



The Origins of Life: From the Birth of Life to the Origin of Language

By John Maynard Smith, Eors Szathmáry

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In this fascinating book, John Maynard Smith and Eors Szathmáry present an original picture of evolution. They propose that during evolution there have been a number of major transitions in the way in which information is passed between generations. These transitions include the appearance of the first replicating molecules, the emergence of co-operative animal societies, and the unique language ability of humans. Containing many new ideas, this book is contemporary biology on the grandest scale, from the birth of life to the origin of language.

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Editorial Review

Amazon.com Review

Life is a long, strange trip, and in *The Origins of Life*, John Maynard Smith and Eörs Szathmáry blast you through its three-and-a-half-billion-year history at breathtaking pace.

Life, we learn, is information, transmitted in ever more intricate ways across the generations. Self-replicating chemicals walled themselves into cells, organized themselves into regimented communities of chromosomes, swapped notes with other populations to become sexual, cloned themselves to form multicellular colonies called organisms, got together with other colonies to form societies, and, eventually, in the case of one particular ape, developed the ability to put this whole story down on paper.

For those evolutionists brought up on the theory of "red queens" and "self genes," *Origins* provides a complementary crash course in the practical nuts-and-bolts biology behind the headlines. The authors describe the technical problems involved in the transition from one stage to another, and explain the ingenious and often fortuitous steps that natural selection took to overcome them. For example, the rigid walls of the first cells gave way to more flexible membranes that could engulf food particles and incorporate "little organs" such as mitochondria. A "cytoskeleton" of filaments and tubules was needed to maintain the cell's integrity, and--presto!--this structure was the perfect motorway for intracellular traffic, ideal for shearing the cell apart during cloning, and provided the earliest means of locomotion, such as the tail of sperm.

With this attention to detail, the book requires careful reading--but it's worth it. Maynard Smith and Szathmáry's book makes you realize just how lucky you are to be alive. --*Oliver Curry, Amazon.co.uk*

From Publishers Weekly

How did life on Earth go from individual molecules in hot carbon soup to viral spirals, to cells, to sex cells, to us? Smith and Szathmáry's *The Major Transitions in Evolution* (1995), addressed to other evolutionary biologists, responded to this question by reviewing Darwinism through the lens of information theory. The authors' new work brings nonexpert readers an "account of the evolution of complexity," of changes in the ways "genetic information... is stored, transmitted and translated." Smith and Szathmáry (professors, respectively, at the University of Sussex, England, and the Collegium Budapest, Hungary) apply their model to periods in the history of life, from the era of the first self-replicating molecules to the advent of chromosomes and thence to cells and cell walls, sexual differentiation and mating, symbiosis between species, animal societies and symbolic speech. Directing their interest in information transfer to biological processes and epochs, they cover topics ranging from the definition of life (why do we not call fire "alive"?) to the basis of tribal warfare. Moving speedily from epoch to epoch, fueled by a few important concepts (such as the division of labor) and explaining all the genetics they use, Smith and Szathmáry show "just how difficult it has been to evolve complex organisms whose genes co-operate rather than compete." A chapter on sex offers several theories of how it arose; a later chapter examines the origins of our built-in ways of understanding and generating grammatical sentences in our native languages. Compact, dense, formidable yet accessible, this book exposes readers to the cutting edge in theoretical evolutionary biology. Copyright 1999 Reed Business Information, Inc.

From Scientific American

Maynard Smith and Szathmáry are intrigued by the complexity of organisms. "The more we know about

them--their biochemistry, their anatomy, their behavior--the more astonishing are the detailed adaptations that we discover. How could all this complexity have arisen?" Darwin's theory of evolution by natural selection cannot alone account for it; that theory predicts only that organisms will get better at surviving and reproducing in their current environment, not that they will become more complex. The answer, according to the authors, is that organisms increase in complexity as a result of "a small number of major changes in the way in which information is stored, transmitted, and translated." Maynard Smith (emeritus professor of biology at the University of Sussex) and Szathmáry (at the Institute for Advanced Study in Budapest) call these changes "the major transitions" and cite eight of them in evolutionary history, beginning with replicating molecules and ending--at least for now--with the development of human language. In explaining the transitions to a general readership, the authors provide a clear-eyed review of a large part of modern biology.

Users Review

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