

Book Review

Freedom and Evolution: Hierarchy in Nature, Society and Science, by Adrian Bejan, Springer Nature. ISBN: 978-3-030-34008-7.

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This is an exceptionally entertaining and engaging book about freedom and evolution, with the subtitle hierarchy in nature, society, and science. In his new book, Adrian Bejan covers a wide range of topics such as thermodynamics, freedom and evolution, diversity and hierarchy, as well as science and freedom.

This highly original book has 11 chapters. The first chapter is Nature and Power. Adrian Bejan shows that nature consists of two systems. The first system is the one chosen by the human observer to analyze and discuss. It can be an open system where there is mass flow across the boundary or a closed system where there is no mass flow across the boundary, such as engines and brakes. The second system is the surroundings, or the environment, which opposes the flow system movement. The movement on the earth surface is due to power. The power is dissipated promptly into heat that is transmitted to the ambient.

In the second chapter, Adrian Bejan unveils the physics behind Economies of Scale. He shows that systems of flow tend to flow more easily by coming together into fewer and bigger systems. He gives several examples of systems integration. Conversely, all the moving things (e.g., rivers) do not follow this trend because all the movement on earth is on volumes and areas, not point to point.

In the third chapter, Adrian Bejan presents Hierarchy, which is natural and most needed to create a movement that evolves toward designs with greater access. The hierarchy is due to the Constructal Law. He gives several examples of hierarchy, including his own experience as a previous player in the Romanian National Basketball Team.

In Chapter 4, Adrian Bejan shows the physics basis of Inequality, which increases with increasing wealth. Inequality reduction calls for redistributive measures that reduce the wealthier's incentives

to produce wealth. This leads to an equilibrium between more equality and more wealth.

Social Organization and Innovation are the subjects of Chapter 5. Bejan shows that the organization evolves naturally as the movement of society members increases. When the society size increases, the organization becomes more hierarchical, with greater non-uniformity in the distribution of movement in the populated region.

Chapter 6 is dedicated to Complexity. Bejan describes Complexity as a difficult concept, such as turbulence, or chaos. At first, when persons knew a lot less than what we know today, complexity meant headache, fuzziness, difficulty, and why bother.

In Chapter 7, Discipline, Bejan puts together several disciplines such as geometry and thermodynamics. This chapter continues where Complexity chapter left off. To explore its discipline, the science of complexity can benefit from the example set by thermodynamics, which is a discipline with clear words, principles, and rules.

Diversity is Chapter 8. Bejan illustrates the birth of diversity from freedom, with examples from human evolution and spreading through science and technology. For example, he shows the diversification and spreading of engineering disciplines during the period 1700s–2000s.

In Chapter 9, Bejan shows that we can predict evolution from the physics law that governs the phenomenon of evolution. He gives examples of other laws that give us the power to predict, such as Newton's second law of motion and the second law of thermodynamics.

In Chapter 10, Diminishing Returns, Bejan shows that we can observe diminishing returns in evolving flow architectures, which have become "mature." Diminishing return is a global phenomenon, which accompanies evolution. When the evolving flow configuration is more mature, the improvements in the performance of the overall flow-access become smaller.

The book's last chapter is Science and Freedom. Science evolving itself in the direction of more freedom. Bejan shares memories of his professors when he was an undergraduate at MIT in the late 1960s. He details his recent investigation of the practice of plagiarism.

In summary, this book is highly recommended to readers of all ages, especially high school seniors and college students in search of their paths in life.