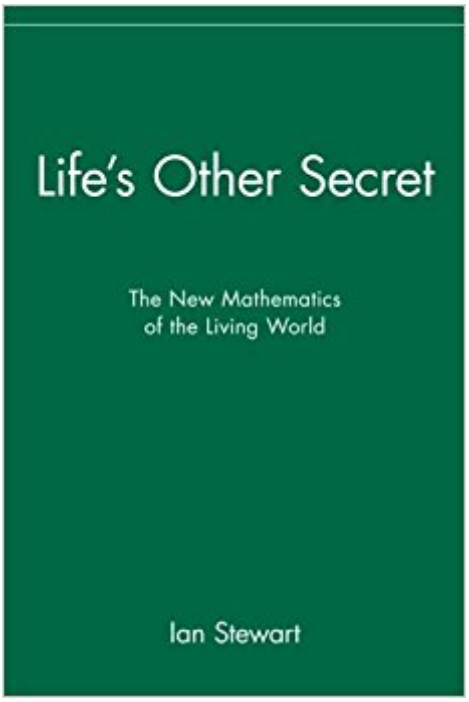
Life's Other Secret: The New Mathematics Of The Living World



Synopsis

"Stewart writes with such compelling clarity that general readers can share in the intellectual daring of his perspective."—Booklist An invitation to a hidden world In Life’s Other Secret, mathematician and award-winning science writer Ian Stewart reveals the way mathematics describes the origin, structure, and evolution of life. Featuring a sumptuous gallery of color illustrations demonstrating nature’s intricate wonders, here is an intriguing invitation to enter a world deeper than DNA, a world where number series bloom in springtime and equations gallop across the plains. From the latest theory of how life started to the rules governing the shapes into which animals grow to the ancient patterns of evolution, Stewart illuminates the fundamental forces that shape our world.

Book Information

Paperback: 285 pages
Publisher: Wiley; 1 edition (January 27, 1999)
Language: English
ISBN-10: 0471296511
ISBN-13: 978-0471296515
Product Dimensions: 6.1 x 0.8 x 9.3 inches
Shipping Weight: 1.1 pounds (View shipping rates and policies)
Average Customer Review: 3.7 out of 5 stars 8 customer reviews
Best Sellers Rank: #2,706,293 in Books (See Top 100 in Books) #87 inÂ Books > Science & Math > Mathematics > Applied > Biomathematics #2991 inÂ Books > Medical Books > Basic Sciences > Genetics #7005 inÂ Books > Textbooks > Science & Mathematics > Biology & Life Sciences > Biology

Customer Reviews

While long an indispensable tool for the physical sciences, mathematics has only relatively recently been used to describe the symmetry of the living world. Stewart sees mathematical laws at work even at the level of DNA replication. Copyright 1999 Reed Business Information, Inc. --This text refers to the Hardcover edition.

Life’s first secret, Stewart says, is the molecular structure of DNA. The other secret, he believes, is mathematical control of a growing organism. (Mathematician Stewart’s activities include conducting this magazine’s Mathematical Recreations department.) Arguing that "life is a partnership between

genes and mathematics," he embarks on an absorbing study of what life is, how it originated and how the search for mathematical laws that underlie the behavior of living organisms will illuminate those deep questions. Along the way, he examines mathematical patterns in flowers, bird feathers, animal locomotion and many other features of life. But he hopes for much more profound findings in biomathematics. "A full understanding of life depends on mathematics," he writes. "At every level of scale, from molecules to ecosystems, we find mathematical patterns in innumerable aspects of life. It is time we put the mathematics and the biology together."

This book is about biomathemetics for those of us who didn't know we were interested in biomathematics. Stewart teases us into the subject by exploring different contexts for the question of "What is Life?". This leads to explorations into how life is shaped by the properties of physical laws. The book focuses on abstractions. Stewart talks about ideas, but chooses not to go into much detail. Many of the illustrations have no explanations, and some have errors. The ideas are all clearly related, but they are never really tied together in the book. I think this was intentional. I think Stewart is hoping that the theme of the book will emerge from the ideas. If he had tried to state the theme as a conclusion that tied the ideas all together, the theme would belong to the author. He wants the theme to belong to the reader, and so he let's us come to our own conclusions. This leaves you with an unfinished feeling, but there are lots of good references (I especially like his annotated further reading section). I feel wiser for having read this book. The most confusing part of the book comes from using the name "math" to describe the language of numbers and as a notation for describing symmetries in the physical universe.

I think 4 or 5 stars is really over-rating this book...In short, if you "are" a mathematician to any degree, and are more than just a layperson looking for some neat facts to through out during cocktail conversation, then skip this. There are some answers, yes; but you won't find any of the depth of understanding that, in my opinion, goes with enjoying mathematics.There were a number of times I was reading a chapter, lost track of what the point was, and looked at the top of the page for the chapter name for help. A number of times I found myself unable to get the chapters' contents to jive with their titles and intros. Overall, it felt like a mish-mosh of topics, questions, answers,...The part about "Turing's equations" was especially frustrating. Over and over they were described in the context of looking for understanding behind animals' stripes, spots, etc. First the equations seemed to provide some answers; later they were not proven to have a physical basis; later still biologists are said to have re-embraced them. But through all this, not ONE iota of description (never mind --

gasp -- an equation) of what Turing’s equations are !The one part of the book I *did* enjoy was the beginning third or so which, for me, added continuity to my previous disjointed understanding of how life could evolve from inorganic materials. And yes, he makes his point that "Genes are great, but there’s math in there too!". But the point does *not* require that much argument; after a while, you’re saying, "OK, OK, you’ve made your point. Can you focus on depth and continuity a bit more please."At 2/3-rds through the book, I skimmed the rest looking for something to make me want to continue reading it. I stopped reading it at that point.

In Life’s Other Secret Ian Steward contends that DNA ain’t all there is to living things - that life is as much about the complex unfolding of dynamic systems as it is about the information encoded in your genes.Sounds plausible to me. Is Steward right? Dunno. But at least I know what the questions are, which is the first step.What I do know is that this is an interesting, well written and well argued book.

Life’s Other SecretThe New Mathematics of the Living Worldby Ian StewartThe secret that this book explains is that although we have come to believe that genes are the basis of all life they are only one part of it. Genes are the building blocks but there may be underlying mathematical principals that govern how the blocks are put together. When you consider that mathematics is the study of structure and pattern you can start to see how this relates to the biological world. Nature displays many example of patterns. But why? Are the organisms following some mathematical law? Take for example the spiral pattern in the seeds of a sun flower. This pattern, in fact, follows the Fibonacci sequence - one spiraling clockwise and the other counter clockwise. A Fibonacci sequence (named after the guy who discovered it), goes like this:1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144...Each number is a sum of the previous two- 3 + 8 = 13.So, these spirals are quite beautiful, but why spirals? Why not concentric circles, or squares or random patterns? What biologists have found, is that, this pattern is the most efficient way of packing as many seeds as possible into the head of one sun flower. So how do you get from a sequence of numbers to a spiral? This involves the "golden number" or "golden angle" of 137.5 degrees and the ratio of one Fibonacci number to it’s neighbour. This led me to wonder about spirals. Why are spirals important in Celtic art? Why do we see spirals when we hallucinate? (Just like in the cartoons when the mouse hits the cat on the head...).The sun flower seed patterns is just one small example of the many topics covered in this fascinating and extensively illustrated book. There lots and lots of ideas to exercise your brain - why are leopard spots different from jaguar spots? How do fish and birds all turn at once? Do crowds of people make

patterns? This book may stimulate your mind - open your mind to thinking about very interesting things - although at times it's frustrating, leaving you feeling that you missed something along the way.

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