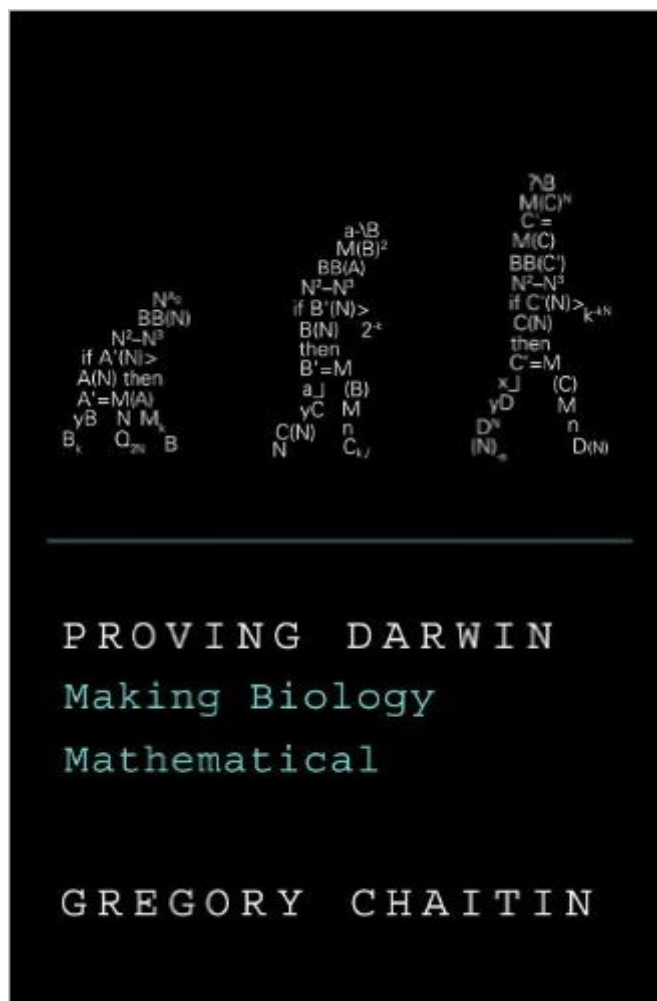# Proving Darwin: Making Biology Mathematical

Synopsis

Groundbreaking mathematician Gregory Chaitin gives us the first book to posit that we can prove how Darwinâ ™s theory of evolution works on a mathematical level.Â For years it has been received wisdom among most scientists that, just as Darwin claimed, all of the Earthâ ™s life-forms evolved by blind chance. But does Darwinâ ™s theory function on a purely mathematical level? Has there been enough time for evolution to produce the remarkable biological diversity we see around us? Itâ ™s a question no one has yet answeredâ ”in fact, no one has even attempted to answer it until now.Â In this illuminating and provocative book, Gregory Chaitin argues that we canâ ™t be sure evolution makes sense without a mathematical theory. He elucidates the mathematical scheme heâ ™s developed that can explain life itself, and examines the works of mathematical pioneers John von Neumann and Alan Turing through the lens of biology. Chaitin presents an accessible introduction to metabiology, a new way of thinking about biological science that highlights the mathematical structures underpinning the biological world. Fascinating and thought-provoking, Proving Darwin makes clear how biology may have found its greatest ally in mathematics.

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Customer Reviews

Mathematician Gregory Chaitin attempts to provide a mathematical model of evolution in this short book based on a university course given in the Spring of 2011 at the Federal University of Rio de Janeiro, where the author is a professor. It also adapts material given at one of his lectures at the Santa Fe Institute. It is a quick read and an outline at best of his work, but it does give the reader a general idea of the concepts behind what the author calls "metabiology", an attempt to model evolutionary adaptation through computer software rather than natural software, otherwise known as DNA.The central premise of this book is that by utilizing algorithmic information theory and the flexible and creative nature of postmodern mathematics, one can construct a working mathematical toy model of evolution, creating a piece of randomly mutating software that selects for a fitness trait. The main idea here is that DNA is a naturally occurring piece of software, our internal programming language as it were. This is not an original concept, but it is one that Chaitin expands upon greatly in the text.I'll admit that it's an absolutely compelling idea. Evolution, after all, is the backbone of modern biology, but its main concepts are often misunderstood or outright rejected by a significant portion of the population. If one can really take a mathematical model and "prove" that the basic mechanisms of evolution (random mutations and natural selection) work as advertised, then it could go a long way towards advancing scientific literacy.Keep in mind that the author's model is simplistic at best, selecting for only one trait and having none of the environmental pressures that truly drive adaptation.

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