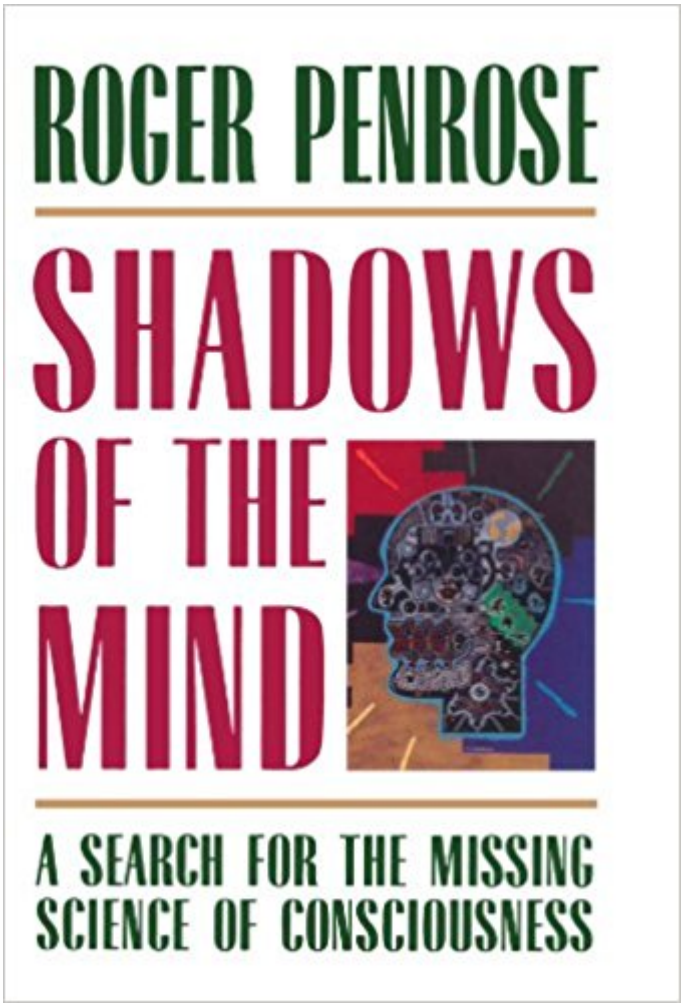
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Shadows Of The Mind: A Search For The Missing Science Of Consciousness



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Synopsis

A New York Times bestseller when it appeared in 1989, Roger Penrose's The Emperor's New Mind was universally hailed as a marvelous survey of modern physics as well as a brilliant reflection on the human mind, offering a new perspective on the scientific landscape and a visionary glimpse of the possible future of science. Now, in Shadows of the Mind, Penrose offers another exhilarating look at modern science as he mounts an even more powerful attack on artificial intelligence. But perhaps more important, in this volume he points the way to a new science, one that may eventually explain the physical basis of the human mind. Penrose contends that some aspects of the human mind lie beyond computation. This is not a religious argument (that the mind is something other than physical) nor is it based on the brain's vast complexity (the weather is immensely complex, says Penrose, but it is still a computable thing, at least in theory). Instead, he provides powerful arguments to support his conclusion that there is something in the conscious activity of the brain that transcends computation--and will find no explanation in terms of present-day science. To illuminate what he believes this "something" might be, and to suggest where a new physics must proceed so that we may understand it, Penrose cuts a wide swathe through modern science, providing penetrating looks at everything from Turing machines (computers programmed from artificial intelligence) to the implications of Godel's theorem maintaining that conscious thinking must indeed involve ingredients that cannot adequately be stimulated by mere computation. Of particular interest is Penrose's extensive examination of quantum mechanics, which introduces some new ideas that differ markedly from those advanced in The Emperor's New Mind, especially concerning the mysterious interface where classical and quantum physics meet. But perhaps the most interesting wrinkle in Shadows of the Mind is Penrose's excursion into microbiology, where he examines cytoskeletons and microtubules, minute substructures lying deep within the brain's neurons. (He argues that microtubules--not neurons--may indeed be the basic units of the brain, which, if nothing else, would dramatically increase the brain's computational power.) Furthermore, he contends that in consciousness some kind of global quantum state must take place across large areas of the brain, and that it within microtubules that these collective quantum effects are most likely to reside. For physics to accommodate something that is as foreign to our current physical picture as is the phenomenon of consciousness, we must expect a profound change--one that alters the very underpinnings of our philosophical viewpoint as to the nature of reality. Shadows of the Mind provides an illuminating look at where these profound changes may take place and what our future understanding of the world may be.

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Customer Reviews

This book asserts that human consciousness is not necessarily intelligible in terms of computational models. The brain’s conscious activity essentially transcends the forms or possibilities of computation. Penrose (mathematics, Oxford) illustrates his thesis via mathematical logic, including detailed discussions of Godel’s proposition of incompleteness, Turing’s machines and computabilities, quantum mechanics, and microbiology. Eventually, Penrose argues that artificial intelligence and computer-controlled expert systems are capable of assisting local human expertise but will not be able to replace such expertise. Expanding on some of the ideas and concepts proposed in his controversial book, The Emperor’s New Mind (Oxford Univ. Pr., 1989), Penrose challenges others to reconsider traditional concepts. Some familiarity with mathematical logic or processes will facilitate one’s appreciation of this book. Recommended for scholars, specialists, and informed lay readers.Donald G. Frank, Harvard Univ., Cambridge, Mass.Copyright 1994 Reed Business Information, Inc. --This text refers to an out of print or unavailable edition of this title.

A leading critic of artificial intelligence research returns to the attack, attempting to lay the groundwork for an analysis of the true nature of intelligence. Building on his arguments in The Emperor’s New Mind (not reviewed), Penrose (Mathematics/Oxford) begins by refuting the assertion that true intelligence can be attained--or even adequately simulated--by the strictly computational means to which current computers are ultimately limited. Much of his argument depends closely on the application of G”del’s Undecidability Theorem to Turing machines--deep waters for

laypeople, although the fundamentals of his argument are accessible to readers without sophisticated mathematical training. Having disposed of the central tenets of current AI research, Penrose then turns to an even more fundamental question: the actual foundations in modern physics (i.e., relativity and quantum theory) of the phenomenon of consciousness. Here much of his summary depends on fairly complex mathematical reasoning, although the key points are summarized for the general reader who has been willing to follow him so far. Penrose feels that a new physical synthesis, reconciling the paradoxes of quantum theory and bringing them into harmony with Einstein's gravitational theories, is ultimately necessary to explain the noncomputational elements of consciousness and intelligence. He speculates on the possible role of cellular structures called microtubules in creating a quantum phenomenon on a macroscopic scale within the brain, but grants that more research is needed to establish any connection between physical and mental phenomena. His conclusion steps back to a philosophical overview of the subject, paying homage to Plato, among others. A challenging examination of a central problem of modern philosophy, with no final answers but plenty of food for thought. (76 line drawings) (First printing of 50,000; $50,000 ad/promo) -- Copyright Ã Â©1994, Kirkus Associates, LP. All rights reserved. --This text refers to an out of print or unavailable edition of this title.

I rate this book highly for its many interesting insights---great food for thought. I think Penrose' assessments of models of consciousness by other physicists are on the mark, including his critique of decoherence theories. He is probably on the right track in treating the collapse of the wave function as a real phenomenon, in which case he is correct is saying "what is going on will have no chance of being properly understood until we have a much more profound appreciation of the very nature of matter, time, space, and the laws that govern them." (p. 395)I was not persuaded by Penrose' own theory at all. The only connection between quantum mechanics and consciousness is that they are both mysterious. Moreover, it is the qualia of consciousness that is mysterious, not the fact that we are non-algorithmic.

Penrose is my favorite science author. He's not for everyone -- he's not afraid to use mathematics, and his diagrams (for me) are often unintelligible, but his pursuit of an understanding of the mind at the quantum level is worthwhile, even noble.

You think when you skim it "oh this is too mathy" but it isn't. You can understand everything, without any advanced math skills at all!

Convincing argument that the mind is not a Turing Machine and that's about it. All living things, especially plants, and the cells they are made of have evolved highly complex minds to sustain and improve their being. It seems obvious that this is not unique to a species, but is a universal characteristic of everything we can observe extended to the Cosmos -- the universal mind and consciousness. To understand consciousness we have to understand how living things embody the universal mind. So in this regard this book, while an ingenious mathematical argument, is more classical newtonian thinking than a modern scientific exploration of the mind. Such a treatment can be found in, "The Holographic Universe" by Michael Talbot.

Brilliant author, love his ideas, but a little bit too much math.

Penrose's writing is somewhat thick. It is worth slogging through it, however. Consciousness is the X factor in experiments. It is a large part of quantum mechanics. I liked this book. It is not light reading, though.

This is not an easy book to read or to follow. Still, it's required reading for someone like me who is interested in the Penrose-Hameroff theory of consciousness. I am always grateful when academics like Penrose write books for the general public.

Excellent alternative view to mainstream philosophy. Vast improvement over the emperor's new mind, especially in terms of having taken criticism on board. It can be read independently, even though it can also be read as a sequel of sorts. If mind and consciousness are interesting to you, and you like hearing about theories in physics, this is a great book.

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