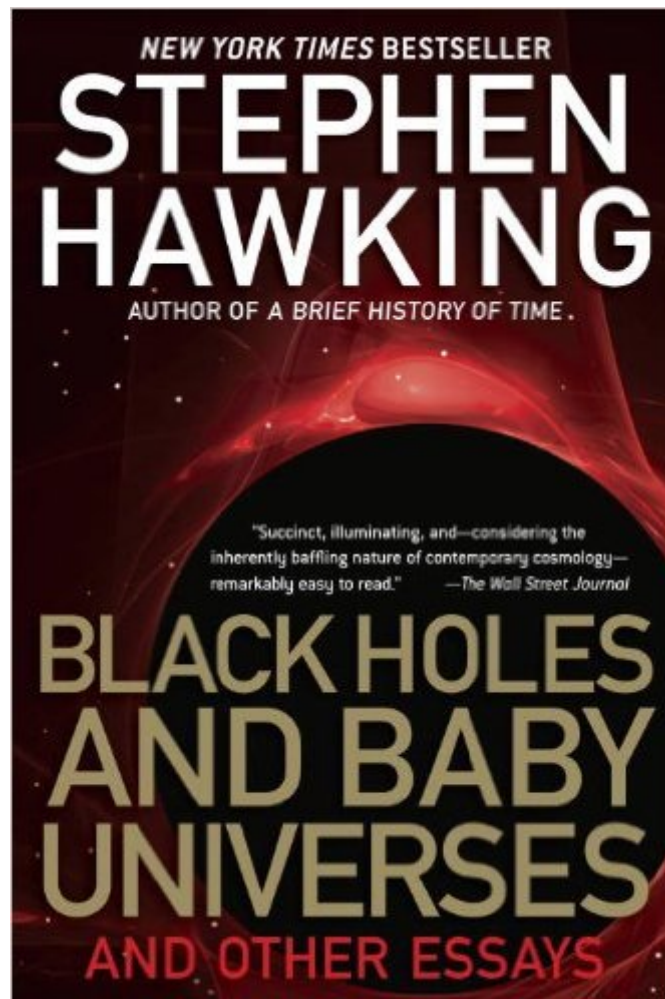


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# Black Holes And Baby Universes And Other Essays



## Synopsis

NEW YORK TIMES BESTSELLER THIRTEEN EXTRAORDINARY ESSAYS SHED NEW LIGHT ON THE MYSTERIES OF THE UNIVERSE AND ON ONE OF THE MOST BRILLIANT THINKERS OF OUR TIME. In his phenomenal bestseller *A Brief History of Time*, Stephen Hawking literally transformed the way we think about physics, the universe, reality itself. In these thirteen essays and one remarkable extended interview, the man widely regarded as the most brilliant theoretical physicist since Einstein returns to reveal an amazing array of possibilities for understanding our universe. Building on his earlier work, Hawking discusses imaginary time, how black holes can give birth to baby universes, and scientists' efforts to find a complete unified theory that would predict everything in the universe. With his characteristic mastery of language, his sense of humor and commitment to plain speaking, Stephen Hawking invites us to know him better and to share his passion for the voyage of intellect and imagination that has opened new ways to understanding the very nature of the cosmos.

## Book Information

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## Customer Reviews

As a Cambridge professor who occupies the same chair as Isaac Newton once did, Stephen Hawking is probably the most well-known scientist in the world. His book *A Brief History of Time* has sold millions of copies, a rare feat for a work of theoretical physics. Hawking's perennial appeal is driven by his theoretical brilliance, his ability to explain difficult concepts to lay audiences, and his heroic, wheelchair-bound struggle with Lou Gehrig's disease. To be sure, Hawking's reputation is

not confined to popular acclaim. Other noted scientists, not known to be motivated by sympathy for Hawking's physical condition, have shown the greatest respect for Hawking's work. As Dr. Kip S. Thorne, a physics professor at CalTech, recently said in a New York Times article, "Stephen can see much farther and much more quickly what nature is likely to be doing than most of the rest of us poor mortals. Very few have his level of understanding and insight, or his ability to ask the right questions that trigger others to work on problems in ways they might never have thought of."

Hawking's book *Black Holes and Baby Universes and Other Essays* continues his attempt to popularise the findings of cosmology and theoretical physics. The book is composed of one interview and 13 essays, most of which were originally given as lectures. Several of the essays are autobiographical. Hawking recounts, for example, his family history, his birth on the 300th anniversary of Galileo's death, his childhood fascination with electric trains, and his marriage and three children. Of all the segments of the book, it is the interview that gives the most insight into Hawking's personality and tastes. The interview was broadcast on BBC in 1992 as part of the famous British series called *Desert Island Discs*, in which interviewees are asked to choose eight records, one luxury object, and one book they would wish to have with them on a desert island. Hawking's choices are Poulenc's *Gloria*, Brahms's *Violin Concerto*, Beethoven's *String Quartet Op. 132*, Wagner's *Valkyrie*, the Beatles' "Please Please Me," Mozart's *Requiem*, Puccini's *Turandot*, Edith Piaf's "Je ne regrette rien," George Eliot's *Middlemarch*, and a large supply of *creme brulee*. Hawking even says that if he had both physics and music, he would not want to be rescued from the island. Hawking's wry sense of humor, which no doubt has sustained him through his physical difficulties, shines through in some of the essays. He says, for example, that he has no plans to write a sequel to *A Brief History*. "What would I call it?" he says. "A Longer History of Time? Beyond the End of Time? Son of Time?" Could someone travel through a black hole? Probably not, says Hawking, because the destination would be as uncertain as "traveling on some airlines I could name." Hawking's scientific essays are very approachable for the non-scientist. He seems to have deliberately avoided mathematical equations, saying that he was advised that each equation he included in a book would halve the sales. (He then speculates that he could have sold twice as many copies of *A Brief History* had he not included the one equation  $E=MC^2$ !) Hawking displays a remarkable ability to explain difficult ideas through the use of everyday analogies. Explaining the idea that light is divided into packets called quanta, Hawking says, "It is a bit like saying one can't buy sugar loose in a supermarket but only in kilo gram bags." He compares the expansion of the universe in its earliest stages to the rate of inflation in Germany after World War I. This book is perfect for someone who prefers readability over density and detail. The one weakness of the book

may be its perfunctory treatment of deep philosophical issues. In a few essays, Hawking discusses such profound questions as free will, the existence of God, and the ultimate nature of the universe. It can be frustrating, however, that Hawking never comes to anything more than a wishy-washy conclusion on any of these issues. Hawking pokes fun at the idea of determinism (can one really believe that Madonna was eternally destined to be on the cover of Cosmopolitan?) but finally says that yes, everything is determined, although on the other hand, we really have no way of knowing. "Why does the universe bother to exist?" Hawking asks. He apparently has no opinion on the subject, except the following consolation: "If you like, you can define God to be the answer to that question." Hawking's resolute agnosticism and firm equivocation on important philosophical questions is not very enlightening. Then again, one doesn't read Hawking for his philosophy but for his fascinating and thought-provoking descriptions of the universe we live in. Few books serve that purpose better than *Black Holes and Baby Universes*. I strongly recommend it.

I immensely enjoyed *A Brief History of Time*, and had high hopes for this book as well. Unfortunately I was disappointed. Don't get me wrong, it is a good book full of interesting things, but there is far too much repetition, both with *A Brief History of Time* and within this book itself. It seemed that he explained his "the only boundary condition is that there is no boundary" theory in every essay. Good material, but you won't find much in here that you didn't already know if you read *A Brief History of Time*. I would recommend skipping this and going straight to *The Universe in a Nutshell*, a more recent Hawking book.

Because the movie about Professor Hawking, *THEORY OF EVERYTHING*, has just been released. This book is a way to get to know him better. In this book he shares his life's story and what led him to start his writing career. This title is a must have if you want a fuller picture about one of the best writers concerning theoretical physics and cosmology today.

Most essays are accessible. Some were a challenge. A good book, but I preferred his earlier work, *A Brief History of Time*. I love that he has taken astrophysics, a subject which potentially an elitist minority group of humans on this planet might grasp, and made it the rightful business of all humans by describing it so simply.

An event horizon is the boundary of a black hole, defined by the light that can reach out that far and no further. Hawking himself sometimes uses pictorial metaphors to illustrate abstruse mathematical

concepts, and this one occurred to me by way of an analogy of the brilliant illumination that I am trying to persuade to shine out far enough to reach my own dim wits hovering hopefully in the outer darkness. The whole 'feel' of Hawking's discourses reminds me of the stories I have read about Einstein at work - placid, orderly and without excitement (or should I say 'perturbation'?). Genius of this kind seems to be a kind of glorified knack - such minds just operate naturally with concepts of this kind, and there is no sense of effort or struggle. Sandwiched between some biographical material and a radio interview, the main material in this book is a collection of essays and lectures. They include Hawking's inaugural lecture at Cambridge where he occupies the chair of mathematics once held by Newton, and all are intended in the first place for an audience of his peers. On the other hand, where Newton and Einstein did not try to address the general public, Hawking, like Russell, seeks to do just that, and he does it superbly. The style of writing is both literate and unpretentious, and the occasional jokes are very good. Readers who, like myself, are intensely interested in the subject-matter but entirely lacking in natural aptitude for it, ought to find this book enormously helpful. There is a certain amount of repetition inevitably, but the more of that the better so far as I'm concerned. Any amateur trying to get a handle on mathematical concepts like these has to get into a mathematician's way of thinking as best he can and stop thinking as a layman. We can all understand the basics of gravitation without being Newton, but if we are still struggling with the general idea of the General Theory of Relativity in 2006 it's worth remembering that it was propounded in 1915 and that physics and astronomy have come on a long way since then, so we had better get our minds round it at last. At least as astounding to me as Hawking's triumph over his physical paralysis is the fact that this professor of mathematics at Cambridge never graduated in that subject. His degree subject was physics, allegedly on the grounds that the Oxford physics course was easy. Not easy enough to tempt me away from Latin and Greek, I must say, but doubtless for him. Mathematics is just a technique that Hawking invokes as a tool in his quest for a grand unified theory of the entire cosmos. This, said he 20 or 30 years ago, is something he hoped and largely expected could be achieved in 20 or 30 years. I'm sure we would have heard if he thought by now that he had got there, but he honours us with his ideas at the time of writing on the origin and future of the universe. The main obstacle to the final resolution of the issue is apparently that no one has yet successfully integrated old Newton's gravitation with the rest of it. However he also helps us with some more 'back-at-the-office' theory concerning black holes, on which topic he appears to be the leading thinker, and that gives him the opportunity to remind us of the outlines of the most important advances since Einstein, namely quantum mechanics and Heisenberg's uncertainty principle. The latter principle enunciates that the better the position of a particle can be

predicted the less well its velocity can be predicted, and conversely. Since it is necessary to predict both, all we can do is predict the combination on a 'smeared' statistical basis. It seems to come into everything, and Hawking invokes it to try to comfort us with the belief that although everything (and everyone) actually is determined by particle physics, the extent of the unpredictability is such that we might as well consider ourselves to be free agents. For once, I would dare question him. In the first place such a view doesn't seem to require Heisenberg - simply viewing the story of the cosmos as a chain of events constituting causes and effects would surely get us that far, as the permutation of these is incalculably large and therefore only to some extent predictable. Secondly, when we talk about 'free will' and 'determinism' what are we even talking about? I'm often told in arguments that I can think what I like. On the contrary, I wish I could, but my own observation and reason, such as they are, leave me unable to. When I exercise 'free choice', e.g. in choosing from a menu, I can quite understand that my choice might be determined by physical causes (whether that is the truth of it or not). However when I change my mind about something factual or theoretical, which is taken as a sign of free intelligence, I do so because I feel that the evidence leaves me no choice, and evidence is not an 'event' or a 'cause' or any matter of particles or physics. Where does all this leave 'free will'? Those seeking God or a Creator will find that Hawking hedges his bets, so that any capable by nature of thinking what they would prefer to think remain, I suppose, 'free' to do so. The issue is beyond me, and my own quest is for a better understanding of the cosmos I have been born into and will have to leave before too long. May I wish Professor Hawking a long and productive further career. We are much the same age, and his 20-30-year estimate for solving the riddle of the cosmos is up around now. If he finds it, I hope I can recognise it when I see it.

While it's amazing Dr. Hawking can even write a book, this work doesn't not compare with earlier ventures, like the History of Time. Still a decent read but a bit overpriced for its brevity. Many sections are repetitive, as chapters were assembled from prior writings. Still many concepts were new to me and are explained only as this great author could with his expressive talents.

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