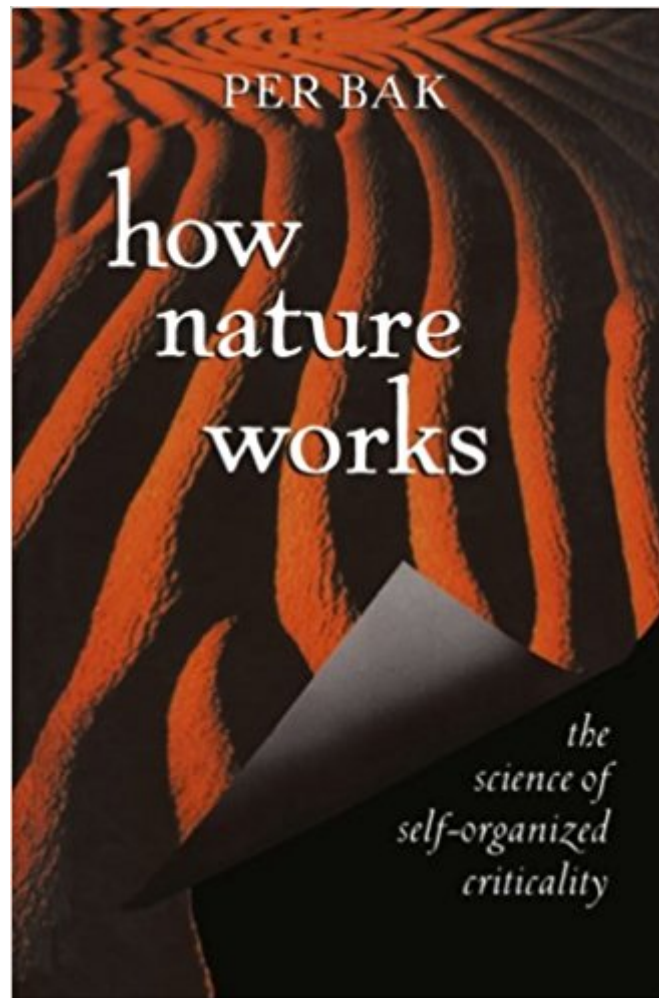




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How Nature Works: The Science Of Self-organized Criticality



Synopsis

Self-organized criticality, the spontaneous development of systems to a critical state, is the first general theory of complex systems with a firm mathematical basis. This theory describes how many seemingly desperate aspects of the world, from stock market crashes to mass extinctions, avalanches to solar flares, all share a set of simple, easily described properties."...a'must read'...Bak writes with such ease and lucidity, and his ideas are so intriguing...essential reading for those interested in complex systems...it will reward a sufficiently skeptical reader." -NATURE"...presents the theory (self-organized criticality) in a form easily absorbed by the non-mathematically inclined reader." -BOSTON BOOK REVIEW"I picture Bak as a kind of scientific musketeer; flamboyant, touchy, full of swagger and ready to join every fray... His book is written with panache. The style is brisk, the content stimulating. I recommend it as a bracing experience." -NEW SCIENTIST

Book Information

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Customer Reviews

. . . In print, at least, what might seem arrogant comes across as a kind of innocent, childlike enthusiasm, a lack of concern for anything but the sheer joy of figuring things out. His ruthless simplifications of geology, evolution, and neurology pay off because, as Bak notes, his models describe behavior that is common across these domains. This universality means that trampling across others' turf is not only acceptable, but almost mandatory, if the underlying principles are to be exposed. Finally, for the most part, Bak wants the reader to grasp the basic logic of his arguments; only rarely does he try to persuade with flights of poetic language or brute intellectual authority. --This text refers to the Hardcover edition.

...[Bak's] book is written with panache. The style is brisk, the content stimulating. -- New Scientist...a must read...essential reading for those interested in complex systems. -- Nature

This is a really good read for anyone interested in learning more about the mathematics behind nature. Also good for anyone interested in the origin of life or how evolution works. A bit mathy/computer science heavy at times. Worth it though.

I couldn't let the previous reviewer's comments stand without comment. I can't believe the reviewer read the same book that I did. Bak's treatment is detailed, clear, and balanced. When he is enthusiastic he let's you know exactly why, leaving you free to make up your own mind. The fact that most of the studies he describes were published in Physical Review Letters might tell you something about their quality. The book provides wonderful examples of the role of models in science, much better than any I've come across in rather extensive search for materials for a course on the Nature of Science I help teach. I'm reading the book for the third time (not because it is difficult to read, but simply because it repays rereading) and I admire it more with each reading. If you want to understand models that display Self Organized Criticality, this book is without question the place to go.

Per Bak, sadly now deceased, in How Nature Works wrote a book of considerable intellectual strength, but one quite accessible to the general reader. The basic notion of the book, that self-organized criticality underlies the world we live in and does so at multiple levels of organization, is clearly developed and supported with examples from geophysics, from evolution, from brain science, and the list goes on, and this is done with clarity and force. For me, personally, what is most effective about this book is the ability it gives thereader to make comparisons between such disparate natural events as earthquake occurrences and the occurrences of extinction events of differing magnitudes; they both obey simple power law relationships. Further, Bak is masterful in the way in which he approached an explanation of $1/f$ noise. Finally, the book is well referenced so that readers who are equipped with some math and scientific insight may pursue chosen concepts in more depth. In closing, for the reader who might be a bit math-phobic, Bak is one of those researcher/authors who empowers his readers to take risks, go beyond their perceived limitations, and enter a new world of knowledge and inquiry. If you are one of those, take a leap of faith, buy the book, and open your eyes and mind to a new world. With respect and gratitude to a great

scientist, Per Bak, Tony Harper

This book is a great attempt at finding some universality based on systems in a "critical" state, with departures from such state taking place in a manner that follows power laws. The sandpile is a great baby model for that. Some people are critical of Bak's approach, some even suggesting that we may not get power laws in these "sandpile" effects, but something less scalable in the tails. The point is :so what? The man has vision. I looked at the reviews of this book. Clearly a few narrow-minded scientists do not seem to like it (many did not like Per Bak's ego). But the book is remarkably intuitive and the presentation is so clear that he takes you by the hand. It is even entertaining. If you are looking to find flaws in his argument his pedagogy allows it (it is immediately obvious to us who dabble with simulations of these processes that you need an infinite sandpile to get a pure power law). Another problem. I have been ordering the book on for ages. Copernicus books does not respond to emails. I got my copy at the NYU library. Bak passed away 2 years ago and nobody seems to be pushing for his interest and that of us his readers (for used books to sell for 99 implies some demand). This convinces me NEVER to publish with Springer.

It's a short book that takes a long time to read. He explains topics well and simply. There's very little posturing. What was most interesting to me in the book is the description of the process of scientific discovery. He talks a great deal about finding very simple models, how these simple models often exhibit the behaviour of their much more complicated cousins, about cooperating with others in a cross disciplinary manner, about not be stuck in a dominant paradigm, and about working a problem until it's solved. Very refreshing.

I felt that the book was well written given that many of the concepts detailed were rather complex and advanced. I enjoyed the read because the author made a convincing case in addressing my doubts about a purely 'Darwinian' or 'Religious' explanation for evolution as we know it.

Excellent book, well worth reading and thinking about.

A good read and very helpful. I learned a lot.

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