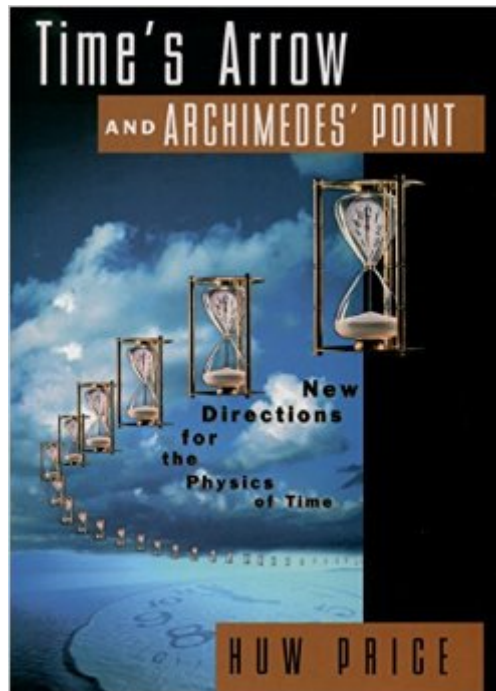


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# Time's Arrow And Archimedes' Point: New Directions For The Physics Of Time



## Synopsis

Why is the future so different from the past? Why does the past affect the future and not the other way around? What does quantum mechanics really tell us about the world? In this important and accessible book, Huw Price throws fascinating new light on some of the great mysteries of modern physics, and connects them in a wholly original way. Price begins with the mystery of the arrow of time. Why, for example, does disorder always increase, as required by the second law of thermodynamics? Price shows that, for over a century, most physicists have thought about these problems the wrong way. Misled by the human perspective from within time, which distorts and exaggerates the differences between past and future, they have fallen victim to what Price calls the "double standard fallacy": proposed explanations of the difference between the past and the future turn out to rely on a difference which has been slipped in at the beginning, when the physicists themselves treat the past and future in different ways. To avoid this fallacy, Price argues, we need to overcome our natural tendency to think about the past and the future differently. We need to imagine a point outside time -- an Archimedean "view from nowhen" -- from which to observe time in an unbiased way. Offering a lively criticism of many major modern physicists, including Richard Feynman and Stephen Hawking, Price shows that this fallacy remains common in physics today -- for example, when contemporary cosmologists theorize about the eventual fate of the universe. The "big bang" theory normally assumes that the beginning and end of the universe will be very different. But if we are to avoid the double standard fallacy, we need to consider time symmetrically, and take seriously the possibility that the arrow of time may reverse when the universe recollapses into a "big crunch." Price then turns to the greatest mystery of modern physics, the meaning of quantum theory. He argues that in missing the Archimedean viewpoint, modern physics has missed a radical and attractive solution to many of the apparent paradoxes of quantum physics. Many consequences of quantum theory appear counterintuitive, such as Schrodinger's Cat, whose condition seems undetermined until observed, and Bell's Theorem, which suggests a spooky "nonlocality," where events happening simultaneously in different places seem to affect each other directly. Price shows that these paradoxes can be avoided by allowing that at the quantum level the future does, indeed, affect the past. This demystifies nonlocality, and supports Einstein's unpopular intuition that quantum theory describes an objective world, existing independently of human observers: the Cat is alive or dead, even when nobody looks. So interpreted, Price argues, quantum mechanics is simply the kind of theory we ought to have expected in microphysics -- from the symmetric standpoint. *Time's Arrow and Archimedes' Point* presents an innovative and controversial view of time and contemporary physics. In this exciting book, Price urges physicists, philosophers, and

anyone who has ever pondered the mysteries of time to look at the world from the fresh perspective of Archimedes' Point and gain a deeper understanding of ourselves, the universe around us, and our own place in time.

## Book Information

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## Customer Reviews

This is heady stuff-Perhaps if you're a theoretical physics professor at CalTech it might make for light postprandial enjoyment.-But for the rest of us...Beware!...Part of the problem is terminology(micro) or ( $\mu$ ) innocence for example....Oddly, I read this book for the same reason I read Proust-I'm fascinated with Time!-But be forewarned that, though this book has far less than Proust's 3,000 pages, unless you are the aforementioned professor, you have an extremely tougher row to hoe in reading this book, even though the author goes out of his way to make things understandable to the lay reader. -The basic idea isn't that hard to understand: we are captives of our position in time and that captivity affects our observations of physical (particle, wavelike, whatever) behavior. What the author eventually advances (after ploughing through many other concepts and alternative explanations) is something called "advanced action theory." This theory

entails, as far as I can make out, very simply, that there is a "common future" as well a "common past" that influences what we call the present but that we are unable to perceive this common future because our nature as AGENTS (he uses this term over and over)precludes us from perceiving this common future.-I kept on thinking of a spatial analogy of a person tied to the back of the caboose of a train facing backward. He can see where the train has gone, but not the vista ahead, which is certainly just as real. But if he has been in this position his entire life, he would have no idea what you meant by saying "See that mountain up ahead!" How could you know? It's as if one of us were to state, "See that assassination attempt tomorrow!"- Archimedes' Point for Mr.

In the preface of Time's Arrow and Archimedes' Point, Mr. Price describes his target audience as being those people with an interest in the subject of time, yet no formal education in either Physics or Philosophy. In this light I feel that the book does not fare well due more to its style than its topic. I am wildly interested in the book's subject matter, and I have no formal education in either Physics or Philosophy, yet I found myself struggling at times to appreciate Mr. Price's logic on the first pass. Following the linguistic style of the book was apparently an issue for the editors at Oxford as well because it contained over a half-dozen typographical errors (all contextual; not spelling errors).The ultimate purpose of the book is to make the case for a "Block Universe", one in which time does not flow, but rather whose entire existence already resides as a fourth dimension. "Archimedes' Point" in the title refers to the need for us to step out of our shells as agents in time, and view nature "from nowhen" if we are to truly understand the concept. Mr. Price begins by analyzing what appears to be the natural symmetry of time as outlined by the mathematical description of physics. He then presents common time-asymmetric arguments, one after another, and shows them to be ultimately fallacious, contradictory, or suffering from anthropocentric double standards. Near the end of the book Mr. Price incorporates the strange behavior of quantum mechanics, which can plausibly be explained by advanced action (aka causes coming from the future), to bolster his "Block Universe" claims. In the end I almost take the Block Universe for granted, and from this perspective the book is a resounding success.Making it through the book was ultimately satisfying.

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