

53 of 58 people found the following review helpful:

★★★★★ **The Emperor's New Mind.**, December 18, 2003

By [Wesley L. Janssen](#) ★★★★★ (San Diego, CA USA) - [See all my reviews](#)

★★★★★ ★★★★★ ★★★★★

This review is from: [The Emperor's New Mind: Concerning Computers, Minds, and the Laws of Physics \(Hardcover\)](#)

Roger Penrose, "one of the world's most knowledgeable and creative mathematical physicists," presents in his 1989 *Emperor's New Mind* one of the most intriguing and substantive popularizations of mathematical logic and physical theory that has ever been published. As a reader of many books written by scientists, I will say that few compare with this one. Penrose wrestles with what he sees as some of science's most inadequate or poorly developed (although popularly accepted) ideas. As certain physical theories are found wanting, his grapplings extend to some of the deepest questions of metaphysics. Of the deepest questions, Penrose says, "To ask for definitive answers to such grandiose questions would, of course, be a tall order. Such answers I cannot provide; nor can anyone else, though some may try to impress us with their guesses." While he speaks respectfully of individuals with whom he has certain differences of opinion, the "some" in that statement might be taken to be Hawking, Dawkins, Dennett, to suggest a few. The author here tends toward a more humble and questioning approach. Penrose's puzzlings are complex, creative, and speculative, and even his admirers might easily misrepresent certain of his opinions and conjectures. A case in point may be the fact that he finds cosmic inflation theories to have less explanatory power than others claim for them -- this doesn't mean he necessarily rejects inflation, rather he doubts claims that inflation significantly helps explain the specialness of the early universe. Positivists may be disposed to discount the problem but there appears to be good reason for Penrose's skepticism. However this is not treated in this volume.

Rigorously building a case against the fundamental arguments for strong AI, Penrose begins with what for him is to ultimately be 'le coup de grâce', considerations and arguments from mathematical logic. If the human mind works non-algorithmically, then we know of no way to digitize/program its processes. The mind does in fact function non-algorithmically, a fact demonstrated without much difficulty. It learns in intuitive, non-linear, and mysteriously creative ways. The idea that some non-algorithmic approach might achieve a program equivalent to the human mind is not supported by any "useful" (or better, see below) physical theory and is not mathematically tenable. Strong AI is thus relegated to a mere ideological preference (and obviously to sci-fi). In his mathematical considerations, Penrose is most interested in the work of Turing and Gödel and in the Platonic essence of mathematics itself. Concluding that the human mind cannot be reduced to an algorithm (or any set of algorithms), Penrose next questions whether the mind might be reducible physically. Here he finds the questions and answers less well defined than he has in mathematics. His tour of classical and quantum physics features interpretations and ideas that many readers may have not encountered (which makes the text fun). The problem of "correct quantum gravity" (that is, the incompleteness [or incorrectness?] of relativity and quantum theories) is one that Penrose and other theoreticians have struggled with for decades. Penrose wonders if this mysterious and conspicuously missing physical theory might be related to the also conspicuously missing science of mind. This speculation on his part is the theme also of his more recent books. As Erwin Schrödinger (like Einstein and Gödel, Platonists all) seems to be one whose ideas are of particular interest to Penrose, I will cite

Schrödinger's view: "Consciousness cannot be accounted for in physical terms. For consciousness is absolutely fundamental. It cannot be accounted for in terms of anything else." But Penrose doesn't quite argue this view, although it would seem an obvious conclusion from his best arguments. Here is a classic example of how we may know 'something' without knowing everything: we can know that the human mind cannot be reduced to an algorithm -- or algorithm of algorithms -- and yet it is not known whether we can even know precisely what mind is. Particularly so if, as Schrödinger says, mind is irreducible.

The chapter on cosmology is excellent, as one might expect of a Roger Penrose. The consideration of the "specialness" of the initial [cosmological] conditions and of the relationship of this specialness to the second law of thermodynamics is also fascinating as it is precisely the second law that lends the "arrow of time" its apparent non-symmetrical aspect -- in other words, defines physical reality as we experience it. In this sense, the second law connects the human mind to the cosmos (which is interesting but does nothing to help us "reduce" mind).

Penrose suggests, and I cannot find any reason to disagree, that all scientific theories can be assigned to one of three broad categories, which he calls: (1.) SUPERB, (2.) USEFUL, (3.) TENTATIVE. All SUPERB theories (there are roughly a dozen) stand within the purvey of physics, and: "It is remarkable that all the SUPERB theories of Nature have proved to be extraordinarily fertile as sources of mathematical ideas. There is a deep and beautiful mystery in this fact: that these superbly accurate theories are also extraordinarily fruitful simply as mathematics. No doubt this is telling us something profound about the connections between the real world of our physical experiences and the Platonic world of mathematics." Over time, theories (particularly those that do not feature such mathematical beauty or fertility) may tend to move between the categories. Theories held to be SUPERB for centuries have dropped completely from the current categories; theories have faded and re-emerged. . . "we should not be too complacent that the pictures that we have formed at any one time are not to be overturned by some later and deeper view."

Some readers will not like the fact that, after extensive rumination on very difficult and deep questions (like "what is mind?"), the author doesn't conclude with a pretense that he, or anyone else, has definitive answers. This reader appreciated the integrity of Penrose's questionings and of his conclusions (or lack of conclusions). I will misappropriate one of Penrose's terms -- as a text examining mathematics, physics, and the human mind, this volume is SUPERB.

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Was this review helpful to you?      [Comments \(3\)](#)

30 of 36 people found the following review helpful:

★★★★★ Don't be fooled by kitsch materialists, March 23, 2000

By A Customer

This review is from: [The Emperor's New Mind \(Paperback\)](#)

First, what this book is not: It is not "creation science"...it doesn't address evolution...or the existence of God...or existence of the human soul. In other words, it is NOT special pleading against modern science by someone with a religious agenda. What it IS rather, is a solid study of cognition, theories of artificial intelligence, and the enduring problem of the nature of human

consciousness by one of the world's top physicists (a professed materialist by the way, not a religious believer), who together with Stephen Hawking developed the astrophysics of "black holes" in the '60's. What Penrose suggests here (a theory he expands on in his subsequent "Shadows of the Mind"), is that science, and specifically physics, is inadequate now, and more importantly will always be inadequate, to describe the nature of human intelligence, cognition, and consciousness--a thesis similar to the showing of Godel's 1931 Theorem that certain fundamental axioms of mathematics were incapable of proof within any mathematical system. In other words, Penrose suggests that there are elemental restrictions within science itself limiting our understanding of our own mental processes, which concomitantly limit the possibilities for development of artificial intelligence. And that obviously doesn't sit well with those for whom naturalistic science is itself a kind of "religion," as some of the dismissive reviews on this page show. My advice: just ignore them and read this book, and well as its successor, "Shadows of the Mind." It's a challenging read and not for intellectual lightweights, but it will richly reward those with the patience to make it through.

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Was this review helpful to you?      [Comment \(1\)](#)

47 of 60 people found the following review helpful:

★★★★★ Magnificent - Changed my life, October 13, 2005

By [Dr. Hugh Deasy "dilettante"](#)  (DA, BRD) - [See all my reviews](#)



This review is from: [The Emperor's New Mind \(Paperback\)](#)

About 10 years ago I was a physicist with no interest in philosophy when I idly picked up a copy of this book on special offer. As I read I was drawn into the fascinating world of Penrose, where he explains with beautiful clarity some of the physics/math's I knew well already and some that was new to me like Godel. The latter he explained very well graphically, with the diagonal cut. This graphical approach is his strength - it is also used to good effect in his most recent book, "The Road to Reality". But where he really scored in TENM was in opening my eyes to the world of philosophy on the mind/body debate. His references to Searle and others were pointers I followed up to good effect until I was thoroughly engrossed in that debate. Thus the book was very effective. His insights on mathematical inspiration were also good, as was the way Deep Blue failed miserably on an obvious chess problem because its brute force method lacks the 'qualia' or feeling of meaning and true understanding. Thus with Godel he had a good math reason for doubting that Computers could solve all the problems we grasp intuitively and with examples of this intuition he gives good 'intuitive' reasons. I suspect that for many other physicists this book was also an eye-opener. So the 5 stars are richly deserved. Having said that, and with the hindsight of later reading on the philosophy of consciousness, what was not emphasised enough in the book was a discussion of the ineffable nature of subjective consciousness. E.g. the idea of 'qualia' or subjective experience of red or music etc. is a theme that is the basis for the 'hard problem' of consciousness in philosophy, a term coined by David Chalmers. This 'hard problem' or 'explanatory gap' is another powerful argument against AI and a reason to doubt that purely objective processes can explain how the 'wine of subjective experience arises from the water of objective processes'. Thus the book would have been more complete with such a discussion, as it takes a bit of lateral thinking to grasp this, and most scientists are blissfully ignorant of this funda-mental feature of reality. However, his discussion

of mathematical insight is indirectly concerned with one of the 'non-sensory qualia' and thus touches on the problem of the subjective/objective dichotomy.

Yes, maybe there are hordes of scientists or others swamped by the default world-view of reductionism but who feel uneasy at the idea that we are just computers made of meat. For them this could be the opening to the counter-arguments that will enable them to escape the blanket coverage given in the media to dismal, depressive wofflers like Daniel Dennett and Dawkins. When I see the number of reviews here who start with adulation of Dennett then I realise that we need more high profile standard bearers for the anti-AI position. It seems most people have read no further than the nihilist drivel of Dennett and his ilk. When I recall his 'Darwin's dangerous idea' and its revolting comparison of darwinism to an acid eating through anything which he contemptuously dismissed as 'sky-hooks' etc. then I long for my Penrose or Colin McGinn or David Chalmers or even John Searle - though the latter's insistence on emergence of consciousness from brain as digestion from stomach is a bit hard to stomach. I noticed also in one or two of the reviews below this muddled confusion of Darwinism and consciousness - again one sees the mark of the Dawkins/Dennett brigade there. Darwinian theories of natural selection have little to do with conscious processes. Maybe Dennett's multiple drafts theory has an element of that, but the fact that he uses this as a weapon toward eliminativism is unjustified. Most of the popular science readers who lap up Dennett fail to realise that he's one of a dying breed of behaviourists who effectively censored any mention of consciousness for almost a century. Thus we are only now picking up where William James left off - his writings are again extraordinarily relevant and modern. Thus the title Emperor's New Mind can also refer to this tragic lost century of ultra-materialism and negative positivism. The scales have fallen from many people's eyes now, as they join the cognitive revolution in consciousness studies - Dennett and other neo-behaviourists are indeed dinosaurs in the age of the Tucson conferences with their exciting discussions on C - but since those are pluralist gatherings the whole spectrum of thought is represented, from Dennett to Penrose to Chalmers...

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Was this review helpful to you? ★★★★★ ★★★★★ ★★★★★ ★★★★★ [Comment](#)

16 of 19 people found the following review helpful:

★★★★★ **Highly Recommended**, August 26, 2002

By [Assela Pathirana](#) ★★★★★ (Japan) - [See all my reviews](#)

This review is from: [The Emperor's New Mind: Concerning Computers, Minds, and the Laws of Physics \(Hardcover\)](#)

As opposed to what the title suggests, the bulk of this book is devoted to describing the foundations of the modern physics and computing. I was immensely fascinated by the accounts on the important subjects like classical mechanics, special relativity, general relativity, Turing machines, introductory quantum mechanics, artificial intelligence, etc. A fundamental difference between 'A brief History of Time' (Hawkins) and this book is that while the former skims over the theories needed to build the case of the book, this does a very thorough job of describing them. Of course this approach has its price, namely the mathematical complexity. Even though the author suggests skipping the mathematics and reading on if the reader is unfamiliar with the subject, I feel such reading will hardly do the justice to this fine book.

The recommendation: If you know basic mathematics like interpreting a simple equation (involving exponents, logarithms, etc.), a bit of probability, etc. and the willingness to learn more, this is an excellent book for you. However, if you simply cannot withstand equations among text and are determined to avoid them at all costs, perhaps this is not the book for you.

The ultimate message of the book, namely the proposition that the process of human thinking is related to quantum mechanical effects of matter did not sound very convincing to me. Perhaps this is not an accident, for the author state facts in the parts dealing with various scientific principals and is speculating at the stage of this proposition. My advice: Don't worry about this part. If you understand and are convinced -- good! If not: Still you've got your money's and time's worth by understanding the basics of modern science, in a comprehensive manner.

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Was this review helpful to you? ★★★★★ ★★★★★ ★★★★★ ★★★★★  [Comment](#)


17 of 21 people found the following review helpful:

★★★★★ **Penrose's Fascinating Summary of Modern Science**, February 15, 1999

By [Carl Sable](#) ★★★★★ (New York, NY USA) - [See all my reviews](#)

This review is from: [The Emperor's New Mind: Concerning Computers, Minds, and the Laws of Physics \(Hardcover\)](#)

Roger Penrose, one of the world's top physicists, summarizes modern science, examining topics including Turing machines, relativity, quantum physics, black holes, etc. At the end, he argues that the human mind can not be simulated by computers or anything algorithmic. The Emperor's New Mind is my favorite book, although I didn't feel that way the first time I read it. It is quite technical, compared to, for instance, A Brief History of Time, which covers some of the same topics. The second time I read the book, I really dedicated a lot of time to understand the material as well as I could, often working out problems with paper and pencil. This was necessary for me to see that his conclusion was related to the rest of the book. While Penrose obviously can not "prove" his belief, he gives a strong, fascinating arguement, and the book has definitely affected my philosophical views concerning consciousness.

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Was this review helpful to you? ★★★★★ ★★★★★ ★★★★★ ★★★★★  [Comment](#)

187 of 259 people found the following review helpful:

★★★★★ **As if by magic!**, October 8, 2004

By [O. Buxton "Olly Buxton"](#) ★★★★★ (Highgate, UK) - [See all my reviews](#)

★★★★★ ★★★★★

Daniel Dennett's excellent book Consciousness Explained extracts a very funny cartoon from Scientific American, in which two professors stare at a blackboard showing a formula full of complex algebra. In the middle of the formula appears the sentence, "THEN A MIRACLE OCCURS". One professor points to the statement and says to the other, "I think you should be more explicit here in step two."

Roger Penrose isn't just any old boffin: he is the Emeritus Rouse Ball Professor of Mathematics at Oxford University and has been knighted for his services to Science. The Emperor's New Mind is his attempt to crack that perennial philosophical chestnut, the Consciousness/Artificial Intelligence problem. Penrose's view is that Strong AI is simply wrong and that a computer could never replicate (functionally or actually) what we know as "consciousness".

Right. Take a deep breath here. For it's a scary thing for a mere mortal (with a decidedly ordinary bachelor's degree in the humanities) to say something like this about the one of the cleverest men on the planet, but I can't see any way around it: In this book Roger Penrose completely, totally, misses the point. Insofar as it's considered an entry on the Consciousness/AI debate, The Emperor's New Mind - all 583 pages of it - is all but worthless.

There. I said it.

Then again, nearly 500 of those pages don't even purport to be about consciousness, so perhaps all is not lost. Instead, they contain an extremely dense, at times fascinating, but uniformly (and I use the word deliberately) dazzling overview of the more esoteric parts of modern mathematics, physics and cosmology. While Penrose thinks it is necessary background, it isn't - it amounts to an extremely long winded appeal to authority:

One is left with the firm impression that the Rouse Ball Professor of Mathematics at Oxford University is a very, very smart chap, and that one really ought to see that what ever he says goes. This is no small irony, given the title of his book. For if anyone is holding himself out as being a tailor purveying a cloth that only the cleverest people can see, it's Roger Penrose.

Here's where I think he goes wrong. Firstly, his attempt to undermine the AI position is founded on purely mathematical reasoning. Pure mathematics is a closed logical system. Its truths aren't falsifiable, so by themselves have no explanatory force. Mathematical statements (such as "1+1=2") are necessarily true for all time and all universes so, ipso facto, they can't - by themselves - tell us anything about any particular universe. Yet that is just what Penrose asks them to do. He invokes Gödel's theorem of undecidability, perhaps to counter the argument I have just made, but it isn't convincing - being logically unable to prove all truths in a particular set (even though you know they are true) is very different from being able to falsify them. Without that power, you have no explanatory traction in the outside world. Penrose's entire attack on Strong AI is based on an unfalsifiable, and therefore non-content carrying, argument.

Another error is to assume an algorithm must have been designed for the purpose for which it is used, and must work perfectly to be of any use. Natural selection illustrates that this is simply not the case. An algorithm may have a number of useful unintended by-products, and an algorithm can be extremely useful even when we know it to be completely misconceived at every level: take Newtonian mechanics as a good example. We've known for a century it isn't correct but in most practical circumstances it works fine.

Which brings me to my next point: for all the learning Penrose includes on Mandelbrot sets, phase space, entropy and Hawking Radiation, The Emperor's New Mind is conspicuous for what it leaves out: The bibliography contains no reference to Karl Popper nor the general philosophy of science - which might have helped him on the issue of falsifiability - nor crucially to a

number of writers who have been very influential on the modern mind/AI question: Daniel Dennett is barely mentioned (Dennett's writing probably represents the "forefront" of the consciousness debate), nor is Richard Dawkins well-referenced, despite having written compellingly (and, being a zoologist, with a great deal more expertise) on the question of algorithms in natural selection. Indeed, Penrose doesn't clearly present the arguments of any particular supporter of strong AI, but rather chooses to generalise loosely as if he is convinced his mathematical deductions can carry the day, and that AI doesn't present a significant challenge. Douglas Hofstadter is given a little space, and John Searle and his largely discredited Chinese Room Experiment a fair space, but other than that the only philosopher Penrose seems to be aware of is Plato.

Another thinker Penrose doesn't seem familiar with is William of Occam. Instead of doing some background reading (and applying a little common sense), Penrose has launched a theory which (as he proudly proclaims) takes us to the ends of time and the universe and back to the smallest subatomic particles to explain (in ways he freely admits he doesn't understand) an everyday, prosaic (but still extremely hard to grasp) phenomenon. In its interstellar journey Penrose's theory drifts very close to dualism, and close (but not quite so close, perhaps) to positing (or needing) some sort of God to work. That will give succour in some quarters, but not the ones Penrose has in mind, I suspect.

Occam's Razor would require that such untestable and speculative suppositions be rejected unless no other explanation is available. Penrose would protest there are none; Dennett, Dawkins, Hofstadter and their colleagues and adherents (including me) would beg to differ, and point to a lot of literature that Penrose hasn't read. In any case one would think that Penrose's own intuition (which he claims helps him to see truth despite Gödel undecidability!) ought to help him see his theory is, as Jeremy Bentham would say, "nonsense on stilts".

Ultimately, when Penrose says "quantum theory explains consciousness" he is really saying no more than "something magic happens!" or even "THEN A MIRACLE OCCURS".

Mr Penrose, I think you should be more explicit here in step two.

Olly Buxton

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9 of 11 people found the following review helpful:

 **Brave Postulations!**, June 9, 2000

By "[cosmos317](#)"  (USA) - [See all my reviews](#)

This review is from: [The Emperor's New Mind \(Paperback\)](#)

I can't say enough for this book. Whether or not you agree with Penrose's idea that science will never be enough to grasp human consciousness or not, this book is a fascinating journey into Quantum Physics, Godel's Incompleteness Theorem and a good time to evaluate your own thoughts on human consciousness based on logic and science rather than a spiritual approach regardless of your feelings on Penrose's postulations.

I must give a word of caution to a would-be reader, this is not a book for someone not willing to get through some technical stuff. If you only want to be spoon-feed an opinion without understanding HOW the opinion was formed, this is not the book for you.

HIGHLY RECOMMENDED!

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6 of 7 people found the following review helpful:

★★★★★ A great, great book., September 11, 2007

By [Pinner Blinn "skyisland"](#) **★★★★★** (Arlington, MA USA) - [See all my reviews](#)

I was compelled to write as I came by on the way to buying Dr. Penrose's more recent book ("Road to Reality") and was appalled that Amazon features 2 out of 3 negative views on the first page, including one which dismisses the "Emperor's new mind" as "rubbish". Surely the book is controversial in certain quarters, but the vehemence of much of the criticism can only make me wonder why some people are so defensive about it.

I have to admit I have not reread this book since my original reading around 1990, so take my remarks at some discount on that basis. But I will tell you that this book remains influential in my choice of what I read and how I evaluate things even to this day. It has indeed changed my life.

Dr. Penrose's premise is that a computer simulation of a brain will not achieve the equivalent of human consciousness. I don't wish to enter the fray of arguing points. Dr. Penrose is a mathematical and scientific genius, a deep thinker on the nature of reality, and he can do his own counterpoint. Read this book with an open mind, and even if you disagree with some of his arguments, you will take much away with you.

Here's my take. "Consciousness" is pretty central to the whole enterprise of scientific endeavor, as well as how each of us understands our place in the world. Consciousness, as modeled by psychological and AI researchers, has a lot to say about the biological/physical systems that underpin what is happening in our heads, but one has to wonder about claims that consciousness is now completely understood. To this end, Dr. Penrose takes us on a fascinating journey to the frontiers of scientific knowledge, at scales both large and small. This is entirely relevant to the central theme. Science can only talk about what we can measure, and there are limits to what we can now measure. Our current picture of reality is not as complete as some people would have us believe.

So read Penrose. Read Stephen Jay Gould. Read Raymond Smullyan. Read about the Banach-Tarski theorem. Read about Fermat's last theorem. Read great literature. Keep an open mind. Peace!

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Was this review helpful to you? ★★★★★ ★★★★★ ★★★★★ ★★★★★ | [Comment](#)

6 of 7 people found the following review helpful:

★★★★★ **Strange new world**, April 17, 2001

By [James E. Vancik "gravityone"](#) ★★★★★ (Indianapolis, IN USA) - [See all my reviews](#)
★★★★★

This review is from: [The Emperor's New Mind \(Paperback\)](#)

My guess is that the ideas in this book are what happens to an internationally acclaimed mathematician/physicist as he tries to deal with quantum non-locality. Quantum non-locality is getting some physicists to think about the position of the mind in physical reality. The interesting thing about this book is seeing how a great mind attacks problems in computability, new physics, old physics, mathematics, philosophy, and especially AI. This book tries to kill AI.

The discussion methods used to explore these ideas are sophisticated and semi-technical and very appropriate and interesting. The conclusions however are off the wall and verge on the metaphysical. I wouldn't recommend this book for light reading or light thinkers. It is worth the price just to see how someone like Penrose thinks and does problem solving.

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Was this review helpful to you? ★★★★★ ★★★★★ ★★★★★ ★★★★★ | [Comment](#)

26 of 36 people found the following review helpful:

★★★★★ **Don't let the non-reader reviews fool you!**, August 30, 2004

By [J.B.](#) ★★★★★ (San Francisco, CA) - [See all my reviews](#)

There are some DUMB reviewers in here that makes one doubt if they even read the book!

An example: the review titled "The argument is 25 years old and invalid., February 8, 2004" by Jonatan (Norway) claims that the entire book hinges on the argument of Lucas called "Minds, Machines and Goedel" in which Lucas uses Goedel's theorem to disprove strong-AI. Mr. Jonathan, HAVE YOU EVEN READ THE BOOK, BECAUSE THERE ARE COUNTLESS ARGUMENTS AGAINST STRONG-AI THAT YOU HAVEN'T DISCUSSED FROM THE BOOK! Here are some:

- 1) Searle's Chinese Room: The computer can manipulate language, but can it understand meaning?
- 2) Platonic argument: The number "2" as understood by a human is NOT a symbol, which is presumably what a computer "understands".
- 3) Quantum indeterminism: This has been extended by more well-known people recently such as Hameroff.

This is a wonderful book, however it does have its limitations, since it doesn't actually disprove strong-AI, but merely gives several reasons as to why it may not be right.

9 of 12 people found the following review helpful:

★★★★★ **The Emperor's New Mind**, February 13, 2002

By [Joe Zika "Khemprof"](#) ★★★★★ (Cincinnati, Ohio) - [See all my reviews](#)

★★★★★ ★★★★★

This review is from: [The Emperor's New Mind: Concerning Computers, Minds, and the Laws of Physics \(Hardcover\)](#)

The Emperor's New Mind by Roger Penrose is thought provoking and absorbing. Not being a physicist, I thought this work was going to be daunting, but to my surprise the author made the subject readable and understandable.

The physics and mathematics within this book is not hard to understand, but as a layperson quantum mechanics and quasicrystals were rather complex concepts. There are mathematical formulae in this book, but as the author points out read the words and the formula will play out...in other words if you understand the concept the formula only confirms the logic. But as I understand, Heisenberg's Uncertainty principle also tells us that when we try to measure both position and momentum of a particle, not only are we incapable of measuring both simultaneously, but far more incomprehensibly, both the position and momentum cannot exist at the same time. Now, the implication here is that such properties, which we are inclined to think of as inherent properties of the particle, do not exist until they are measured, the Copenhagen Interpretation of quantum mechanics. Particles are really nothing more than probability wave functions that expand infinitely across the universe. So, in the terminology of quantum mechanics, the act of measurement collapses the wave function... counter intuitive.

Artificial intelligence will some day match a human mind... awareness and understanding, but to understand the human mind first is what Penrose is trying to explain.

If you have a serious interest in physics, mathematics, philosophy, and artificial intelligence you will like this book.

White and black holes, the structure of the brain and understanding the physical processes of consciousness all come into play.

This is not light reading, but read it.

To understand the mind, is to understand mankind

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Was this review helpful to you? ★★★★★ ★★★★★ ★★★★★ ★★★★★  [Comment](#)

2 of 2 people found the following review helpful:

★★★★★ **First Class Scientific Novelty**, August 8, 2009

By [jason m "jason m"](#) ★★★★★ (Ontario, Canada) - [See all my reviews](#)

I'll have to admit: at first I had my qualms with this book. I found the general idea extremely interesting - take us on a tour through mathematics, computer science, physics, philosophy, and biology to prove that a thinking computer is not possible. However, upon first reading the book I

found the material to be extremely difficult. It just seemed that so much detail was omitted that it was incomprehensible. However, after further reading, I realized that I wasn't reading the book in its proper perspective. This should not be read as an air-tight mathematics text. Instead, Penrose gives a big picture view of the logic and mathematics of most concepts; you would be better off trying to simply get the gist of the ideas as opposed to trying to obtain a full-fledged understanding (because such an understanding would probably require several volumes to be written). In any event, this is now one of my favourite books. (I also suggest that if you want a more detailed view of some of the concepts, you read "Shadows of the Mind.")

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2 of 2 people found the following review helpful:

★★★★★ NewMind, ReMind, UberMind, NeverMind, February 3, 2009

By [wRichard Stark](#) **★★★★★** (Tampa, FL [wrstark@yahoo.com]) - [See all my reviews](#)

★★★★★

As a professional mathematician, I find Penrose's serious work colorful. So I bought this easy-reading book. The table of contents listed material that is the focus of many popularizations [yawn]. But this book is so far beyond the usual treatments that I am being drawn in deeper and deeper. My morning reading stretches on and on into office hours. Penrose writes beautifully!

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Was this review helpful to you?      [Comment](#)

4 of 5 people found the following review helpful:

★★★★★ Very thought provoking but logically flawed, October 2, 1997

By [Mark Fitzsimmons](#) **★★★★★** (Los Angeles, CA) - [See all my reviews](#)

★★★★★

This review is from: [The Emperor's New Mind: Concerning Computers, Minds, and the Laws of Physics \(Hardcover\)](#)

I found the book to actually be more interesting in its discussion of physics and quantum mechanics than when I got to his thesis on mind and the computational impossibility of reproducing it in a computer. Although most of this is lucidly written and meticulous in its attention to detail, Penrose's final conclusion that the mind must have a quantum-mechanical aspect is unsupported by any evidence and seems to come from nowhere but his own deep desire to be more than chemicals. For me, the weakest part of the argument (in fact the only "evidence" he gives for his conclusion, really!) is the discussion of how long it takes a computer algorithm to solve a particular type of problem vs. how long it takes a person. It seems plausible, but ignores the fact that in this world, thousands of people work in parallel and cooperatively over many years to solve difficult problems and build on previous successes and failures. It ignores the roles of specialized education, folk knowledge, anecdotal evidence and how all of these result in common-sense elimination of fruitless pathways and recognition of fruitful pathways in human problem-solving. Nevertheless, I found his physics primer (the first several chapters) to be better than many I have read, and the whole book gave me many nights of weird dreams. At the end, though, I wound up disappointed and feeling like I had been hoodwinked into someone's attempt to logically deduce his own personal faith.

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Was this review helpful to you? ★★★★★ ★★★★★ ★★★★★ ★★★★★ [Comment](#)

25 of 36 people found the following review helpful:

★★★★★ **Brilliant physicist, flawed reasoning**, September 10, 2001

By [Ivan Phillips "doctor logic"](#) ★★★★★ (Buffalo Grove, IL United States) - [See all my reviews](#)

This review is from: [The Emperor's New Mind \(Paperback\)](#)

The book covers a lot of ground, but the grand tour of physics and mathematics is designed primarily to support the author's argument that machines will never be capable of matching human intelligence. The author's main argument for this is based on Godel's Incompleteness Theorem. Unfortunately, this argument is just plain wrong. It assumes (without explanation) that human intelligence bypasses the limitations of the theorem in a way that computer intelligence cannot - as if humans somehow know it's better to be incomplete than inconsistent. The presentation of 'alternative' theories about the physical nature of intelligence seem unnecessary when the central argument falls down.

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Was this review helpful to you? ★★★★★ ★★★★★ ★★★★★ ★★★★★ [Comment](#)

8 of 11 people found the following review helpful:

★★★★★ **Inconclusive, but worth its weight in transistors**, February 29, 2004

By [Tobias Bologna "Toby"](#) ★★★★★ (USA) - [See all my reviews](#)

To all those who wish to dismiss this book: Let's give Roger Penrose a break. After all, he's pretty smart (ahem!), and even if he turns out to be incorrect in suggesting that consciousness can be explained physically using physics we don't have yet, the book is a vigorous and entertaining attempt to put forth the case. He states up front that _we don't have the physics yet_, so where's the controversy?

I find the claim that Penrose simply rejects the view that the mind is a (computational) system, because no system can be both consistent and complete, a little misleading and certainly no substitute for reading the book. To address this on just one front, there is also a positive side to Penrose's argument, namely, that the mathematical insight needed to recognize undecidability and related arguments as legitimate--an insight he tries to defend against competing philosophies of math--would itself appear to lie outside the realm of computation.

As for the idea that ENM is a poor man's GEB, I see the two books as completely different in motivation. In GEB, Goedel is central in leading to the conclusion that some sort of self-reference lies at the heart of intelligence. In ENM, Goedel is important in flushing out regions of mathematical thought that appear to be non-computational, but the overarching suggestion is that consciousness will someday be explained using as-yet-undiscovered physics.

For me, the attractiveness of both books lies in their "vigor with rigor," that combination of mastery, humility, and generosity one longs for in science writing.

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Was this review helpful to you?      [Comment](#)

8 of 11 people found the following review helpful:

★★★★★ Well worth the read, April 4, 2000

By **A Customer**

This review is from: [The Emperor's New Mind \(Paperback\)](#)

I do not believe that previous reviewers are at all correct when calling this book a "cult book" or attempting to completely refute the conclusion of this book. For one thing, this book provides a lot more than just Penrose's conclusion, written in an understandable, yet extremely in-depth style. The discussions of Turing machines, quantum physics, and consciousness are very thought-provoking. Although Penrose's conclusion is not proven, and may even be incorrect, the ideas he presents are well worth the read.

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Was this review helpful to you?      [Comment](#)

1 of 1 people found the following review helpful:

★★★★★ Very Good, November 21, 2009

By [Imran khan](#) **★★★★★** - [See all my reviews](#)

★★★★★

Amazon Verified Purchase([What's this?](#))

This review is from: [The Emperor's New Mind \(Paperback\)](#)

Price was affordable to me. Book's condition was excellent.
Buying book from Amazon.com is about over all satisfaction.

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Was this review helpful to you?      [Comment](#)

5 of 7 people found the following review helpful:

★★★★★ A maverick says:, September 20, 2008

By [WB, Zeno](#) **★★★★★** - [See all my reviews](#)

it's more than 8 years since I read TENM. The other day I found it fallen on the floor and decided to write a review about it, although I remember it hazily. I was dismayed to see it has 11 1 star revs, against only 23 5 star ones. How is it possible?

I think neg revs misinterpreted the book's intent: here [I hope] we're not in the middle of a religious war, as with string versus loop, or Darwin versus ID, or Sokal versus God knows what (by the way, I'm with Sokal). What Penrose set out to do, IMHO, was to amuse himself a little, and (why not?) also earn some money and get his name away from twistors and spin networks and tiling, and into the public's awareness; and by the way, propound some of his pet hypothesis and beliefs. But all among rational people. I was stunned by the virulence of some neg revs, as if he were rejecting naturalism (and even if so, what?). It seems that civilised discourse is definitely over.

So in my view the book is to be taken first of all as an opportunity to explore a first-rate mind, and what an enjoyment that is! I've NEVER seen Turing machines, Goedel method of converting letter strings into numerical ones, etc., better explained outside a classroom, when a prof had to clarify things for stumbling students.

As for his theses, well ... I concur with him about the implications of Goedel's theorem. I think his critics miss the point he's trying to make. Let's be reasonable: nobody can prove anything one way or the other, but to assert, as one neg rev does, that SUBJECTIVE vision is algorithmical ... well, again! What meager evidence we have (humble introspection) would seem to point the other way. As Eddington once said "if you see a salvo of rockets soaring upwards, it doesn't disprove the existence of gravity, but certainly is no evidence for it". I think the onus of proof lies with those who assert mind processes ARE algorithmical. Another neg rev says math is a closed system; well, if so, please explain to me the REASON for the connection between Riemann's zeta and prime numbers. Ah, we don't have the whole picture of the building's architecture yet? Well, neither do we of the (Uni/Multi)verse, another closed system, and this last one with some connection to reality, whatever THAT means. It depends on whether we're Platonists (as Penrose elsewhere acknowledges himself to be) or Formalists -and perhaps here one also should lump the Intuitionists?-.

As for the tubules and the -shotgun- marriage between quantum "theory" and gravity, they are two different things. I think the TUBULE HYPOTHESIS is a falsifiable suggestion (I wonder why Penrose mentioned it at all), hasn't any theory-like status, and anyhow doesn't purport to explain purely MENTAL phenomena: it's as far from it as any physical theory that eschews dualism. So I don't think it has anything to do with the AI discussion. Anybody wanting to criticize it is welcome (though not on the ground that hook -or flat- worms also have tubules: are they free-floating in a vacuum, or inside some cell of the worms?).

As regards the UNTENABILITY OF QUANTUM "THEORY" with its many dualities and dialetheisms -wavicles, wavefunction propagation versus collapse, acausality, nonlocality- I concur with Penrose that it is a phenomenally successful collection of recipes in search for an explanation, not a true theory (that's why I put the scare quotes around it) and should be reformulated, as should have been Newton's because of its nonlocality. In TENM he seeks to do it in a very incomplete and somewhat unorthodox way, but obviously doesn't put forward a theory to that effect in the book, so take it only as an amiable proposal! Even so, I think this is more of a philosophical question (should theories be based on entities understandable to human minds shaped by evolution, if only, pace Mach, by analogy and metaphorically, as for example the 4-dimensional continuum?; or should they be accepted even if they deny basic notions about "reality" such as non-contradiction and causality?) than a scientific one, and so must have as many answers as there are reviewers.

By the way, delving a little more into the AI problem: I think neither Penrose nor the reviewers here mention self-referentiality, which I would think should be considered the hallmark of (self)consciousness, on which naive -but honestly toiled- set theory foundered, and which would seem difficult to implement algorithmically. Why is that?
Another reviewer, and not book-oriented question: what results are emerging NOW from


research into computerised evolutionary algorithms?

To summarise this rambling half non-review: when reading Penrose (and especially "TENM" and "[The Road to Reality: A Complete Guide to the Laws of the Universe](#)") I had the warm feeling I was in the company of a trusted, non-abrasive old friend with whom one might - respectfully, because he knows so much more than you do- disagree, but to whom it is always sage to listen and to pay attention to. And for this, TENM gets my five stars.

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Was this review helpful to you?      [Comment](#)

7 of 10 people found the following review helpful:

 **A mess**, September 7, 2007

By [Randall McCutcheon](#)  (Bexley, OH) - [See all my reviews](#)



This book is a real mess, and although I am giving it five stars, I don't really recommend anyone read anything like all of it. In fact, most of it isn't about the problems with strong AI at all. Mostly, it's a general, populist book about modern physics and mathematics. That can be an interesting read too, but probably Penrose isn't the person to be writing such a thing. He uses way too many exclamation points and I suspect he also tends to think he knows more than he really does. For example, it is clear by his one use of the word "ergodic" that he thinks it means something like "single orbits of a measurable set spread out and fill the whole space". That's mixing, not ergodicity. Lots of ergodic transformations do nothing of the kind, like for example irrational rotations of the circle. I only know this because I'm an ergodic theorist; I do tend to wonder how many other things I would catch Penrose speaking as if he knew more about them than he does, if only I knew more about them than I do.

So why does this book get five stars? Mostly because it has no good competitors. Daniel Dennett, for example, wrote a book called "Consciousness Explained." In it, he didn't even try to explain consciousness. Which is not to say he didn't write a terrific book. He did. It's wonderful. But when it comes to consciousness, Dennett just punts and doesn't seem to realize this is what he is doing (hence the ludicrously inappropriate title). This is why Searle thinks cognitive scientists come out, on analysis, "too stupid for words" (Dennett's phrase, speculating on what Searle thinks--if you haven't read these two guys' reviews of each others books, you really are missing some top-flight entertainment). As scientists, that's not really fair, but as philosophers of consciousness, it's probably pretty apt. Unfortunately Searle, marvelously adept at diagnosing the deficiencies of others, is ill-equipped to give a positive account. Penrose on the other hand at least gives us an inkling of what a positive account might look like. He does this mostly in the last chapter of the book, which is all I think anybody really needs to read (read the chapter on quantum theory too, if you don't remember anything about it).





Is Penrose right? I think, in broad outline, probably so. I do think consciousness has some power to choose at quantum branching points. I think this because I believe in the causal closure of the physical, I believe in the efficacy of consciousness, I don't believe that consciousness is physical, and I don't believe in overdetermination. You can only rectify these beliefs (as far as I can tell), by booting causal closure upstairs into the many-worlds arena and letting

consciousness slide around in this ultra-high-dimensional plane with some measure of latitude. It's also the only way I can imagine that consciousness could have evolved in the first place (given that the strong AI premise that consciousness is automatically, miraculously generated by the execution of an algorithm really is too stupid for words).

I'm sure I'm one of hundreds of people who took quantum mechanics as an undergraduate and immediately formed these opinions; I am happy to defer to Penrose as to the details of how it might work. Are these details worked out in full, or even correctable in principle? Probably not. But almost surely it's not for being too crazy; the truth of the matter about consciousness is probably much, much crazier than even Penrose can imagine. Indeed, probably too crazy to be of any practical use to cognitive science now (maybe ever). So you're still going to have good reason to read your Daniel Dennett.

Oh, right. Penrose thinks the quagmire of consciousness has a lot to do with computability, tilings, entropy and Godel incompleteness. It doesn't (though the aperiodic tilings make for a good analogy involving unusual crystals). Those are just things Penrose knows a lot about, and paranoids think that all the things they know about are related.

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14 of 15 people found the following review helpful:

★★★★★ General comments

This book is a significant improvement on Penrose's previous writing of similar scope, "The Emperor's New Mind", especially that he has more specific ideas on the actual biological manifestations of the noncomputational processes he seeks as basis for consciousness. Even if one does not agree with his arguments, there is a great amount of information on...

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Published on December 26, 1999 by mervyn@ynmail.com

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1 of 1 people found the following review helpful:

★★★★★ Physics of the mind

Penrose, while more famous, does not do as well at popularizing the heady physics and mathematics in this area as Barrow in Pi in the Sky: Counting, Thinking, and Being and Tipler in The Physics of Immortality: Modern Cosmology, God and the Resurrection of the Dead (see my reviews there). His reasoning is too tortured and formula-heavy for me, and I consider myself an...

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Published 21 months ago by Todd Stockslager

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14 of 15 people found the following review helpful:

★★★★★ **General comments**, December 26, 1999

By "mervyn@ynnmail.com" ★★★★★ (Tampa, Florida) - [See all my reviews](#)

This book is a significant improvement on Penrose's previous writing of similar scope, "The Emperor's New Mind", especially that he has more specific ideas on the actual biological manifestations of the noncomputational processes he seeks as basis for consciousness. Even if one does not agree with his arguments, there is a great amount of information on physics and so on, written in a style that makes the book a pleasure to read. A previous review mentioned that many have opposed the logical arguments from the first part of the book. Penrose, however, has replied quite well to many criticisms (see PSYCHE, an electronic journal on consciousness), and I think it is premature to pass final judgement. For an alternative, not necessarily incompatible, view of consciousness I highly recommend "The Feeling of What Happens" by the distinguished neurologist Antonio R. Damasio (or at least check out his article "How the Brain Creates the Mind" in Scientific American, December 1999).

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Was this review helpful to you? ★★★★★ ★★★★★ ★★★★★ ★★★★★  [Comment](#)

29 of 35 people found the following review helpful:

★★★★★ **A work with far reaching implications**, May 22, 2000

By **A Customer**

Amazon Verified Purchase([What's this?](#))

Between the beautifully written prologue and epilogue, this book approaches a range of topics in modern physics in a unique and readable way. Through a continuation of some earlier work, Penrose furthers an argument for brain function and consciousness that many in the artificial intelligence field will not appreciate. He presents his case that the human mind will never be simulated with digital a computer, no matter how complex. But that is not his main focus of this book.

Even more facinating are his calculations which indicate how mathematically unique our existence is under the 2nd law of thermodynamics. To me, it's ultimately ironic that the physical principal which orders our universe and makes intelligent life possible (the 2nd law), is the result of an unimaginably improbable set of initial conditions. Although Penrose never invokes the concept of a creator or supreme being, in my mind, this poses an interesting challenge to those in the scientific community who claim our universe is simply the result of random particle collisions over a long period of time.

If we combine the concepts of similar structures scaling across space and time (tensegrity and fractals), with Penrose's ideas that consciousness may be associated with quantum gravity interactions in microtubules (present in all living cells), perhaps there is far more mystery and beauty to this existence than some would now believe...

This book was satisfying and thought provoking, and I highly recommend it to anyone interested in the mysteries of the very large and the very small.

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17 of 21 people found the following review helpful:

 **Devastating**, October 14, 2003

By [Alan Wilder](#)  (Toronto, Canada) - [See all my reviews](#)

This review is from: [Shadows of the Mind: A Search for the Missing Science of Consciousness \(Hardcover\)](#)

Simple criticism is what Penrose does best. Finding contradictions, oxymorons, and mistakes is his specialty. His critique is certainly warranted now more than ever, as AI seems to be the slowest advancing field of all. In 1970s, we were 20 years from AI. Today, we are apparently 20 years from AI. I wager good money that in 2023, we will be 20 years from AI. How do we build something that we do not even know what it is? Is the mind computational? What is intelligence? These questions are still largely the realms of philosophy and not science. There are arguments, but the evidence is basically non-existent and largely inferential; if it was any other field, literally negligible. But, some people argue, the very question of materialism rests in this quest. This is no necessarily true.

True AI is going to have to be more than a calculator. Actually, the best possible way to see if you believe in AI is to ask yourself: is a calculator a manifestation of AI? If not, there are problems with AI. Too many minds have built their fame and fortune arguing the opposite so the argument is not going away. Hence, I doubt this debate will be over any time soon.

However, in 20 years, I suspect nothing will have changed from the debate. Criticism of Shadows of the Mind usually involves oversimplification of Penrose's arguments. What you may think he says and what he does say are two completely different things.

Penrose has answered some criticism with rightful indignation in place.

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9 of 11 people found the following review helpful:

 **Brilliant but Limited**, October 28, 2003

By [Avid Reader](#)  (Franklin, Tn) - [See all my reviews](#)



Penrose is following the pathway started in THE EMPEROR'S NEW MIND - an exploration of the brain, consciousness, humanity and machine "thinking". I think Penrose would rather say machine "Computation" since he does not think of the human mind as an entity that can be explained in formula, algorithms, or programs.

Rather our consciousness, our "knowing" that we are who we are is an evolutionary process made possible through quantum effects. That is Roger Penrose's argument and while it is an interesting one it is by no means definitive. What Penrose has done, though, is relentlessly investigate questions usually left unanswered and in most cases, unasked.

For example, how did consciousness happen? How did it evolve? Is it still evolving and can it be replicated? Once again, as in the EMPEROR, replication of an activity does not mean the same thing except to the outsider. If a computer plays chess and defeats the world champion, it is an astounding feat - not of chess playing but of computer building. Big Blue did nothing that it had not been programmed to do and that is our quandary - at what point would a machine ever begin to do what it wants and for what reason.

We developed psychologically and emotionally as we tried to adapt to our changing environment. Our uniqueness is due to many things, one of them being a left-right brain. To what conditions could a computer respond that would suddenly bring forth awareness? How would it grow and evolve outside of organic matter?

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15 of 20 people found the following review helpful:

★★★★★ **Consciousness: Could it be explained by the Quantum Model?**, April 17, 2000

By "[julietapetrpni](#)" ★★★★★ (CANADA) - [See all my reviews](#)

This book is one of the most exciting of its kind. To me, the best science book I ever read. When talking about human brains it is not longer a matter of Computation or the Quantum Model. It's also a quest of one of our primary needs: the knowledge of our selves. Explained from a scientific point of view. It highlights however in a certain way the spiritual dimension of human beings. Without telling us directly, Penrose introduce on the reader's mind phylosophique and religious issues, as possible links on the explanation of the whole. It's true, we can't conclude (after reading the book) we have a definitive explanation, which has been proved right. However on this book, to my knowledge, it's the first time a scientist establish the link: Our Brains: Consciousness and the Quantum Model! If I compare to others books of its kind, such as Stephen Hawkins and Sir Roger Penrose in Space and Time, 1995; Leon Lederman in God Particle, 1995; Fred A. Wolf in Taking the Quantum Leap, 1982 and Star Wave, 1984; and finally the previous book of Penrose: The Emperor's New Mind, 1990 I have to conclude on the fact that Penrose, on Shadows of the Mind goes beyond frontiers others could not reach before. And I have to analyze briefly the new aspects Penrose approach in a such visionary way: 1) The strong possibility that physics (of particles) could be the basis of the appearance of high intellectual functions in our brains (which is quite opposite to the traditional scientific knowledge of the chemical basis being the cause) 2) The strong possibility of the emerge of the highest intellectual function: consciousness into the most complex part of our brains: the neuronal synapses (microtubules) and 3) the possibility certain human brains could react differently from the average, because of a different physical arrangement. Of course, conclusions have not ben proved yet. However R. Penrose already advance on his book as examples, some clinical

experiments which uses different anaesthetic on patients who loss consciousness;in order to prove his proposal of the new physical basis being the cause of that effect. To me these proposals,if some day proved right are revolutionary on the field of science and on the knowledge of our selves. The link he suggest between the Quantum Model applied to consciousness is not only unique up to now(to my knowledge),but could be the pathway which could lead us to the comprehension of one of the most intriguing,fascinating and really unknowd mystery:Our Brains:How come our consciousness could emerge on it and make us different from animals!And moreover it allows the reader to think on others possible dimensions of his proposals. I do agree:the book isn't for everybody.We have to like the subject and have already a certain knowledge on the matter. If you belong to that category,don't miss it!It's great! (...)

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Was this review helpful to you? ★★★★★ ★★★★★ ★★★★★ ★★★★★ [Comment](#)

1 of 1 people found the following review helpful:

★★★★★ **MIND MYSTERY and QUANTUM MECHANICS**, February 7, 2009

By [Sam Botros "SGB"](#) ★★★★★ - [See all my reviews](#)

I advise that students in any discipline: Mathematics, Physics, Chemistry, Biology, should be aware and even become involved in studying Quantum Mechanics (QM) right away after their B.SC. degree. That is what I had the chance to be introduced to this fantastic branch of physics on 1949. It is time to realise and be convinced that using the very simple

quantum mechanical models one can realise results in excellent agreement with experiments, results that are impossible to obtain by using classical physics. That is why the books of ROGER PENROSE are of tremendous treasure in a world not familiar of this branch that the MIGHTY GOD have put in their hands to explain this universe He has created.

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1 of 1 people found the following review helpful:

★★★★★ **No other book tackles this subject so clearly**, July 10, 2008

By [avarma "avarma"](#) ★★★★★ (Austin, TX United States) - [See all my reviews](#)

Just opening this book to a random page and reading that page - sets one's mind on fire.

The basic thread running throughtout the book is that of 'what is computable and what is not'. The process of 'Understanding' as humans know it - Penrose argues - is NON-COMPUTABLE. He provides brilliant examples of how computers can 'solve' any problem - without 'understanding' what they are solving (e.g. DeepThought and the simple chess move which stumped it).

This theme in itself would make this a worthwhile read. However - this book offers further gems from Quantum Physics - with perhaps the simplest and best explanation of lesser known quantum paradoxes such as the 'delayed choice' experiments. Godel's theorem is also dealt with

lucidly.

Few authors can tackle the issue of 'mind and consciousness' without stepping into some mystical/unscientific goo. Penrose stays scientific - and works from facts and well known experiments.

I do not know of any other book that tackles this subject so clearly - and in such an exciting fashion. From my perspective - this clearly deserves 5 stars.

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1 of 1 people found the following review helpful:

★★★★★ Physics of the mind, March 24, 2008

By [Todd Stockslager](#) **★★★★★** (Raleigh, NC) - [See all my reviews](#)

★★★★★

This review is from: [Shadows of the Mind: A Search for the Missing Science of Consciousness \(Hardcover\)](#)

Penrose, while more famous, does not do as well at popularizing the heady physics and mathematics in this area as Barrow in [Pi in the Sky: Counting, Thinking, and Being](#) and Tipler in [The Physics of Immortality: Modern Cosmology, God and the Resurrection of the Dead](#) (see my reviews there). His reasoning is too tortured and formula-heavy for me, and I consider myself an advanced popular reader.

However, he does reach the deep conclusion that "whatever brain activity is responsible for consciousness . . . It must depend upon a physics that lies beyond computational simulation (p. 411)." Instead of resorting to the mind as mystical or mysterious, Penrose postulates that consciousness, while incalculable, is still physical, perhaps in an interaction in the brain between classical physics and quantum physics not yet discovered or understood. Penrose points to the possibility of "microtubules" (part of the cytoskeleton that exist even in single-cell paramecium--and seem to give that cell some level of understanding!) that form neurons at the quantum level being the answer to this current quandary:

"Accordingly, the neuron level of description that provides the currently fashionable picture of the brain and mind is a mere shadow of the deeper level of cytoskeletal action--and it is at this deeper level where we must seek the physical basis of mind!"

That Penrose only gets to this statement on p. 376 of this heavy tome is part of the problem with this book.

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Was this review helpful to you?      [Comment](#)

8 of 12 people found the following review helpful:

★★★★★ Deeply insightful into our patterns of thought., June 2, 1999

By **A Customer**

Roger Penrose has written a book which transcends all other efforts in probing the patterns of human reasoning. Although the book has generated controversy amongst mathematicians, few who have reviewed this work have stated categorically that he is wrong. Penrose's conclusions are unpleasant for those who believe in strong AI but they may very well be right. The potential reader considering purchasing this book should be aware that the book is technical and requires thought. Penrose does not make allowances for sloppy thinking (although, one has the feeling Penrose thinks he is making allowances). If you are open minded, not given to leaping to conclusions, and genuinely curious about science and human thought, this book plus The Emperor's New Mind, are definitely books for you.

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 **Mind's Shadows illuminated**, October 2, 2007

By [John Gale](#)  (Sydney, NSW Australia) - [See all my reviews](#)



Another stunning book by Sir Roger Penrose. It's really a five star book discounted here by one star because those lacking physics and mathematics will find some passages hard work, even though the author is being as kind as possible in a book of this calibre.

The book is a neat sequel to his "The Emperor's New Mind", extending the central theme that our little-understood human consciousness allows us to think way beyond the computational and mindless world of artificial intelligence.

In doing so, we have a marvellous survey of classical and modern physics, including the mysteries of the quantum world.


Sir Roger raises the question 'Will we ever be able to truly understand our own Nature-provided brain and its processes in terms of our own science?', and argues that, somewhere out there beyond our present reach, there is a unifying Platonic view of the Universe.

This book is a tour de force on several planes. Highly recommended.

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1 of 2 people found the following review helpful:

 **Very Good**, November 21, 2009

By [Imran khan](#)  - [See all my reviews](#)



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I got this book in a very good condition. My book arrived just in time. Price was low.

I am very much satisfied buying this book from amazon.com.

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17 of 29 people found the following review helpful:

 **Not very inspiring!**, November 16, 2000

By A Customer

This book contains a nice discussion of the Gödel-theorem and some very nice parts about quantum mechanics. He is right when stating the necessity to find a theory of mind. But in my opinion the author chose a bad ratio of science to pure speculation. On the one side, it contains a lot scientific reasoning, so the reader should have some knowledge of modern physics for example. On the other side, he is just scratching on the surface of the theory, so readers with scientific background will not be satisfied and challenged at all by his descriptions (exceptions mentioned above). The author failed to explain important facts about the biological mind. Shadows of the mind is not very helpful. But it is worth to read this book just for the nice parts! I think it is not the time yet to write books on this subject for the public. Write them for the scientific community.

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16 of 28 people found the following review helpful:

★★★★★ Science is a great deal more than mindless computation, August 1, 2005

By [Luc REYNAERT](#)  (Beernem, Belgium) - [See all my reviews](#)

After reading again part of Roger Penrose's exhaustive book, my tentative conclusion is as follows:

All thinking is physical action.

All physical action cannot be properly simulated computationally.

Even if it can, computational simulation cannot by itself evoke qualia.

I believe G. Edelman that the mind is a matter of matter and that consciousness is an emergent phenomenon.

In John Boslough's 'Steven Hawking's Universe', Steven Hawking said: 'Even if we do achieve a complete unified theory, we shall not be able to make detailed predictions in any but the simplest situations.'

And, J. von Neumann & H.H.Goldstine stated: 'a mathematical formulation NECESSARILY (I underline) represents only a (more or less explicit) theory of some phase (or aspect) of reality, and not reality itself.' (Quoted in K. Popper - The Open Universe)

More, computation is Lamarckian. If we program even very sophisticated robots, they will live in their own reality. A computer does not attain any genuine understanding of what he is actually doing.

Human understanding is not an algorithmic activity. Human behaviour is in its essence not rational. It is Darwinian (look what is happening all over the world).

A big part of this book is also based on the wave function in quantum mechanics.

The decoherence theory explains clearly that continuity (waves) does not exist in the universe.

The waves collapsed : 'The constant bombardment of objects by constituents of their environment reduces the probabilities inherent to quantum mechanics to coin tosses and roulette wheels' (Brian Greene). Everything in the universe is discrete, even time (Lee Smolin).

Schroedinger's cat is dead or alive. Not both.

Even if I cannot always agree (or comprehend) with the author, I consider this book as a brilliant achievement. It contains a wealth of information (e.g. Goedel) and is thought-provoking.

N.B. For Platonism, see my comment on 'The Emperor's New Mind'.

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2 of 5 people found the following review helpful:

 **Penrose has an agenda**, September 27, 2007

By [Alan Turing "transient"](#)  (Fair Lawn, NJ United States) - [See all my reviews](#)

Roger Penrose is confident that consciousness can't be explained without some kind of "new physics". He's not very explicit here, as to what this "new physic" should be.

Penrose spends a lot of effort describing paradoxes of quantum physics, so we should assume that "new physics" would have something to do with those paradoxes. He also spends a lot of effort trying to prove that consciousness can't be produced by any kind of Turing machine. He presses this point very hard, giving examples of non-computable problems, but I do not find him to be really persuasive.



Here's a good example of his style, on pg. 290: "I am going to suppose that detector itself can also be assigned a quantum state... This is the usual practice in quantum theory. It is not altogether clear to me that it really makes sense to assign a quantum-mechanical description to a classical-level object, but this is not normally questioned in the discussions of this kind."

What's this "not normally questioned"? I don't think he can persuade anybody with this kind of non-logic. Another problem with his book - Roger Penrose is really fighting windmills. He has invented some stupid AI person who says "ok, here's our wonderful Big Iron and our wonderful team of hackers - they would feed their Beautiful Macaroni Code into this Big Iron - and voilà! you got a real smart strong AI robot to chat with about everything you like. No Turing test needed"

Whereas everybody in AI, strong or not, understands that just as life itself is a process - so is an intellect, and consciousness and awareness. It has to grow, and develop, and learn. May be it can grow and develop fast, but still - it needs to grow, and learn. And yes - make mistakes, like Turing said.

The book is very vague (except chapters on Goedel theorem, where Penrose at least stays within his area of expertise). Also it reads more like a religious tract where the author has a preconception and would try anything and everything to confirm it.

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0 of 2 people found the following review helpful:

★★★★★ **An illuminated exposition on the nature of consciousness and how it emerges from certain properties of the nervous system**, November 30, 2006

By [Frater W.I.T.](#) ★★★★★ - [See all my reviews](#)

This book explains how personal consciousness develops from processes of the nervous system. There are structures along nerves and brain cells that have superconductive properties which can process information consistent with how the mind works. The magician will gain an understanding of what the aura is and how magical phenomena follow from the nature of these properties of the nervous system.

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26 of 48 people found the following review helpful:

★★★★★ **A most magnificent edifice built on sand.**, August 4, 2001

By [Not a Clue](#) ★★★★★ (Redondo Beach, CA USA) - [See all my reviews](#)

This review is from: [Shadows of the Mind: A Search for the Missing Science of Consciousness \(Hardcover\)](#)

This book is an evil-twin, good-twin combo. The first half is a rather difficult, rambling, and biased presentation of the thesis. The second half includes an excellent discussion of some aspects of quantum mechanics, although concluding with an interesting speculation proposing microtubules as the solution to his conundrum. Unfortunately Penrose shares the prevalent human hubris, rendering his objectivity dubious at best.

We now know that it is not possible to determine whether a program halts at infinity or continues after it gets there. Adding more axioms will not ultimately clarify the distinction. Penrose correctly states that non-deterministic programs do not enlarge the domain of computability. From those facts, Penrose concludes that mathematicians must use non-computable methods to reach verifiably true statements.

However, either random programs or exhaustive search can construct any finite sentence, conclusion, chain of thought, or sequence of bits. Recourse to non-computability therefore does not enable us to generate more true statements, and Penrose does not show that it would help us "know that they are true." If quantum mechanics can provide access to infinity, then we MAY need to revise the notion of computability. Don't hold your breath; qubits and quantum computers don't extend the theoretical limits of computability.

Penrose makes it clear in the first chapter that he is motivated by an irrational fear that machines will take over the world and enslave humans. Why should they do that? Well, that is what humans do. They why would machines be worse? No answer. Wouldn't it be better to encourage non-military research in machine intelligence and robotics, teach them genuine secular ethics, etc.? Why should they share our goal of breeding to the Malthusian limit? Won't they occupy a separate and beneficial niche, like our relation with honeybees? Won't machines prefer planets and places with less water? Aren't intelligent machines the only way the legacy of our species can outlive our star (or even, with high probability, the next century)? If irrational fear is non-

computable, it is also unsound.

Penrose may indeed be

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3 of 8 people found the following review helpful:

★★★★★ Consciousness and God Particle, February 3, 2000

By [julieta petroni](#) **★★★★★** (CANADA) - [See all my reviews](#)

For years I've been preparing a Protocol about Consciousness and the quantum Model. I'm Medical Research Doctor. I read many books on these subjects ...Stephen Hawkins, and Sir Roger Penrose... Space and Time 1995)...Leon Lederman (God Particle 1994) and many others related to the subject.. I want briefly analyze Sir Roger Penrose on Shadows of the mind from the two aspects I found the most fascinating: 1) the possibility of the physical basis of our brains rather than the chemical ones and 2) the strong possibility our consciousness emerges on the most complex part of our brain: the neuronal synapsis (microtubules). To me this is revolutionary on actual medical research field and I think it'll be the future of neurological and quantum physics quest....He's on the right pathway....And moreover this kind of knowledge.. if proved right..(of course up to the point of our material, human limitations)..will lead us to answers to those basic HOW'S that really matters: Our brains..how come consciousness make us human beings and differentiated us from animals. Now if I rejoin Leon Lederman on his search of that particle smaller than neutrinos (God Particle)...that one which could establish perhaps the direct link on the energy-matter hierarchy....I've to ask myself thinking on Penrose's Proposals: What if is that particle emerging directly from energy....the one which makes the whole difference in our cytoskeletons (neuronal synapsis)? What if both explanations...Penrose and Lederman..explain HOW come we became humans?...

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3 of 8 people found the following review helpful:

★★★★★ New breakthrough after Penrose, August 21, 1998

By [ssmith@aol.com](#) **★★★★★** (Cambridge, MA) - [See all my reviews](#)

Penrose is basically correct about the radical differences between the human mind and a computational machine. But in order to understand exactly why Dennett and most of cognitive scientists are wrong, the book I am currently reading is a must-read. I believe this book has conclusively proved that the mind is not derived from matter understood in the model of Newtonian mechanics. It instead must be explained in a model that is free from the assumption of spatial locality. Otherwise, we will commit a Fallacy of Unity Projection, as the author calls it. The author's conjecture that the square root of -1 is the psy-factor in physics is particularly intriguing. His thought experiments on cross-sensory perception, interpersonal telepresence, and cross-communication-situations are extremely interesting and enlightening. Anybody interested in Penrose's books (including Penrose himself?) should read this book. The title of the book is: "Get Real: A Philosophical Adventure in Virtual Reality."

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9 of 20 people found the following review helpful:

★★★★★ **Consciousness and God Particle**, February 3, 2000

By [julieta petroni](#) ★★★★★ (CANADA) - [See all my reviews](#)

For years I've been preparing a Protocol about Consciousness and the quantum Model. I'm Medical Research Doctor. I read many books on these subjects ...Stephen Hawkins, and Sir Roger Penrose... Space and Time 1995)... Leon Lederman (God Particle 1994) and many others related to the subject.. I want briefly analyze Sir Roger Penrose on Shadows of the mind from the two aspects I found the most fascinating: 1) the possibility of the physical basis of our brains rather than the chemical ones and 2) the strong possibility our consciousness emerges on the most complex part of our brain: the neuronal synapsis (microtubules). To me this is revolutionary on actual medical research field and I think it'll be the future of neurological and quantum physics quest.... He's on the right pathway.... And moreover this kind of knowledge.. if proved right.. (of course up to the point of our material, human limitations).. will lead us to answers to those basic HOW'S that really matters: Our brains.. how come consciousness make us human beings and differentiated us from animals. Now if I rejoin Leon Lederman on his search of that particle smaller than neutrinos (God Particle)... that one which could establish perhaps the direct link on the energy-matter hierarchy.... I've to ask myself thinking on Penrose's Proposals: What if is that particle emerging directly from energy.... the one which makes the whole difference in our cytoskeletons (neuronal synapsis)? What if both explanations... Penrose and Lederman.. explain HOW come we became humans?...

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24 of 58 people found the following review helpful:

★★★★★ **Amazon Rating System Revealed As Unfair to Good Authors...**, September 1, 2000

By [Harley Davis](#) ★★★★★ (Mountain View, CA USA) - [See all my reviews](#)

I'm sorry, but this book, like his previous forays into the world of cognitive science, is a ludicrous (but readable) attempt by a brilliant mind to find some way around the inescapable facts of materialism. I'm not going to try to defend that position in this review, so take it for what it's worth.

What I do find unfair, however, is that this book receives an average of over 4 stars whilst a competing book, "Consciousness Explained", by Daniel Dennett, receives a mere 3 1/2 stars.

"Consciousness Explained", while having plenty of debatable points, is clearly a serious effort to grapple with the problem of consciousness in a serious way, taking into account real evidence from cognitive science. Penrose's books on the subject, on the other hand, are a form of highbrow escapism.

So, Gentle Buyer, I urge you to beware of popularity contests when judging books on-line...

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