The Major Transitions in Evolution

John Maynard Smith, Ers Szathmry
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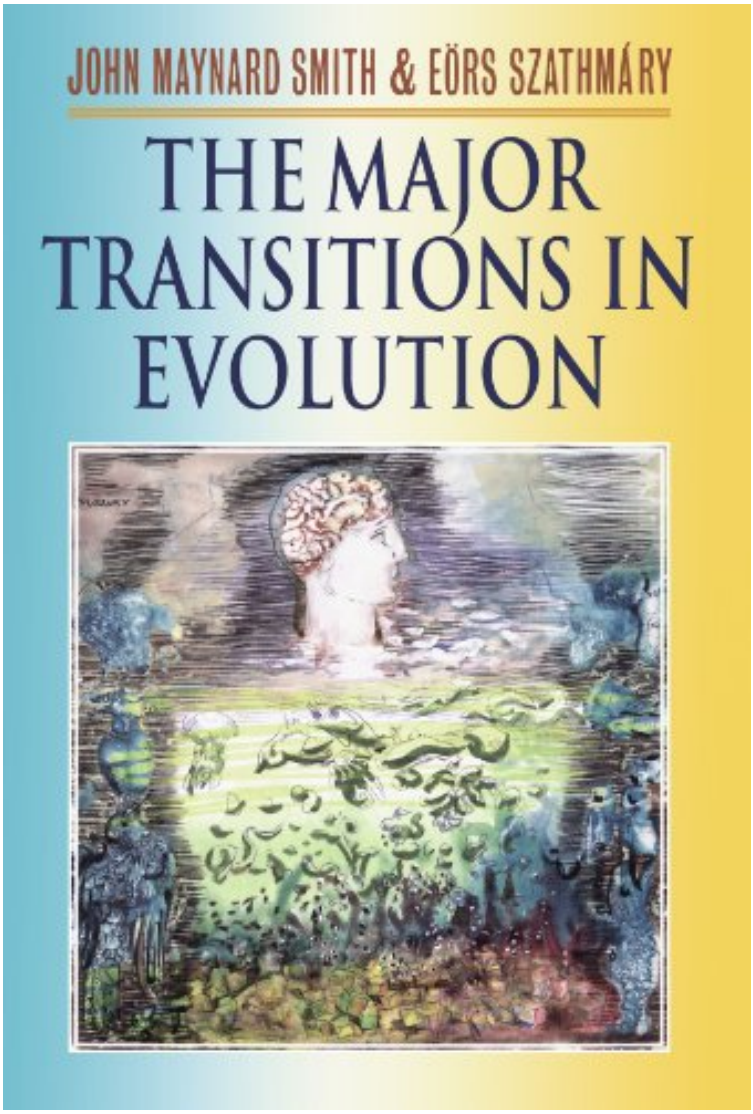

#951573 in Books 1998-02-12 1998-02-12Original language:EnglishPDF # 1 5.80 x .90 x 8.90l, 1.36 #File Name: 019850294X360 pages | File size: 16.Mb

John Maynard Smith, Ers Szathmry : The Major Transitions in Evolution before purchasing it in order to gage whether or not it would be worth my time, and all praised The Major Transitions in Evolution:

1 of 1 people found the following review helpful. A classicBy Gerson A Calgaroexquisite approach on the subject of evolution and its particulars, especially on ways to transition between the structures of the species. Recommended0 of 0 people found the following review helpful. play it againBy benjamin blomclassic smith, a turn on3 of 3 people found the following review helpful. Important But A Bit Dated; 4.5 StarsBy R. AlbinThis very interesting book is worth reading for 2 reasons. First, the authors' list of major transitions in evolution concisely identified a series of

particularly important research areas. Second, the authors' discussions of each of these transitions are nice analyses of information about and potential explanations for each of the transitions. The framework erected by the list of major transitions apparently has had durable value in guiding a good deal of research. Some of the individual sections are now unavoidably dated, as their has been significant additional research and real progress in some of these areas. The authors focus on major transitions that involve the development of or major changes in the way information is transmitted between generations, for example the emergence of chromosomes or sexual reproduction. Another major theme is the emergence of increasing complexity, in particular, the recurrent phenomenon of independently replicating entities evolving into entities that replicate only as part of a larger whole. Examples are the development of multicellularity and sociality. All the transitions are discussed in the context of evolutionary theory and selective advantage, which is key to understanding the transitions. For some of the transitions, such as the origin of compartmentalization, the discussions are about plausible reconstructions. For others, such as the evolution of sex, there is considerable data to discuss. While this book was written with biologists in mind (the authors also wrote a corresponding popular book), the arguments are laid out clearly and there are abundant, useful charts and diagrams to illustrate the authors' arguments.While it was written about 20 years ago, many aspects of this book have a strongly contemporary flavor. The authors discuss, for example, the origins of eukaryotes and the root phylogeny of life. An important discovery was recently made on this topic. In their section on development, there is a discussion of Turing's model for development, which the authors discuss as a theoretical construct. Evidence for the reality of Turing-like mechanisms in development was published in Science within the last couple of years. In their discussion of the development of human sociality, the authors suggest that important social mechanisms emerged initially in the context of kin selection and then were extended to non-kin. Again, this idea is supported by some interesting, recently published research. Maynard Smith and Szathmary clearly identified a series of important research areas and provide a nice way of thinking about these problems generally, a substantial achievement.

Over the history of life there have been several major changes in the way genetic information is organized and transmitted from one generation to the next. These transitions include the origin of life itself, the first eukaryotic cells, reproduction by sexual means, the appearance of multicellular plants and animals, the emergence of cooperation and of animal societies, and the unique language ability of humans. This ambitious book provides the first unified discussion of the full range of these transitions. The authors highlight the similarities between different transitions--between the union of replicating molecules to form chromosomes and of cells to form multicellular organisms, for example--and show how understanding one transition sheds light on others. They trace a common theme throughout the history of evolution: after a major transition some entities lose the ability to replicate independently, becoming able to reproduce only as part of a larger whole. The authors investigate this pattern and why selection between entities at a lower level does not disrupt selection at more complex levels. Their explanation encompasses a compelling theory of the evolution of cooperation at all levels of complexity. Engagingly written and filled with numerous illustrations, this book can be read with enjoyment by anyone with an undergraduate training in biology. It is ideal for advanced discussion groups on evolution and includes accessible discussions of a wide range of topics, from molecular biology and linguistics to insect societies.

"It spans the major transitions in evolution, starting with a prebiotic mix of free molecules and ending with the evolution of human language . . . . A splendid and rewarding tour de force."--NatureAbout the AuthorJohn Maynard Smith (1920-2004) was Emeritus Professor of Biology in the University of Sussex. Eors Szathmary is at the Institute for Advanced Study, Budapest.