The Self Made Tapestry: Pattern Formation in Nature

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For centuries, scientists have struggled to understand the origins of the patterns and forms found in nature. Now, in this lucid and accessibly written book, Philip Ball applies state-of-the-art scientific understanding from the fields of biology, chemistry, geology, physics, and mathematics to these ancient mysteries, revealing how nature's seemingly complex patterns originate in simple physical laws. Tracing the history of scientific thought about natural patterns, Ball shows how common presumptions--for example, that complex form must be guided by some intelligence or that form always follows function--are erroneous and continue to mislead scientists today. He investigates specific patterns in depth, revealing that these designs are self-organized and that simple, local interactions between component parts produce motifs like spots, stripes, branches, and honeycombs. In the process, he examines the mysterious phenomenon of symmetry and why it appears--and breaks--in similar ways in different systems. Finally, he attempts to answer this profound question: why are some patterns universal? Illustrations throughout the text, many in full color, beautifully illuminate Ball's ideas.

The Self Made Tapestry: Pattern Formation in Nature Details

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Author	:	Philip Ball
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From Reader Review The Self Made Tapestry: Pattern Formation in Nature for online ebook

ka?yap says

Philip ball provides a comprehensive overview of the Emergent phenomenon of pattern formation in nature.

His discussions range from the physical processes like the minimal surfaces in bubbles and foams, BZ reactions, convection cells, mineral dendrite formations, branching of rivers to the very similar patterns formed in the biological systems like the pattern formation on the hides of zebras and giraffes, branching patterns in trees, retinal nerves etc., and the patterns in communities of animals and humans He finally concludes with a chapter on the general principles governing pattern formation. Why do so many different physical phenomenon produce very similar patterns?

One theme we can see throughout this book is an argument against the gene-centric reductionism in modern biology. That the presence of some frequently repeating mathematical patterns in the nature like reaction-diffusion systems, fractals, spirals that can be generated by Fibonacci ratios, suggests some physical determinism in morphogenesis.

Highly recommended. some beautiful illustrations are provided and the author assumes no previous knowledge on the part of the reader.

DJ says

popped up in a paper on self-organizing circuits in the brain

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Adrian Herbez says

amazing book- really good overview of how physics and chemistry interweave with evolution to create patterns

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Nor-ashiah says

Interesting!

Nick Gogerty says

good summary of many concepts and constructs

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laurena says

In short, one of those books that helps set fundamental frameworks of understanding for the universe. I come back to it again and again. A study of "Pattern Formation in Nature" - Philip Ball looks at many types of patterns, from bubbles to honeycombs to stripes in animals, to fractal shorelines, to name just a few, and digs down into the underlying forces that give rise these patterns, often again and again in diverse natural environments. A bit dense at times for those not given to poring over mathematical or chemical equations in the midst of their prose, it nonetheless has such a compelling interlinked line of subject matter, that any deep interest in the "why" of the structural composition of the natural world will make this book a beautiful thing to visit many times over.

Scott Stensland says

solid foundation on complex systems, covers pattern formation in both biology, chemistry and physics

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Jaslyn says

took 3years and bees hives r c00l

Alex says

I tend to read this in dribs and drabs. Fascinating stuff.
